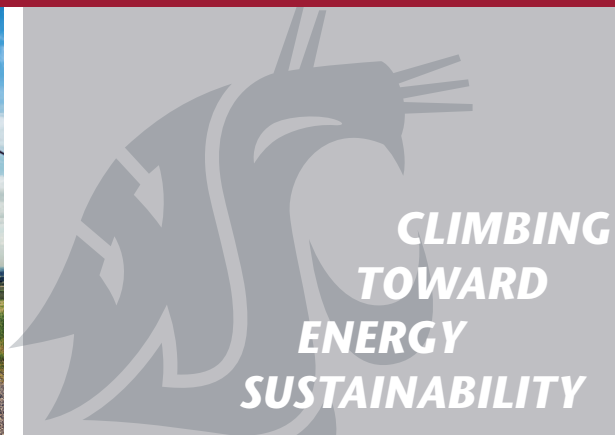




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NATIONAL EXTENSION ENERGY SUMMIT



CLIMBING
TOWARD
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2015 *Abstracts*

PRESENTED BY:
WASHINGTON STATE
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Talking Climate: A Roundtable Conversation on How Extension Educators Can Engage Audiences on Climate Change Issues and Adaptation and Mitigation Practices
Christopher Jones & Mark Apel

The Journal of Extension published a number of articles in 2014 pertaining to the issue of climate change and the role for Extension educators, including Burnett et al., 2014; James, Estwick & Bryant, 2014; Tyson, 2014; Morris et al., 2014, and Jones & Lenart, 2014. It is evident that Extension audiences, as well as Extension educators, are like the Global Warming's Six Americas (Leiserowitz, Maibach, Roser-Renouf, & Hmielowski, 2012, Wojcik, Monroe, Adams & Plate, 2014) in that they can be segmented into a scale of six categories from Alarmed to Dismissive. A general theme that emerged from the above articles is the need for Extension educators to be well versed in the science while using appropriate outreach methods that can help audiences with different paradigms about climate change to be more open to learning and adopting best management practices. Participants will engage in a facilitated discussion centering on the approach proposed in Morris et al., 2014: "• Develop a tiered approach to address clients' varied needs: provide explicit climate change information when solicited and otherwise emphasize resource health and resilience to future uncertainty; • Concentrate efforts on clients who lack strong opinions about climate change; and • Focus on local climate change impacts and specific threats...." We ask, "Is there general consensus for this approach?", "Does this approach relate well to Extension Energy education?", "How would you suggest changing or refining this approach to be more effective?" and "What are the next steps?" Our intended outcome is to establish preliminary focus group understanding of whether emerging JOE literature is indeed being accepted as Extension practice and how it may be improved, adapted and/or disseminated for Extension Energy education programs and as a Cooperative Extension system-wide response to climate change.

Christopher Jones

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Christopher Jones is an Associate Extension Agent at the University of Arizona in Gila County, Arizona. His background includes a Bachelor of Science in Forestry (Northern Arizona University, 1987) and Master of Science in Renewable Natural Resources (University of Arizona, 1995). He served as a Peace Corps Volunteer in Guatemala and as Territorial Forester in American Samoa before becoming a Cooperative Extension Agent. He conducts programs in horticulture and natural resources, including programming addressing climate change impacts on natural resources since 2003. Chris leads the Association of Natural Resources Extension Professionals' Climate Science Initiative (sites.google.com/site/anreclimate).

Mark Apel

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Mark Apel is an Area Extension Agent in Community Resource Development with the University of Arizona Cooperative Extension in southeastern Arizona where he implements programs in land use planning, sustainable development, small acreage landowner assistance and regional economic development. Mark has been a Peace Corps Volunteer (Morocco), worked for the National Park Service and the Nature Conservancy, and as a private consultant and a county planner. Mark is a member of the National Network for Sustainable Living Education (NNSLE). He holds a B.S. in Environmental Resource Management (Pennsylvania State University, 1982) and an M.A. in International Affairs (Ohio University, 1987).

BREAKOUT SESSION 1

Track 2 - Communicating Energy through Extension

APRIL 8, 2015
11:00AM - 12:30PM

Building Bioenergy Literacy

Moderator - Cary Weiner, Colorado State University

Smart Lighting Strategies for Your Home

Marsha G. Alexander

Lighting is one of the most overlooked elements of design in our homes. Based on research from the US Department of Energy, lighting can account for up to 15% of a family's total residential utility bill. Today there are many exciting new lighting options available to develop functional and attractive environments. With recent governmental manufacturing requirements, many of the old lamps(bulbs) are no longer available for consumers. Purchasing lighting products is sometimes confusing for consumers who are not familiar with terms and descriptions found on new packaging. This session will provide Extension educators with comprehensive program resources that cover the newest consumer information and trends in residential lighting. The program can be adapted to a wide variety of Extension audiences. Intended audiences include homebuyers, renters, seniors, high school, and middle school students. Among the resources to be shared is the Smart Lighting Strategies for Your Home PowerPoint presentation and support materials. During this session, special emphasis will focus on lighting selection and quantity of light sources, terminology, placement, energy management, and color rendition, all relating to designing a functional and quality environment. LEDs (light emitting diodes), and CFLs (Compact Fluorescent Lighting) will be discussed in detail.

Each educator who attends the training will receive a PowerPoint version of Smart Light Strategies for your Home for their program use. The presentation includes informational note pages for the educators. The program reflects well documented, research based information, and "best practices" in residential lighting management and design.

