

## **Background Information on Richard G. Nelson**

Richard Nelson is an associate professor with Kansas State University and also serves in the university's center for Sustainable Energy specializing in bioenergy assessment, supply, markets, and sustainability issues. Dr. Nelson graduated with degrees in engineering from Oklahoma State University.

He is also principal of Enersol Resources, a private energy and environmental consulting firm. He has over 20 years experience in the bioenergy field and has served as a consultant to the National Renewable Energy Laboratory, Oak Ridge National Laboratory, Idaho National Laboratory, Western Governors' Association, and the National Biodiesel Board.

## **Current Projects and Funding Sources**

*Kansas Biomass Resource and Supply Assessment.* Kansas Bioscience Authority.

*Investigation of Select Land-use Activities and Ecosystem Conditions Pertaining to Large-scale Biofuels Production and Implementation in the Northern Great Plains and Midwest.* US Environmental Protection Agency.

*Enhanced Resource Assessment for the Western Governors' Association.* Western Governors' Association.

## CURRICULUM VITA

### I. PERSONAL DATA

Name: Richard G. Nelson  
Address: 133 Ward Hall  
Director and Department Head  
Engineering Extension and  
Team Leader, KSU Center for Sustainable Energy  
Kansas State University (KSU)  
Manhattan, KS 66506-2508  
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### II. EDUCATION

Ph.D. Agricultural Engineering, Oklahoma State University, 1989  
M.S. Mechanical Engineering, Oklahoma State University, 1982  
B.S. Mechanical Engineering, Oklahoma State University, 1981

### III. ACADEMIC EXPERIENCE

2003 - Present Director and Department Head, Engineering Extension, KSU  
2004 – Present Associate Professor, Biological and Agricultural Engineering,  
KSU  
1989 - 2003 Assistant Professor, Engineering Extension, KSU

### IV. INDUSTRIAL AND OTHER NON-ACADEMIC EXPERIENCE

2008 – present Member, International Energy Agency, Task 40 - Sustainable  
International Bioenergy Trade  
2007 – present Member, Western Governors' Association – Transportation  
Fuels for the Future – Creating a Transportation Fuels Policy  
Roadmap for the West  
2005 – 2006 Member, Western Governors' Association – Clean and  
Diversified Task Force (Biomass Energy)  
2006 - Member, Kansas Biomass Taskforce (Governor Appointee)  
2004 – 2007 Member, Kansas Energy Council (Governor Appointee)  
2000 – present Principal, [Enersol Resources](#), Manhattan, KS

### V. ACADEMIC AREAS OF SPECIALIZATION, COURSES TAUGHT AND NEW COURSES DEVELOPED

none

### VI. RESEARCH INTERESTS

- Renewable energy resource assessment and sustainable utilization
- Energy and environmental analyses of integrated energy resources and systems

## VII. GRANTS AND CONTRACTS

### Proposal/Principal Investigators/Funding Agency/Year/Amount

<i>Kansas Biomass Resource and Supply Assessment.</i> (R. Nelson, M. Langemeier, J. Williams, D. Rogers, D. Wang, C. Rice, S. Staggenborg, J. Blair, and P. Pfromm). Kansas Bioscience Authority, 2008.	\$300,000
<i>Regional Biomass Feedstock Partnership – Biomass Residue Removal.</i> (R. Nelson, D. Presley) U.S. Department of Energy SunGrant Program, 2008.	\$72,000
<i>Investigation of Select Land-use Activities and Ecosystem Conditions Pertaining to Large-scale Biofuels Production and Implementation in the Northern Great Plains and Midwest.</i> (R. Nelson) U.S. Environmental Protection Agency, 2008.	\$100,000
<i>Extension Network on Bio-based Renewable Energy.</i> (R. Nelson). USDA Cooperative States Research Education and Extension Service, 2007.	\$10,000
<i>KSU Center for Sustainable Energy – Targeted Excellence Program.</i> (M. Rezac, R. Madl, R. Nelson). Kansas State University, 2007.	\$750,000
<i>Energy Consumption and Associated Carbon Emissions Analysis for National Agriculture Practices – Phase 3.</i> (R. Nelson). U.S. Department of Energy, 2005.	\$103,394
<i>Strategic Development of Biomass in the Western States -Development of Supply Scenarios Linked to Policy Recommendations.</i> (R. Nelson). Western Governors’ Association, 2007.	\$49,903
<i>U.S. Speaker and Specialist Grant – Renewable Energy in Bulgaria (Sofia, Bulgaria).</i> (R. Nelson) United States Department of State, 2006.	\$3,136
<i>Proposal for Implementing Biomass Energy Expansion in the Western Governors’ Association Region</i> (R. Nelson) Western Governors’ Association, 2006.	\$50,000
<i>Energy Consumption and Associated Carbon Emissions Analysis for National Agriculture Practices – Phase 2</i> (R. Nelson) U.S. Department of Energy, 2005.	\$96,394

