Sun Grant Initiative

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Minnesota Renewable Energy Roundtable:
Renewable Chemicals
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• A consortium of the nation’s land-grant universities addressing national bioenergy and bioproduct challenges at the local level and on a regional scale

• Supporting research and educational activities in the development of:
  • Biobased transportation fuels
  • Biobased products

• Authorized in 2002, 2008, and 2014 Farm Bills
Five Regional Sun Grant Centers

- Oregon State University (OSU)
- San Diego State University (SDSU)
- Pennsylvania State University (Penn State)
- Oklahoma State University (OSU)
- University of Hawai‘i at Mānoa
Research across the bioenergy value chain

Sun Grant Initiative

- Feedstock Development
- Feedstock Logistics
- Conversion Processes
- Economics and Policy

End Products: Biofuels, Bioproducts, and Biopower

Distribution
End Use

- Biofuels: rail, truck, pipelines, biodiesel, fuel pump
- Bioproducts: rail, truck
- Biopower: transmission lines

SUSTAINABILITY
U.S. Department of Agriculture
- Sustainable Feedstock Production
- Biobased Products
- Regional Competitive Grants

U.S. Department of Energy
- Regional Feedstock Partnership
- Biobased Products
- Regional Competitive Grants

U.S. Department of Transportation
- Renewable Transportation Fuels
- Regional Competitive Grants

Feedstock Development
- Plant Breeding
- Agronomic Management
- Sustainable Production
- Equipment Technology

Logistics
- Feedstock Production
- Harvest, Delivery, and Storage
- Transportation
- Pre-Processing

Conversion Processes
- Conversion Technologies
- Cost of Production
- Biological Conversion
- Thermochemical Conversion

System Analysis
- Industrial Ecology
- Feedstock Transport
- Biofuels Transport
- Delivery Infrastructure

Economics, Marketing, and Policy
- Economics and Policy
- Impact on Food, Feed, and Fiber Markets
- Economic Return
- Production Economics

Environmental Impacts
- Life Cycle Analysis
- Greenhouse Gas Emissions
- Carbon and Energy Balance
- NOx Emissions

- **North Central**: Federal Funding: 14, Cost Share: 15
- **Northeast**: Federal Funding: 24, Cost Share: 11
- **South Central**: Federal Funding: 13, Cost Share: 15
- **Southeast**: Federal Funding: 24, Cost Share: 11
- **Western**: Federal Funding: 14, Cost Share: 15

Total: Federal Funding 77, Cost Share 77
Regional Feedstock Partnership (2008-2016)

- Sun Grant/Land Grant/DOE/USDA-ARS partnership
- Funding
  - DOE—$20+ million
  - Cost Share—$5+ million
- Feedstock field trials
  - Woody species
    - Poplar, willow
  - Corn stover
  - Small grain residue
  - Herbaceous crops
    - Energycane, Sorghum, CRP
    - Miscanthus, Switchgrass
Regional Feedstock Partnership (2008-2016)

➢ National yield potential maps for several biomass species
➢ Publicly available data sets
Sun Grant Summary

• Broad scope of projects across bioenergy value chain
• Primarily early stage projects that may not have been funded in other programs
• Projects have often been catalyst for further research activity
• Strong linkage to industry
• Gregg Johnson—University of Minnesota
  • Feedstock development for renewable chemicals and other bioenergy
• Goutham Vemuri—Sasya LLC
  • Developing renewable chemicals from biomass sugars
• Qi Hua Fan—Michigan State University
  • Energy storage options using renewable products