The Smart Lighting Strategies for the Home program has resulted in the collaboration and sustainability of several key urban partnerships. One of the outcomes was the recent publication of a collaborative resource booklet that has been utilized by thousands of metropolitan residents in Kansas City.

Marsha G. Alexander

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Headquartered in Kansas City, Marsha G. Alexander serves as a Housing and Environmental Design Specialist with University of Missouri Extension. Her work is focused on consumer programs in housing, and environmental issues. In 2008-2010, Alexander served as national chair of the lighting work group for eXtension's Home Energy Community of Practice.

Marsha began her career as a residential and contract interior designer. She earned both B.S. and B.F.A. degrees from Western Carolina University. She received her M.S. degree from the University of Tennessee. Alexander earned the rank of Extension Professional through the University of Missouri. She holds the Healthy Housing Specialist Certification through the National Environmental Health Association.

BREAKOUT SESSION 1

Track 2 - Communicating Energy through Extension

APRIL 8, 2015
11:00AM - 12:30PM

Building Bioenergy Literacy

Moderator - Cary Weiner, Colorado State University

Fuel Literacy

F. John Hay

Ethanol and Biodiesel have both positive and negative impacts on gasoline and diesel fuel. Many consumers have strong negative feelings related to biofuels. Consumers can feel confident of their fuel purchases when they understand how biofuels such as ethanol and biodiesel change the properties of the fuel. This presentation will detail how ethanol changes gasoline and how biodiesel changes diesel fuel. This presentation will help extension educators in their discussions related to ethanol and biodiesel by giving them the knowledge to say what properties of the biofuel are positive and which are negative with an emphasis on how to avoid the negative.

F. John Hay

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F. John Hay is an Extension Educator for the University of Nebraska Lincoln Extension. His focus is Energy and Biofuels. John has degrees in Agronomy from the University of Nebraska and Texas A&M University. Extension interests include bioenergy crops and renewable energy production. John has ten years of experience teaching agronomy and energy topics including five years teaching undergraduate course in Energy Science.

From the Forest to the Classroom: Energy Literacy as a Co-Product of Biofuels Research

Justin Hougham

The Northwest Advanced Renewables Alliance (NARA) is a biofuel research project that includes a holistic educational approach to energy literacy. NARA research is focused on woody biomass as a feedstock for biofuels and associated co-products, particularly in the forested areas of the U.S. Pacific Northwest. Extending beyond the science of biofuels, the NARA project examines many social elements of our energy economy, including education. Projects that can combine research and connections to educational venues provide excellent opportunities to expand the impact of grant funded proposals. Keys to making this possible include coordination across disciplines, interpretation of research results, and research processes in the field coupled with investment into integrated educational strategies within the project. This presentation outlines elements of the NARA approach to energy literacy, offering strategies for approaches to broader impacts in projects beyond the energy sector. Developing sustainable alternatives to conventional energy sources is an important 21st century challenge, one that will require a future workforce prepared to succeed in the bioenergy sector. Moving education forward at the speed of research will require a transformational shift in academic approaches, away from entrenched disciplinary specialization and towards pedagogies rooted in authentic, experiential learning and real-world issues (Hougham, et al 2012). The overarching goal of the education component of this project is to recruit, motivate, and train students to become next-generation bioenergy professionals by transforming bioenergy-based education. We achieve this goal by introducing bioenergy literacy in many venues where students and stakeholders can engage with research in progress. The potential outlined here for integrated and holistic educational approaches for multidisciplinary grant-funded work stretches beyond energy literacy, offering a framework that could be used in a variety of large-scale research programs.

Justin Hougham

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Dr. R. Justin Hougham is an assistant professor at the University of Wisconsin-Extension and Director of Upham Woods Outdoor Learning Center where he supports the delivery of a wide range of science education topics for K-12 students, graduate students, and in-service teachers. Justin is also an energy literacy researcher with the Northwest Advanced Renewables Alliance. Justin's scholarship is in the areas of place-based pedagogies, STEM education, energy literacy, and education for sustainability.

BREAKOUT SESSION 1

Track 2 - Communicating Energy through Extension

APRIL 8, 2015
11:00AM - 12:30PM

Building Bioenergy Literacy

Moderator - Cary Weiner, Colorado State University

On-Farm Biodiesel

Chris Callahan

Motivated by high and increasingly volatile fuel prices, several farms in Vermont began experimenting with on-farm biodiesel production in 2005. In the words of John Williamson, one partnering farm, "All of our farms were producing our own fuels a hundred years ago, we're just getting back to that model and doing it with a liquid fuel instead." These farms have expanded their efforts to include growing oilseeds, pressing on the farm, producing livestock meal, processing fuel in larger batches and also exploring the culinary food oil market. UVM Extension has partnered with farmers in this work providing agronomic and crop variety research, engineering support and education and outreach opportunities.

This presentation will summarize our community's efforts toward sustainable, economic and high quality fuel production from farm inputs. In summary, even at relatively moderate yields and at small scales of production, Vermont's farm-based biodiesel enterprises are producing fuel for approximately \$2.30-2.50 per gallon, with a net energy return of 3.6-5.9:1, and net carbon avoidance of 1,984-3,227 pounds per acre per year. Interestingly, scale of production is not a significant factor in terms of carbon avoidance. Biodiesel can be produced on Vermont farms with competitive costs compared to market pricing while providing more energy in the fuel than is required to make it and also allowing for net reduction of greenhouse gas emissions.