<i>Agriculture Benefits/Costs Resulting from a Greenhouse Gas Cap-and-Trade System.</i> (R. Nelson, J. Williams, C. Rice). Environmental Defense Foundation, 2005.	\$50,000
<i>Renewable Energy and Environmental and Pollution Trading Credits –Effect on Kansas Renewable Energy Development – Phase II</i> (R. Nelson, S. White) U. S. Department of Energy, 2005.	\$35,000
<i>State of Kansas Energy Research Database</i> (R. Nelson, S. White, A. Barkley) Kansas, Inc., 2005.	\$15,000
<i>Kansas Energy Extension Service</i> (R. Nelson, B. Snead) U.S. Department of Energy, 2005.	\$45,000
<i>Energy Consumption and Associated Carbon Emissions Analysis for National Agriculture Practices – Phase 1</i> (R. Nelson) U.S. Department of Energy, 2005.	\$93,349
<i>Renewable Energy and Environmental and Pollution Trading Credits –Effect on Kansas Renewable Energy Development – Phase I</i> (S.White, R. Nelson) U. S. Department of Energy, 2005.	\$28,228
<i>Comprehensive Environmental Assistance Program</i> (R. Nelson) Kansas Department of Health and Environment, 2004.	\$385,000
<i>Kansas Energy Extension Service</i> (R. Nelson and B. Snead) Kansas Corporation Commission, 2004.	\$45,000
<i>Renewable Energy Economic Impact for Kansas – Phase 1</i> (R. Nelson) Kansas Department of Commerce, 2004.	\$10,000
<i>National Carbon Sequestration Database and Geographic Information System – NATCARB</i> (R. Nelson, C. Rice, S. Staggenborg, J. Williams) United States Department of Energy, 2004.	\$49,941
<i>USDA Biodiesel Fuel Education Grant Program</i> (R. Nelson) USDA and the National Biodiesel Board. 2003.	\$21,000
<i>Pollution Prevention Incentives for States (PPIS) Program</i> (R. Nelson) United States Environmental Protection Agency, 2003.	\$120,000
<i>Tall Tower Wind Data Collection</i> (R. Nelson, M. Hosni) Kansas Corporation Commission, 2003.	\$13,363
<i>Comprehensive Environmental Assistance Program</i> (G. Meyer, R. Nelson) Kansas Department of Health and Environment, 2003.	\$391,197

<i>Kansas Energy Extension Service</i> (G. Meyer, R. Nelson) Kansas Corporation Commission, 2003.	\$45,000
<i>Crop Rotations to Protect Water Quality in Priority Watersheds</i> (R. Nelson, M. Langemeier, J. Williams, D. Devlin, D. Fjell) Kansas Department of Health and Environment, 2002.	\$154,000
<i>Energy-Profit Ratio Analysis for Kansas Agriculture and Bioenergy Costs</i> (R. Nelson) Kansas Corporation Commission, 2002.	\$15,000
<i>Fuel Cell Fact Sheet</i> (R. Nelson) Kansas Corporation Commission, 2002.	\$5,000
<i>Kansas Biomass Energy Resource Assessment</i> (R. Nelson) Kansas Corporation Commission, 2002.	\$37,500
<i>Kansas Pollution Prevention Enhancement Program</i> (R. Nelson, S. Davis, N. Larson) Kansas Department of Health and Environment, 2002.	\$110,000
<i>Crop Rotations to Protect Water Quality – Miami County</i> (R. Nelson, M. Langemeier, D. Devlin, D. Fjell) Kansas Department of Health and Environment, 2001.	\$46,000
<i>Kansas Pollution Prevention Enhancement Program</i> (R. Nelson) Kansas Department of Health and Environment, 2001.	\$70,000
<i>Carbon Sequestration and Methane Mitigation, and the Potential for Economic Enhancement in Kansas</i> (R. Nelson) Kansas Corporation Commission, 2000.	\$4,000
<i>Comprehensive Environmental Assistance Program</i> (R. Nelson, R. Green, S. Davis, N. Larson, B. Johnson) Kansas Department of Health and Environment, 2000.	\$369,000
<i>Demonstration of Sediment Load Reduction into Perry Reservoir through Selective Switchgrass Plantings in the Delaware River Basin – Part 2</i> (R. Nelson) Kansas Department of Health and Environment, 2000.	\$13,000
<i>Water Quality Profit Optimization, Part 3</i> (R. Nelson, M. Langemeier) Kansas Department of Health and Environment, 2000.	\$51,188

<i>Demonstration of Sediment Load Reduction into Perry Reservoir through Selective Switchgrass Plantings in the Delaware Basin</i> (R. Nelson, J. King) Kansas Department of Health and Environment, 1999.	\$13,000
<i>Environmental and Economic Analysis of Switchgrass Production for Water Quality Improvement in Northeast Kansas</i> (R. Nelson, J. King) Kansas Department of Health and Environment, 1999.	\$12,000
<i>Plant 1,000 to 2,000 Acres of Switchgrass in the Perry Reservoir Basin for Co-firing at the Jeffrey Energy Center and Evaluation of Environmental Benefits</i> (R. Nelson, J. King) Kansas Corporation Commission, 1999.	\$22,694
<i>Water Quality Profit Optimization Part 2</i> (M. Langemeier, R. Nelson) Kansas Department of Health and Environment, 1999.	\$64,868
<i>Assessment and Economic Feasibility of Municipal Solid Waste-Generated Methane as an Alternative Energy Source in Kansas</i> (R. Nelson) Kansas Corporation Commission, 1998.	\$19,357
<i>Reducing Bioenergy Cost by Monetizing Environmental Benefits of Reservoir Water Quality Improvements from Switchgrass Production</i> (R. Nelson, J. King) Kansas Corporation Commission, 1998.	\$35,000
<i>Reducing Bioenergy Cost by Monetizing Environmental Benefits of Reservoir Water Quality Improvements from Switchgrass Production</i> (R. Nelson, J. King) Western Regional Biomass Energy Program, 1998.	\$75,000
<i>Prestige, Inc. and Riley County/City of Manhattan Wood Waste Assessment and Utilization</i> (R. Nelson, G. Meyer) Kansas Corporation Commission, 1997.	\$20,000
<i>SODAR Wind Resource Data Collection</i> (R. Nelson, J. King, M. Hannifan) Kansas Electric Utilities Research Program, 1997.	\$20,000
<i>Waste Characterization Study and Wood Waste Assessment and Utilization Study</i> (R. Nelson) Board of Commissioners of Riley Co., Kansas, 1997.	\$71,500
<i>Bioenergy Assessment and Feasibility Analysis for Kansas</i> (R. Nelson) Oak Ridge National Laboratory, 1996.	\$10,000
<i>Economic Feasibility Study Addressing Livestock Manures as an Alternative Energy Source with Pollution Prevention Benefits</i> (D. Matteson, R. Nelson) Western Regional Biomass Energy Program, 1996.	\$24,990

<i>Electric Power Derived from Biomass and Waste Feedstocks for Kansas Electric Utilities</i> (R. Nelson, J. King, M. Hannifan) Kansas Electric Utilities Research Program, 1996.	\$41,500
<i>Bioenergy Feasibility Analysis</i> (R. Nelson) KSU Foundation, 1995.	\$19,100
<i>Economic Feasibility of Energy Production from Livestock Manures</i> (R. Nelson, D. Matteson) KSU Foundation, 1995.	\$9,316
<i>Economic Feasibility of Livestock Manures as an Alternative Energy Source with Pollution Prevention Benefits</i> (R. Nelson, D. Matteson) Kansas Electric Utilities Research Program, 1995.	\$5,000
<i>Economic Feasibility of Livestock Manures as an Alternative Energy Source with Pollution Prevention Benefits</i> (R. Nelson, D. Matteson) Kansas Corporation Commission, 1995.	\$35,000
<i>Greenhouse Gas Emission Inventory for the State of Kansas</i> (R. Nelson, J. Waters) Kansas Corporation Commission, 1995.	\$25,000
<i>Livestock Manures-to-Electricity</i> (R. Nelson, D. Matteson) Kansas Department of Health and Environment, 1995.	\$10,000
<i>Photovoltaic System Design Software Assessment</i> (G. Simons, R. Nelson) Kansas Electric Utilities Research Program, 1995.	\$13,324
<i>Economic Development through Biomass Systems Integration</i> (R. Nelson, M. Langemeier, P. Ohlenbush, G. Naughton) Kansas Electric Utilities Research Program, 1994.	\$42,825
<i>Economic Development through Biomass Systems Integration</i> (R. Nelson, M. Langemeier, P. Ohlenbush, G. Naughton) KSU Foundation, 1994.	\$20,684
<i>Economic Development through Biomass Systems Integration</i> (R. Nelson) Kansas Electric Utilities Research Program, 1994.	\$33,364
<i>Field Test Using Tallowate as Substitute Diesel Fuel</i> (R. Nelson) Kansas Value-Added Center, 1994.	\$5,000
<i>Statewide Plan for the Utilization of Scrap Tires in Kansas</i> (R. Nelson, M. Hossain) Kansas Department of Transportation, 1993.	\$22,000