Although these outcomes are positive, we have not yet seen wide spread adoption of this practice. Production volume remains low, largely the result of low petroleum fuel prices. We will explore this and other possible reasons for sluggish development and possible next steps that Extension and others can consider for improving impact. We see strong potential for increase farm viability via on-farm fuel production and expect there will be increased demand for these practices in the future.

Chris Callahan

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Chris Callahan – Assistant Extension Professor of Agricultural Engineering - University of Vermont Extension. Chris' work focuses on the application of the engineering practice to food systems in Vermont. Specific engagement is with food producers, processors and distributors to improve efficiency, quality, safety and cost control through integration of technology, systems integration and process controls. Areas of focus include systems and process engineering, thermal processes and heat transfer, greenhouse energy efficiency and renewable energy, oilseed processing and farm-scale biodiesel production, harvest and post-harvest processing equipment and systems.

Chris holds a BS in Mechanical Engineering and a Master's in Business Administration from Rensselaer Polytechnic Institute and is licensed as a Professional Engineer.

BREAKOUT SESSION 1

Track 3 - Bioenergy from Farms & Forests

APRIL 8, 2015
11:00AM - 12:30PM

Engaging Audiences through Bioenergy Outreach

Moderator - Kevin Zobrist,
Washington State University

How NEWBio, a Complex Project in a Fledgling Industry, Designs Quality Bioenergy Extension

Sarah Wurzbacher

The NEWBio (Northeast Woody and Warm-Season Biomass Consortium) Project, one of several regional initiatives funded by the United States Department of Agriculture's National Institute of Food and Agriculture (USDA-NIFA) to promote next-generation bioenergy production in the northeastern United States, faces an interesting set of challenges to designing effective extension programming. Some of these challenges are unique to a multi-state, multi-stakeholder initiative that requires close cooperative work between geographically distributed members of academic, governmental, and private entities, but others are very familiar to those working in energy extension: delivering effective programs with limited time, budget, personnel, and resources; crafting outreach materials that will outlast the life of a grant; building a distributed set of field and demonstration programs for a wide variety of audiences that work cohesively together toward achieving concrete, common goals; and designing programming for a bioenergy industry that is relatively new and without well-established business infrastructure or even markets. All of this must happen in a geographic region having an incredible diversity of landscapes, land use legacies, and social and professional demographics. In this increasingly connected world of extension where complex partnerships are necessary to building lasting programs and securing grants, much can be learned from the way a large consortium like NEWBio has attempted to design a nimble and effective extension model. This presentation explores aspects of the NEWBio extension model more fully, with a look at how the project has used publications on a variety of platforms, different types of in-person demonstrations and courses, interactive decision tools, and one-on-one stakeholder engagement to achieve its goals without getting "lost in collaboration."

Sarah Wurzbacher

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Sarah Wurzbacher is a Penn State extension educator based in Crawford County, PA, who holds degrees in environmental science and forestry. Sarah co-leads the extension team for NEWBio, a multi-state, USDA-funded initiative dedicated to expanding agricultural biomass energy in the Northeastern US. This initiative focuses on switchgrass, giant miscanthus, and shrub willow as dedicated energy feedstocks.

BREAKOUT SESSION 1

Track 3 - Bioenergy from Farms & Forests

APRIL 8, 2015
11:00AM - 12:30PM

Engaging Audiences through Bioenergy Outreach

Moderator - Kevin Zobrist,
Washington State University

Engaging Audiences in Biofuel Research Knowledge Denise Attaway

The Sustainable Bioproducts Initiative (SUBI) is a team of university and industry partners led by the LSU AgCenter, studying the regular production of biomass for economically viable conversion to biofuels and bioenergy using existing refinery infrastructure.

The project is funded through the United States Department of Agriculture through its Agriculture and Food Research Initiative (AFRI), which targets the development of regional systems for the sustainable production of bioenergy and biobased products.

The SUBI team has become involved in several opportunities to engage audiences by introducing them both to the program, and biofuels. These opportunities include: creating a table exhibit at the Louisiana State Fair in Shreveport, LA; speaking to students in Slidell, LA; holding field days all over LA; hosting summer youth camps at the biofuels pilot plant in St. Gabriel, LA; and creating an exhibit to bring to trade shows held throughout the United States.

The tabletop exhibit includes three screens, fact sheets and more. The information is such that the exhibit can be staffed or unstaffed. This exhibit contains information mainly for producers and general audiences. The trade show exhibit is built to attract potential collaborators/investors with the project. Information included in this exhibit is a little more scientific-based than the tabletop exhibit used at fairs. Also, researchers are visiting area schools to talk with students about biofuels. In addition, camps are held during summer months for area youth to visit and learn about crops that are being grown for feedstocks. Youth participating in the summer camps also learn about how the feedstocks are processed and made in to biofuels.

By attending this session, participants will learn what the SUBI team is doing to reach stakeholders of all ages and knowledge levels.

Denise Attaway
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Denise Attaway is the communications agent working with the SUBI project. She is responsible for gathering information for the project's website: www.lsuagcenter.com/subi, including: writing and editing print materials; shooting and editing video, shooting and editing still shots; creating webpages; and any other tasks related to communications.

She holds a doctorate in Human Resource Education from Louisiana State University. The title of her dissertation is Utilizing Community Media to Facilitate Cross-Cultural Communication between LSU AgCenter Field and State Agents and Louisiana Agricultural Producers. She holds a master's in English/Technical Writing and a bachelor's degree, both from Louisiana Tech University.