<i>INTERCHEM Tallow Feasibility Project</i> (R. Nelson) Interchem Industries, Inc., 1992.	\$2,000
<i>Resource Assessment and Utilization of Crop Residues for Energy</i> (R. Nelson) United States Department of Energy, 1992.	\$24,950
<i>Tallow-Based Biodiesel Feasibility Analysis</i> (R. Nelson) Kansas Value-Added Center, 1992.	\$3,000
<i>Agribusiness Processing Residues</i> (R. Nelson) Electric Power Research Institute, 1991.	\$19,000
<i>Biomass Industry Profile</i> (R. Nelson) NEOS Corporation, 1991.	\$9,999
<i>Demonstration of Grain Cleanings as a Potential Biomass Energy Source in the State of Kansas</i> (R. Nelson, D. Matteson, R. Hayter) Kansas State Board of Agriculture, 1991	\$30,000
<i>Determination of Optimum Economical and Environmental Disposal Practices for Agribusiness Processing Residues in Kansas</i> (R. Nelson) Kansas Value-Added Center, 1991.	\$7,500
<i>Demonstration of Grain Cleanings as a Potential Biomass Energy Source in the State of Kansas</i> (R. Nelson, D. Matteson, R. Hayter) United States Department of Energy, 1991.	\$65,000

## VIII. PUBLICATIONS, BOOKS AND BOOK CHAPTERS

### BOOK CHAPTERS

Nelson, Richard G., Marie E. Walsh, and John J. Sheehan. "The Supply of Maize Stover in the Midwestern United States." *Agriculture as a Producer and Consumer of Energy*. Eds. Joe L. Outlaw, Keith J. Collins, and James A. Duffield. Cambridge: CABI Publishing, 2005. 195-204.

Nelson, Richard G. and Mustaque A.M. Hossein. "An Energetic and Economic Analysis of Using Scrap Tyres for Electricity Generation and Cement Manufacturing." *Recycling and Reuse of Used Tyres*. Thomas Telford Books, London. 2001. 119-127.

TECHNICAL PUBLICATIONS (refereed)**Primary Author**

Richard G. Nelson, Chad M. Hellwinckel, Craig C. Brandt, Tristram O. West, Daniel G. De La Torre Ugarte, and Gregg Marland. 2009. "Energy Use and Carbon Dioxide Emissions from Cropland Production in the United States, 1990-2004." *Journal of Environmental Quality*, Volume 38, pp. 418-425.

Nelson, R.G. and Mark D. Schrock. 2006. "Energetic and Economic Feasibility associated with the Production, Processing, and Conversion of Beef Tallow to a Substitute Diesel Fuel." *Biomass and Bioenergy*, Volume 30, Issue 6, pp. 584-591.

Nelson, R.G., James C. Ascough II, Michael R. Langemeier. 2006. "Environmental and Economic Analysis of Switchgrass Production for Water Quality Improvement in Northeast Kansas." *Journal of Environmental Management*, 79 pp. 336-347.

Nelson, R.G., Marie E. Walsh, John J. Sheehan, and Robin L. Graham. 2003. "Methodology to Estimate Removable Quantities of Agricultural Residues for Bioenergy and Bioproduct Use." *Applied Biochemistry and Biotechnology* 113 pp.0013-0026.

Nelson, R.G. 2002. "Resource Assessment and Removal Analysis for Corn Stover and Wheat Straw in the Eastern and Midwestern United States – Rainfall and Wind Erosion Methodology." *Biomass & Bioenergy*. Volume 22 pp. 349-363.

Nelson, R.G., J.D. Summers, and J.B. Solie. 1997. "Frequency and Moisture Content Effects on the Viscoelastic Characteristics of Soil." *Soil Technology*. 10, pp. 21-33.

Nelson, R.G., and R.A. Flores. 1994. "Kansas Agribusiness Processing Residues Survey." *Applied Engineering in Agriculture*. 10(5): 703-708.

Secondary or Collaborative Author

Pendell, D.L., J.R. Williams, S.B. Boyles, C.W. Rice, and R.G. Nelson. 2008. "Soil Carbon Sequestration Strategies with Alternative Tillage and Nitrogen Sources under Risk." Review of Agricultural Economics. Volume 29, Number 2. pp. 247-268.

Graham, R.L., R.G. Nelson, J. Sheehan, R.D. Perlack, and L.L. Wright. 2007. "Current and Potential U.S. Corn Stover Supplies." *Agronomy Journal*. 99: 1-11.

Pendell, D.L., J.R. Williams, C.W. Rice, R.G. Nelson, and S.B. Boyles. 2007. "Economic Feasibility of No-Tillage and Manure for Soil Carbon Sequestration in Corn Production in Northeast Kansas." Journal of Environmental Quality. Vol. 35, 2006.

Williams, J. R., R.G. Nelson, and M.L. Langemeier. 2005. The Impact of Higher Energy Prices on Great Plains Crop Farm Expenditures.” *Great Plains Research*, 15 (Spring 2005): pp. 135-152. Center for Great Plains Studies.

Williams, J.R., R.G. Nelson, M.M Claassen, and C.W. Rice. 2004. “Carbon Sequestration in Soil with Consideration of CO<sub>2</sub> Emissions from Production Inputs: An Economic Analysis.” *Environmental Management*. Published online: January 20, 2004.

Wagner, L.E. and R.G. Nelson. 1995. “Mass Reduction of Standing and Flat Crop Residues by Selected Tillage Implements.” *Transactions of the ASAE*. 38(2): 419-427.

Skidmore, E.L., and R.G. Nelson. 1992. "Small-Grain Equivalent of Mixed Vegetation for Wind Erosion Control and Prediction." *Agronomy Journal*. 84(1): 98-101.

#### TECHNICAL PUBLICATIONS (non-refereed)

*Biodiesel Handling and Use Guidelines – Fourth Edition*. National Renewable Energy Laboratory. September 2009. NREL/TP-540-43672. R. G. Nelson, Contributing Author. [www.nrel.gov/vehiclesandfuels/npbf/pdfs/43672.pdf](http://www.nrel.gov/vehiclesandfuels/npbf/pdfs/43672.pdf)

United States Department of Energy. *Congressional Report: Research and Development Challenges to Achieving Increased U.S. Biodiesel Sales (EISA 2007 – Section 221(a))*. 2008. R.G. Nelson, Contributing Author.

Western Governors’ Association. 2008. *Transportation Fuels for the Future – Biofuels Part II. WGA Biodiesel / Renewable Diesel Team – Biodiesel and Renewable Diesel*. R.G. Nelson, Task Force Chair. [http://www.westgov.org/wga/initiatives/transfuels/reports/Biofuel\\_Final\\_Part%20II.pdf](http://www.westgov.org/wga/initiatives/transfuels/reports/Biofuel_Final_Part%20II.pdf)

National Research Council. 2008. *Water Implications of Biofuels Production in the United States*. R.G. Nelson, Co-Author.

Western Governors’ Association. 2006. *Clean and Diversified Energy Initiative*. Biomass Task Force Report, R.G. Nelson, task force member/contributing author. <http://www.westgov.org/wga/initiatives/cdeac/Biomass-full.pdf>

Western Governors’ Association. 2006. *Clean and Diversified Energy Initiative*. Biomass Task Force Report, Supply Addendum, R.G. Nelson, task force member/contributing author. <http://www.westgov.org/wga/initiatives/cdeac/Biomass-supply.pdf>

Nelson, R.G., A. Barkley and S. White. 2006. *Energy Research Survey and Database for Kansas*. Kansas, Inc. Topeka, KS. <http://www.kansasinc.org/pubs/working/Energy%20Research%20and%20Database%20-%202006.pdf>

Nelson, R.G. 2004. *“Rainfall and Wind Erosion-Based Agricultural Crop Residue Retention and Removal Analysis - Resource Assessment for Selected Corn- and Wheat-based Single and Multi-year Cropping Rotations.”* Final report to the National Renewable Energy Laboratory, Golden, CO.

Sheehan, J., A., Aden, C. Riley, D. Lightle, K. Paustian, K. Killian, J. Brenner, R.G. Nelson, M. E. Walsh, J. Cushman. 2002. *“Is Ethanol from Corn Stover Sustainable?”* National Renewable Energy Laboratory, Golden, CO.

Nelson, R.G. 2002. *Soybean-based Biodiesel Resource Assessment.* Report to the South Dakota Soybean Research and Promotion Council, Sioux Falls, SD.