BREAKOUT SESSION 1

Track 3 - Bioenergy from Farms & Forests

APRIL 8, 2015
11:00AM - 12:30PM

Engaging Audiences through Bioenergy Outreach

Moderator - Kevin Zobrist,
Washington State University

Risky Business: Educating Stakeholders about New Energy Crops

David Ripplinger

This presentation will highlight the activities and initial outcomes of a USDA/RMA funded program to educate growers, lenders, and other interested stakeholders on the economics, agronomics, and environmental impacts of energy beets. The program delivered over the winter of 2014-2015 will make use of a variety of tools and methods to ensure that stakeholders have the information and framework they need to evaluate the opportunity and risks associated with growing this new crop. Focus will be placed on lessons learned and transferability to other regions and energy crops.

David Ripplinger

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David Ripplinger is a bioenergy specialist with North Dakota State University (NDSU) Extension and an Assistant Professor in the Department of Agribusiness and Applied Economics at NDSU. In this role he conducts applied research and provides support to farmers and the bioenergy industry. Mr. Ripplinger received a master's degree in agricultural economics from Iowa State University and a Ph.D. in transportation and logistics from NDSU.

BREAKOUT SESSION 1

Track 3 - Bioenergy from Farms & Forests

APRIL 8, 2015
11:00AM - 12:30PM

Engaging Audiences through Bioenergy Outreach

Moderator - Kevin Zobrist,
Washington State University

Lessons Learned for Measuring the Impact of Non-formal Education in Bioenergy

Jill Euken & Sorrel Brown

During the past 3 years, The Extension and Outreach component of CenUSA (a USDA Bioenergy CAP project based in the north central region) has implemented educational activities engaging crop producers, industry leaders and non-farm audiences, including youth, to increase their knowledge about perennial grass production for bioenergy and environmental benefits; and improvements in soil from the addition of 'biochar' (a byproduct of thermochemical bioenergy production) as a soil amendment in home gardens. Activities have included workshops, field days, conferences and demonstrations. Surveys have been conducted to gauge crop producers' interest and willingness to grow perennial grasses for bioenergy. Surveys have measured the increased awareness and benefits of biochar among the public and their intentions to use it in home gardens. The Extension component also includes experiential programs for youth that focus on biofuels, production, carbon and nutrient cycling; and includes outreach in cooperation with Midwest Native American-serving institutions. A novel approach has resulted in the development of a game available through an iPad app.

This presentation will show the effects and impacts the CenUSA Extension education program has had on expanding awareness of a potentially profitable crop alternative, while sustaining the environment and contributing to development of a renewable fuel market. This session will also share "lessons learned" regarding best practices to measure impact and outcomes of Extension and other non-formal educational efforts.

Jill Euken

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Jill Euken serves as Deputy Director of the Bioeconomy Institute at Iowa State University. She leads new program development, industrial collaborations and outreach programs for the Institute. Her background includes 30 years of outreach work for Iowa State University, and five years experience developing farmer-owned value-added businesses in southwest Iowa.

Jill and her husband, Randy, own and operate a Century Farm in SW Iowa, where they produce corn, soybeans, alfalfa, and cattle. They have two grown children and two granddaughters.

Sorrel Brown

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Sorrel Brown is an Extension Program Evaluator in Agriculture and Natural Resources at Iowa State University. Responsibilities include building evaluation capacity among ANR field and campus specialists, developing evaluation instruments to measure outcomes and impact of ANR programs, conducting evaluations, and leading efforts in outcome-based planning and reporting.

Sorrel has an appointment in the Agricultural Education and Studies Department, where she supervises undergraduate students in early field-based experiences and professional internships for Extension, outreach and agribusiness. She is a member of the graduate Faculty Committee and a past Diversity liaison to the College of Agriculture & Life Sciences Diversity Committee.

Discussion 2

Moderator - Marina Heppenstall, Washington State University

Evaluating Effective Energy Extension Materials – E4

Patricia Townsend

Extension professionals work with a diverse array of stakeholders on variety of energy related issues. It is difficult to know how to address the needs of these various stakeholders in producing effective energy related outreach materials. In this discussion session, we will briefly share our experiences in conducting focus groups with stakeholders on evaluating outreach materials for the Advanced Hardwood Biofuels Northwest (AHB) project and then ask the audience/group to share their experiences. In the Pacific Northwest, AHB is a USDA-funded project looking at hybrid poplar as a feedstock for renewable biofuels. We have produced a wide variety of outreach materials on specific aspects of the AHB project such as hybrid poplar, biofuels, and biochemicals, as well energy literacy materials for the general public. Some of these materials, including infosheets, factsheets, and videos, have been produced specifically for extension educators. We will discuss the effectiveness of these materials as well as provide an opportunity for participants to share and discuss their energy related extension materials.

Patricia Townsend

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Dr. Townsend is a Regional Extension Specialist and Educator at Washington State University. Patricia is playing an active role in strengthening extension network and capacity, developing outreach materials and conducting research on the experience and needs of extension professionals regarding biofuels. She completed her Ph. D at the University of Washington (UW) working closely with local landowners on tropical forest restoration and conservation in Costa Rica. While at UW, Patricia also worked on the environmental impacts of biofuel feedstocks. Currently, she is happy to be providing outreach to build a sustainable biofuel system in the Northwest.