Nelson, R.G., J. Leatherman, S. Howell, A. Weber, and L. Tong. 2002. *Kansas Soybean-Based Biodiesel Macroeconomic Analysis.* Report to the Kansas Soybean Commission and the Kansas Corporation Commission – Energy Programs Division, Topeka, KS.

Nelson, R.G., and J. Leatherman. 2002. *South Dakota Soybean-based Biodiesel Macroeconomic Analysis.* Report to the South Dakota Soybean Research and Promotion Council, Sioux Falls, SD.

Nelson, R.G. 2001. *“Resource Assessment, Removal Analysis, Edge-of-Field Cost Analysis, and Supply Curves for Corn Stover and Wheat Straw in the Eastern and Midwestern United States. Rainfall and Wind-Induced Soil Erosion Methodology.”* Report to National Renewable Energy Laboratory, Golden, CO.

Nelson, R.G., and J. Ascough. 2001. *Environmental and Economic Analysis of Switchgrass Production for Water Quality Improvement in Northeast Kansas.* Report to the Western Regional Biomass Energy Program, Lincoln, NE.

King, J.E., J.M. Hannifan, and R.G. Nelson. 1998. *“An Assessment of the Feasibility of Electric Power Derived from Biomass and Waste Feedstocks.”* Kansas Electric Utilities Research Program, Topeka, KS and Western Regional Biomass Energy Program, Golden, CO.

Nelson, R.G., and G. Meyer. 1998. *“Use of Wood Wastes Generated at Prestige, Inc., as an Alternative Energy Source for Lafarge Corporation.”* Report to Kansas Corporation Commission, Topeka, KS.

Nelson, R.G., J. Waters, and S. Thangavadivelu. 1997. *“Greenhouse Gas Emission Inventory for the State of Kansas, Estimates for 1990.”* United States Environmental Protection Agency, Washington, D.C.

Matteson, D.K., and R.G. Nelson. 1997. *“Economic Feasibility and Pollution Prevention Benefits of Livestock Manure as an Alternate Energy Source.”* Report to Kansas Corporation Commission, Western Regional Biomass Energy Program, Kansas Department of Health and Environment and Kansas Electric Utilities Research Program, Topeka, KS.

Weber, A., S. Howell, and R.G. Nelson. 1996. "Kansas City Area Transportation Authority Tallow-Based Biodiesel Test." Final report to Western Regional Biomass Energy Program.

Nelson, R.G., and A. S. M. M. Hossain. 1995. "Statewide Plan for Utilization of Scrap Tires in Kansas – An Energetic and Economic Analysis of Using Scrap Tires for Electricity Generation and Cement Manufacturing." Kansas Dept. of Transportation. Topeka, KS.

Nelson, R.G. and M.D. Schrock. 1994. "Energetics and Economics of Producing Biodiesel from Beef Tallow Look Positive." United States Department of Agriculture-Economic Research Service, *Industrial Uses for Agricultural Materials*, Situation and Outlook Report, publication IUS-3.

Nelson, R.G., and R.A. Flores. 1993. "Compilation of Results Concerning the Kansas Agribusiness Processing Residues Survey." Final report submitted to Western Regional Biomass Energy Program, Kansas Value-Added Center, and Electric Power Research Institute.

Nelson, R.G., and M.D. Schrock. 1992. "Biomass Resource Assessment for the State of Kansas." Western Regional Biomass Energy Program, Golden, CO.

## **IX. TECHNICAL PRESENTATIONS**

### TECHNICAL CONFERENCES

*"Assessing Land Uses and Possible Sustainable Transition Paths to Biofuels Development."* The Impact of Indirect Land Use Change (ILUC). IEA Bioenergy Executive Committee. May 12, 2009. Rotterdam, The Netherlands.

*"Energy Balance – Animal Fats."* Presented at the National Biodiesel Conference. February 2 2009. San Francisco, CA.

*"US Policies for Biofuels - Sustainability criteria for biofuels and bio-energy."* Presentation at Sustainability certification for biofuels and bio-energy. 29 - 30 January 2009 Brussels, Belgium.

*"Energy Balance Basics."* Presented at the National Biodiesel Board Sustainability Summit. November 21 2008. St. Louis, MO.

*"Resource assessment needs, sustainability issues, and life-cycle standard associated with biofuels development."* Presentation at Agriculture's Role in the New Carbon Economy. Manhattan, KS. December 17-18, 2007

*"Energy, Biofuels, and Food Security with respect to Sustainable Production – Supply, Demand & Resources."* Presentation to 2007 Ukraine Biofuels Summit – Kyiv, Ukraine. December 7, 2007.