BREAKOUT SESSION 2

Track 2 - Communicating Energy through Extension

APRIL 8, 2015
9:40AM - 11:10 AM

Outreach Tools for the Extension Professional

Moderator - Peter Skelton,
New Mexico State University

Adapting the Exploring Energy Efficiency and Alternatives Program for Missouri

Don Day & Amanda Marney

In partnership with Montana State University, MU Extension has revised and adapted the Exploring Energy Efficiency and Alternatives materials for Missouri. The Energy Curriculum addresses energy efficiency for homes and farms as well as alternative energy sources including solar electric, solar hot water, small wind, anaerobic digesters, etc. This interactive discussion will focus on how Missouri adapted the curriculum, what addition curriculum materials have been added and how those materials are being incorporated into a high impact educational program by MU Extension. Supplementary materials for marketing the program will be shared as well as evaluation instruments. Evaluation results from programs that have been delivered will be shared.

This target audience for the program are homeowners, farmers and small businesses. In addition, the program is being offered to realtors to teach them the value of energy efficiency and alternative energy in order to better market energy efficient homes. Marketing templates have been developed to attract the attention of potential participants. Tours and presentations of people who have installed alternative energy or adopted energy efficiency practices are being incorporated into the programs. We will also discuss how we are handling the printing of materials in order to reduce the up-front costs of printing. In addition, we will discuss revenue generation strategies to support the program.

Participants who attend can see how these materials can be incorporated into extension programs. Marketing and evaluation tools will be shared with those who attend.

Don Day

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Don Day started his career in extension in 1967 as a farm management agent. He transferred to an Agricultural Engineering Specialist position in 1975 and retired from that position in 2008. Since 2008, he has been coordinating the energy education program in MU extension on a part-time basis. Day has participated in a number of energy related educational programs throughout this career. In the 1970's and 80's he participated in programming related to the energy crisis. These included programs on energy policy, energy conservation and alternative energy. Research projects on solar heating for grain drying and solar hog facilities were conducted.

Amanda Marney

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Amanda Marney has been with University of Missouri Extension since 2007. She has worked as an Agricultural Preparedness Specialist, Extension Associate – Energy Programs, and Community Development Specialist. Marney has been a team member of several integral energy projects at the University of Missouri including MAESTRO (Missouri Agricultural Energy Savings Team – A Revolutionary Opportunity) and Exploring Energy Efficiency and Alternatives. She has assisted residents with Energy Management Audits and Plans, has developed supplementary materials for energy efficiency on the farm, and has authored several guide sheets on energy efficiency including Top Money Saving Practices on Poultry Farms in Missouri.

BREAKOUT SESSION 2

Track 2 - Communicating Energy through Extension

Outreach Tools for the Extension Profesional

APRIL 8, 2015
9:40AM - 11:10 AM

Moderator - Peter Skelton,
New Mexico State University

Transitioning from the Bucket to the Barrel Educational Biofuels Webinar Series

Helene Cser & Robert Bardon

A fundamental issue currently faced in the advanced biofuels arena is the lack of knowledge and understanding of this industry as it moves from the research and development phase to full scale commercial production of biofuels and byproducts using a variety of advanced biomass feedstocks. To educate the public on the transitions taking place a webinar series outreach program is being implemented that covers policy, feedstock characteristics, creating and maintaining a work force, transportation logistics and feedstock demand, sustainability, and research and development advances. Initial outcomes from the first 12 webinars indicates that the series has reached 673 participants and that participants have had 36% gain in knowledge, 16% plan on further investigating the information presented, and an equivalent of 273,424 acres of working lands potentially impacted based on adoption of knowledge gained from the webinars. Education, extension and outreach programs will continue to be needed on the current challenges, trends, and opportunities associated with the commercial scale production of advanced biofuels as the industry works towards complying with the Federal Renewable Fuel Standard.

Helene Cser
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Helene Cser is an Extension Associate at NC State University's Department of Forestry and Environmental Resources in Raleigh, NC. Her career focus over the last 3 years has been on the opportunities and challenges relevant to the bioenergy industry. She also specializes in providing customized forest resource supply assessments and is a contributing member of FiberAnalytics. She has a Masters in Natural Resource Management-Assessment and Analysis, a certificate in Geographic Information Systems and is currently pursuing her MBA at the Jenkins Graduate School of Management.

BREAKOUT SESSION 2

Track 2 - Communicating Energy through Extension

APRIL 9, 2015
9:40AM - 11:10AM

Outreach Tools for the Extension Professional

Moderator - Peter Skelton,
New Mexico State University

Working Group Model for Energy Extension Program Development

Chad Martin

Renewable energy developments in the form of wind farms, biomass power facilities, and even solar farms seem to have created excitement combined with a substantial learning curve which may be overwhelming for stakeholders when new projects bring significant change to a community. Extension professionals can find themselves working diligently to “play catch up” when creating programs in an effort to help welcome energy development opportunities to their communities. Yet, there is a simultaneous need to fulfill the role of helping uncover unpredictable factors from a third party perspective. When Educators are able to identify unique factors along with finding the right decision making tools, they can do even better work in fulfilling the Land Grant mission of providing relevant and transformative Extension programming.

The Indiana Biomass Energy Working Group was formed in 2008 as a result of several projects emerging within the state creating a host of questions for Extension professionals and community leaders along with concerns and excitement. Dr. Klein Ileleji and Chad Martin formed the working group as an organization of engagement, gleaning real world perspectives and university backed research to deliver relevant programming and resources. Mission Statement: The Indiana Biomass Energy Working Group is a consortium of stakeholders from the industry, state and federal government, trade organizations, universities and citizenry working together to create a climate in the state of Indiana that would foster the growth of a viable renewable energy industry, protect our environment, provide energy security and green jobs in our communities. This will be done through educational programming and networking among stakeholders.

Learning Objectives – Session participants will be able to:

- Discover the organizing structure of the a working group;
- Lessons learned which can impact renewable energy development;
- Identify successful Extension programming opportunities in the biomass energy sector;
- Find credible research based tools when implementing Extension programs amid unpredictability;
- And measuring impact of the working group activity.

Chad Martin

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Martin has been a statewide Extension Specialist with Purdue University since January, 2008 and manages the engagement efforts of the Renewable Energy Extension Program at the West Lafayette, IN campus. The program website is available at www.extension.purdue.edu/renewable-energy. His work involves the creation of resources and program development in the areas of biofuels, biomass energy, utility scale and distributed wind energy, and on-farm energy efficiency.

Martin’s background in renewable energy began over twelve years ago at the Illinois Institute for Rural Affairs (IIRA) at Western Illinois University where he co-organized various action programs, including the formation of New Generation Cooperatives and LLCs to capitalize biofuels production facilities with local ownership. He also provided support to the IIRA’s Illinois Wind project. Martin holds a Bachelor degree from Western Illinois University and a Master’s degree from Purdue University in the area of Agricultural and Extension Education.

BREAKOUT SESSION 2

Track 2 - Communicating Energy through Extension

APRIL 9, 2015
9:40AM - 11:10AM

Outreach Tools for the Extension Profesional

Moderator - Peter Skelton,
New Mexico State University

Elements of a Clean Energy Outreach Program

Shaun Taylor

The mission of the Clean Energy Institute at the University of Washington is to accelerate the adoption of a clean energy future by advancing next generation solar energy and electrical energy storage materials, devices and systems, as well as their integration with the grid. CEI education programs disseminate the growing content expertise derived from graduate level research in these field into undergraduate, K-12 and general public facing programs. Grads and undergrads participate as Clean Energy Ambassadors carrying out lessons and activities in K-12 classrooms. To support this there are outreach kits for solar cells, solar car derby, batteries and energy materials. Interactive exhibits, touchscreen station, and table top exhibits make it easy for volunteers to participate. Ambassadors are trained to conduct set programs of varying length which can be booked by schools or community groups.

Shaun Taylor

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Shaun Taylor specializes in science curriculum, technology, and learning systems design. He served for 17 years as VP for Product Development at Videodiscovery, where he developed interactive videodiscs, CD-ROM, online science collection with LCMS and correlation tools. He has developed high stakes science assessments using extended scenarios and hands-on labs. He is Education Director for the Clean Energy Institute at UW where he develops wikis, research videos, and K-12 outreach for solar energy. He is Director of Production for Educurious publishing a problem based, blended learning curriculum. Mr. Taylor has a B.S. in Zoology and a M.Ed. in Science Education.

Increasing Energy Efficiency in Irrigation in Northwestern Washington: A Presentation to Bring Awareness of Energy, Water Savings, Chemigation and Fertigation of Boom-Type Carts and Drip Irrigation

Don McMoran

Agricultural producers in Northwestern Washington need an irrigation system that is low-cost, non-permanent, and highly mobile to provide supplemental irrigation water to certain crops. Reel big-guns fill this need; however, they are grossly energy inefficient and do a poor job at providing a uniform application of water to the crop. Patchy irrigation coverage leads to clusters of plants under stress, reducing overall crop production and inefficient use of available acreage. Recently WSU personnel and a few progressive growers have been experimenting with boom systems and drip irrigation. These new systems are energy efficient and do a great job of increasing irrigation uniformity to the crop. The presentation will discuss the advantages and disadvantages of each system's performance evaluation of efficiency and uniformity for all of the current agricultural irrigation systems utilized in western Washington. The potential to use boom systems and drip irrigation to provide a conduit for supplying nutritional supplementation and chemical pest and disease control as well as irrigation will be highlighted. The economics and practical considerations of converting to more energy efficient systems are also discussed along with how this will benefit the environment.

Don McMoran

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Don McMoran was born on a 2000 acre diversified potato farm in West Side Mount Vernon, of Skagit County, Washington. He grew up working on the farm including bucking hay bales and moving irrigation pipe all summer long. Working in the fields was long and hard but he grew to appreciate how hard area farmers work to make the valley what it is today. Don completed his bachelor's degree in General Agriculture in 1998 with a minor in Spanish and a Masters in Arts and teaching in 2000 from Oregon State University. Don was hired by WSU Skagit County Extension in the spring of 2006 and took over as director in 2011. Don and his wife Ami Jo live in Burlington Washington with their twin daughters Allie and Abbie.

BREAKOUT SESSION 2

Track 3 - Bioenergy from Farms & Forests

APRIL 9, 2015
9:40AM - 11:10AM

Saving Energy on the Farm

Moderator - Jim Jensen, Washington State University

So you want to save energy: How to achieve meaningful results in farm energy efficiency

Anthony Jay Simon & Kip Pheil

This presentation focuses on strategies that can be deployed to boost project implementation resulting from energy audits in the agricultural sector. The WSU Extension Energy Program has been working in collaboration with stakeholders to help agricultural producers reduce their energy footprint without compromising product yield or quality. During the past few years we have learned lessons about how to take energy efficiency off of the bookshelf and move forward into project implementation.

Even though the energy audit is critical in the process of saving energy, once viable projects are identified a tremendous amount of effort is needed by the producer and technical service provider to carry them through to implementation. This effort can range from matching equipment specifications with producer requirements to project financing. One of the most important efforts is identifying and applying for financial assistance with USDA, utility grants or other funding sources. We have found that there are some great opportunities to be had if multiple funding sources can be leveraged together to reduce producer costs.