*“Biomass/Bioenergy Resource Assessment, Supply, and Sustainability Considerations.”*  
Presented at BioRefinery Market, Varna, Bulgaria. December 3, 2006.

*“Biodiesel – A Method for Diesel Particulate Matter Control in Underground Mines.”*  
Presented at the Mining Diesel Emissions Council, Toronto, Canada. October 8-11, 2006.

*“Methodology to Estimate Removable Quantities of Agricultural Residues for Bioenergy & Bioproduct Use with Supply of Corn Stover in the Midwestern United States and Herbaceous Energy Crop Environmental Analysis.”* Presented to Shell Research and Technology Centre Amsterdam, The Netherlands. May 31, 2005.

*“Evaluation of Potential Water Quality Improvement from Herbaceous Energy-Crop Production and Use as a Co-firing Fuel to Meet Renewable Portfolio Standard (RPS) Requirements”.* Presented at the World Renewable Energy Congress, Aberdeen, Scotland. May 26, 2005.

*“The Supply of Corn Stover in the Midwestern United States.”* Presented at the *Agriculture as a Producer and Consumer of Energy*. Sponsored by the *Farm Foundation and USDA’s Office of Energy Policy and New Uses*. June 24-25, 2004, Arlington, Virginia.

*“The Case for Perennial Oilseeds for Liquid Fuel Production.”* Presented at the Sun Grant Initiative Conference, Oklahoma City, Oklahoma, June 14-16, 2004.

*“Sustainability Issues with Agricultural Crop Residue Removal – Soil Erosion Considerations.”* Presented at Combustion Canada '03, Vancouver, Canada, September 21-24, 2003.

*“Methodology to Estimate Removable Quantities of Agricultural Residues for Bioenergy and Bioproduct Use.”* Presented at the 25<sup>th</sup> Symposium on Biotechnology for Fuels and Chemicals, Breckinridge, CO, May 2-5, 2003.

*“Resource Assessment and Removal Analysis for Corn Stover and Wheat Straw in the Eastern and Midwestern United States – Rainfall and Wind-Induced Soil Erosion Methodology.”* Presented at the World Renewable Energy Congress VII, Cologne, Germany, 29 June – 5 July, 2002.

*“An Energetic and Economic Analysis of Using Scrap Tyres for Electricity Generation and Cement Manufacturing.”* Presented at Recycling and Reuse of Scrap Tyres, Dundee, Scotland, March 2001.

*“Energy Input-Output Analysis of Herbaceous Energy and Short-rotation Woody Crop Systems.”* Presented at the 1996 National Solar Energy Society Annual Conference, Asheville, NC, April 13-18, 1996.

*“Economic Feasibility Analysis of Conventional and Dedicated Bioenergy Crop Production.”* Presented at Bioenergy '94 Conference, Reno, NV, October 2-6, 1994.

“*Potential Feedstock Supply and Costs for Biodiesel Production.*” Presented at Bioenergy '94 Conference, Reno, NV, October 2-6, 1994.

"*Herbaceous Energy Crop Production Feasibility Using Conservation Reserve Program Acreage.*" Presented at the 1994 National Solar Energy Society Annual Conference, San Jose, CA, June 1994.

"*Kansas Agribusiness Processing Residues Survey.*" Presented at the 1993 Food Environmental Industry Conference, Atlanta, GA, November 1993.

"*Energetic and Economic Feasibility Associated with the Production, Processing and Conversion of Beef Tallow to Diesel Fuel.*" Presented at the First Biomass Conference of the Americas, Burlington, VT, August 1993.

“*Problems and Potential Solutions Associated with Suspension Burning of Aspirated Grain Cleanings.*” Presented at the Biomass Combustion Conference, Reno, NV, January 28-30, 1992.

"*Estimation of Agricultural Crop Bioenergy Resource Availability in Kansas.*" Presented at the National Bioenergy Conference, Coeur d'Alene, ID, March 1991.

#### OUTREACH & SERVICE PRESENTATIONS

“Biomass Resource Assessment & Supply Analysis – Projects, Concerns, and Future Directions.” Presentation made to Research and Development, ConocoPhillips, Bartlesville, Oklahoma, October 29, 2007.