This presentation will also highlight the different aspects of the audit-to-project-implementation timeline. It is intended as a primer for discussion as funding opportunities and needs can vary by utility, region and type of improvements. It also will act as a primer for discussion on different aspects of the energy efficiency deployment, including taking the "systems approach," employee engagement, utility cooperation, and maintenance best practices. We will also discuss what we learned could be applied to other types of agricultural energy projects.

Anthony Jay Simon

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Tony Simon is an energy systems engineer at the WSU Extension Energy Program. He has experience assessing and analyzing energy systems used in agricultural, commercial, municipal and industrial manufacturing facilities. These energy systems include lighting, motors, air compressors, pumps, fans, steam, refrigeration and cooling towers. For the past few years he has been a technical service provider (TSP) for the USDA National Resource Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP) providing energy efficiency audits and support to farmers in Washington. He is also an energy trainer for the Washington Farm Energy Program. Simon holds a B.S. in electrical engineering from the University of Washington is certified by the U.S. Department of Energy (DOE) Industrial Assessment Center and is a DOE AirMaster+ Qualified Specialist for Compressed Air Systems.

Kip Pheil

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Kip Pheil joined the West NTSC in October 2010. He came to the Energy Technology Development Team from the Oregon Department of Energy where he oversaw generating facility eligibility and Renewable Energy Certificate tracking for the Oregon Renewable Portfolio Standard. Kip also worked as the State's Energy Loan Program engineering analyst, working with public and private borrowers on almost 400 projects valued at approximately \$300 million. Those projects either used renewable resources to produce electricity, heat, or fuels; or reduced energy use through efficiency upgrades. Kip began his energy career doing commercial and industrial energy audits for a small consulting firm and also worked for Honeywell in their building control and life safety automation systems group. He received a BS in Mechanical Engineering from Oregon State University.

Saving Energy on the Farm

Moderator - Jim Jensen, Washington State University

Greenhouse Biomass

Chris Callahan

The use of greenhouses to extend the production season for fresh produce is increasing rapidly in the Northeast. Greenhouse production allows for a more precise control of environmental conditions which improves crop yield and quality compared to outdoor growing. However, greenhouse growing usually requires the addition of heat, typically using propane or heating oil, to maintain temperature and also to reduce humidity. Many growers are concerned about heating fuel cost, price volatility, and greenhouse gas emissions. Over the past five years University of Vermont Extension partnered with 20 greenhouse growers to test a variety of biomass fuel heating systems aimed at improving profitability and reducing environmental impact.

Outcomes to date include:

1. Displacing 600 gallons of propane annually in a typical installation. With propane at \$3 per gallon and wood pellets at \$250 per ton, this equates to a net savings of \$1,000 per year and a system payback period of 10-12 years (without financial incentive).
2. Using wood pellets instead of a propane heater in a Vermont greenhouse results in a net reduction of 3.6 tons of carbon dioxide emissions (a greenhouse gas) per installation per year. This is equivalent to 7,300 vehicle miles.
3. This project resulted in the development of a "learning community" where knowledge was shared among participants, facilitating rapid improvements in heating system selection and operation. Early adopters were quick to identify what worked and what didn't.
4. Early success and initial findings helped secure external funding to expand the project and assist additional growers with the purchase of biomass heating systems.

We anticipate that this integrated research and extension project, which has demonstrated economic and environmental benefits as well as created a learning community of stakeholders, will lead to increased adoption of biomass heating systems for greenhouse with reduced need for incentives in the future.

Chris Callahan

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Assistant Extension Professor of Agricultural Engineering - University of Vermont Extension. Chris' work focuses on the application of the engineering practice to food systems in Vermont. Specific engagement is with food producers, processors and distributors to improve efficiency, quality, safety and cost control through integration of technology, systems integration and process controls. Areas of focus include systems and process engineering, thermal processes and heat transfer, greenhouse energy efficiency and renewable energy, oilseed processing and farm-scale biodiesel production, harvest and post-harvest processing equipment and systems.

Chris holds a BS in Mechanical Engineering and a Master's in Business Administration from Rensselaer Polytechnic Institute and is licensed as a Professional Engineer.

BREAKOUT SESSION 2

Track 3 - Bioenergy from Farms & Forests

APRIL 9, 2015
9:40AM - 11:10AM

Saving Energy on the Farm

Moderator - Jim Jensen, Washington State University

Using a mobile demonstration to talk to farmers about on-farm biodiesel production

Jason P. de Koff, Chris Robbins, John C. Ricketts, Prabodh Illukpitiya, & Alvin Wade

Bioenergy is an important option within our national energy security to enhance renewable fuel production, environmental quality and rural economic development. Farmers are an integral part of the process and need information on ways that they can use bioenergy on their farm. It is estimated that a farmer could devote between 1 and 15% of their acreage to growing a biodiesel feedstock, and the fuel produced could power their equipment for an entire year. With the assistance of a USDA-NIFA grant, Tennessee State University constructed a mobile demonstration and hosted workshops in different counties within Tennessee to engage farmers in discussion on how they could make biodiesel with the demonstrated equipment. Along with these workshops, information was provided on agronomic aspects of biodiesel feedstocks, the economics of on-farm biodiesel production and federal assistance programs related to on-farm production. Evaluation of workshop participants in 2014 identified a significant increase in knowledge, interest, perceptions and awareness of biodiesel and biodiesel production.