“Energy Analyses/Balances of Biodiesel.” Presented to the Select Joint Committee on Energy of the Kansas State Legislature. Topeka, Kansas. January 6, 2006

“Renewable Portfolio Standard (RPS) - Issues, Opportunities, Potential Strategies, and Future Action for Kansas.” Presented to the Select Joint Committee on Energy of the Kansas State Legislature. Topeka, Kansas. January 5, 2006

“Biodiesel – A domestic and renewable fuel for Kansas.” Presented to the Select Joint Committee on Energy of the Kansas State Legislature. Topeka, Kansas. December 14, 2005

“Renewable Energy - Resources, Benefits, & Issues.” Presented at the *Manure-to-Methane Symposium*. Garden City, Kansas. November 1, 2005

“Biodiesel - A renewable fuel to meet today’s and tomorrow’s energy needs in a clean and sustainable manner.” Presentation at *Refueling America*. Raleigh, NC. September 21, 2005.

“Energy & Environmental Awareness Education.” Glacial Hills Resource Conservation & Development Council. Sabetha, Kansas. May 11, 2005.

“Agricultural Biomass - Resources, Opportunities, and Constraints.” Presentation to the Western Governors’ Association Clean and Diversified Energy Advisory Committee Biomass Task Force. Denver, Colorado. April 14-15, 2005

“Energy and Environmental Awareness.” Kansas Board of Regents – Career and Technical Education Conference, Wichita, Kansas. January 24, 2005.

“Biodiesel – A Renewable Fuel to Meet Today’s and Tomorrow’s Energy Needs in a Clean and Sustainable Manner.” Mississippi Soybean Promotion Board. Merigold, MS. January 17, 2005.

“Kansas Renewable Energy Economic Impact Analysis.” Kansas Department of Commerce. Topeka, KS. December 9, 2004.

“Soy Biodiesel – Fueling Our Future.” Iowa Association of Electric Cooperatives, Des Moines, IA, April 7, 2004.

“Biodiesel for Kansas.” 10<sup>th</sup> Annual Meeting, County-Township Road Officials Meeting, Burlingame, KS, March 18, 2004.

“Energy, Renewable Energy and Wind Energy.” Wind Energy Symposium, Greater Morris County Development Corporation, Council Grove, KS, February 26, 2004.

“Overview of Wind Energy Development and Industry.” Kansas Governor Sebelius’ Wind and Prairie Task Force, Topeka, KS, February 20, 2004.

“Wind Energy Development in the Flint Hills.” Manhattan, KS, January 20, 2004.

“Role of Renewables in Electricity, Heating.” Kansas Summit on Natural Gas, Washburn University, Topeka, KS, October 2, 2003.

“Methodology to Estimate Removable Quantities of Agricultural Residues from Select Cropping Rotations.” USDA Symposium on Crop Residues, Omaha, NE, February 5, 2003.

“Agricultural Crop Residue Removal and Soil Erosion Considerations.” National Renewable Energy Laboratory, Golden, CO, December 1999.

“Energetic and Economic Feasibility Associated with the Production, Processing and Conversion of Beef Tallow to Diesel Fuel.” Foods, Feeds, and Products Cluster, Food for the 21<sup>st</sup> Century, University of Missouri, Columbia, MO, November 30, 1993.

## **X. EXTENSION/OUTREACH ACTIVITIES**

### Fact Sheets and Outreach Publications

“Fuel Cell Fact Sheet”

“Energy-Efficient Windows”

“Residential Insulation”

“Environmental Benefits of Carbon Sequestration: Facts about Carbon Cycle and Greenhouse Gases”

“Alternative Fuels May Hold Multiple Answers”

## **XI. NATIONAL PROPOSAL REVIEW COMMITTEES**

United States Department of Energy, Southeastern Biomass Energy Program, 1991, 1992

United State Environmental Protection Agency, Climate Change and Energy, 1997

United States Department of Agriculture, CSREES, 2000 and 2001

## **XII. GRADUATE STUDENTS**

MASTER'S THESES (Committee Member)

G. Khare (Mechanical Engineering) 2004

T. Alder (Agricultural Economics) 2000

T. Stuckey (Agricultural Economics) 1999

No Ph.D. committee service

## **XIII. PROFESSIONAL CONSULTING ACTIVITIES ([Enersol Resources](#))**

University of California, Davis, California and Idaho National Laboratory, Idaho Falls, ID

Western Governors' Association, Denver, CO

ConocoPhillips, Bartlesville, Oklahoma

Agri Bio-Institute, Sofia, Bulgaria

National Renewable Energy Laboratory, Golden, CO

Oak Ridge National Laboratory, Oak Ridge, TN

National Biodiesel Board, Jefferson City, MO

Oklahoma Corporation Commission, Oklahoma City, OK

MARC-IV, Kearney, MO

South Dakota Soybean Research and Promotion Council, Sioux Falls, SD