Tennessee State University biodiesel demonstration trailer

Jason P. de Koff
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Jason P. de Koff is an Assistant Professor and Extension Specialist in the area of Bioenergy Crop Production. He received his B.S. in Chemistry from Ithaca College in 2000, M.S. in Soil and Water Sciences from UC Riverside in 2004, and Ph.D. in Agronomy from Purdue University in 2008. He began work at Tennessee State University in June 2010. He provides assistance to farmers on bioenergy feedstocks and bioenergy production processes and has published 11 related fact sheets. His research focuses on the use of switchgrass and canola for bioenergy production to identify best practices for Tennessee farmers.

BREAKOUT SESSION 3

Track 1 - Interactive Energy Discussions

Discussion 3 -

Examining Energy Outreach

APRIL 9, 2015

11:30AM - 12:30PM

Moderator -Denise Attaway, Louisiana State University

From Research to Implementation: Farm & Small Business Clean Energy Projects

Lissa Pawlisch & Joel Haskard

The University of Minnesota's Clean Energy Resource Teams (CERTs) uses research data from studies funded by the Minnesota Department of Commerce – Division of Energy Resources coupled with Community-Based Social Marketing approaches to help engage stakeholders across the state in implementing energy efficiency and renewable energy projects. Lissa and Joel will discuss successes and failures (!) of past clean energy campaigns (including pre-rinse spray valves, programmable thermostats and Vending Misers) and go into further details about their two current large-scale projects: helping turkey farmers reduce energy use by upgrading to LED lighting in their barns (entitled: Gobbling Up Savings) and helping gas stations and convenience stores upgrade their canopy lighting to LED lighting (entitled: Light Up Your Station and Save). Use of social media, energy forums, seed grants, strategic collaborations, trade journal articles, tabling at events, phone calls, door-to-door outreach... CERTs has tried them all. We'll share lessons learned from our experiences – the good, the bad and the ugly – in taking research and translating that into real world projects. Along with the presentation, the session will allow time for attendees to network and share their experiences translating their research into action (or not). Fun will be had by all!

Lissa Pawlisch & Joel Haskard

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Melissa Pawlisch and Joel Haskard are the Clean Energy Resource Teams (CERTs) Co-Directors for the University of Minnesota's Regional Sustainable Development Partnerships and Extension. Over the past eleven years they have guided CERTs - a unique program partnership designed to connect individuals and communities to the resources they need to identify and implement community scale clean energy projects. Both work directly with community members. Melissa's current focus areas include community shared solar, dairy energy efficiency, and local government clean energy adoption. Joel's focus areas include MN Energy Stories, electric vehicles (EVs), and partnering with utilities on energy efficiency outreach.

BREAKOUT SESSION 3

Track 1 - Interactive Energy Discussions

Discussion 3 -

Examining Energy Outreach

APRIL 9, 2015

11:30AM - 12:30PM

Moderator -Denise Attaway, Louisiana State University

Benefits, Barriers, and Opportunities for Energy Outreach in Extension: A Mixed-Methods Needs Assessment

Roslynn Brain & Blake H. Thomas

The International Energy Association (2014) predicts renewable energy sources will be the world's biggest single source of electricity by 2050. Given the rising societal relevance of renewable energy systems and growing public interest in this type of information, a mixed-methods needs assessment was completed to examine what type of programming Extension currently offers on the topic, and where needs and opportunities lie in Extension energy outreach.

The first part of the study consisted of an online survey sent to all attendees of the inaugural National Extension Energy Summit (March 2013) and focus group interviews with attendees of the inaugural National Extension Sustainability Summit (October 2013). The study used grounded theory to explore Extension's role in energy programming, and four major themes emerged: (1) There is a need for increased energy programming in Extension, (2) Extension's history of providing unbiased, research-based information must remain central to renewable energy programming and outreach efforts, (3) Extension needs to form partnerships with outside existing energy entities to best serve the public, and (4) financing is the principal driver and barrier in Extension clientele's renewable energy decisions.

The second part of the study built used survey and focus group findings to guide the questions for an online survey sent to all Utah Extension employees. Given Utah Extension's minimal role in energy programming, and the state's abundance of fossil and renewable energy resources, the survey explored Extension employees opinions on: (1) The role of different energy sources in Utah's future, (2) Extension employee and clientele energy literacy, (3) whether public and internal demand exists for Extension energy programming, and (4) preferred methods for communicating renewable energy information.

This presentation will discuss the key findings of the national and state-level needs assessments. Participants will better understand the self-identified benefits, barriers and opportunities of energy outreach within Extension.

Roslynn Brain

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Dr. Roslynn Brain, Sustainable Communities Extension Specialist and Assistant Professor at Utah State University. Roslynn uses conservation theory, communication techniques, and social marketing tools to foster community-based environmental behaviors.

BREAKOUT SESSION 3

Track 2 - Communicating Energy through Extension

Harnessing the Power of Community Collaborations

APRIL 9, 2015
11:30AM - 12:30PM

Moderator -Milton Geiger,
University of Wyoming

Smart Energy Infrastructure for the State of Oregon

Eduardo Cotilla-Sanchezi, Scott Reed, Ron Mize

Founded in 1868, Oregon State University (OSU) is one of only two universities in the U.S. to have Sea Grant, Space Grant and Sun Grant designations and it was recently ranked among the best earth and environmental sciences program in the world. OSU's commitment to reliable and sustainable energy systems spans several schools, colleges, research laboratories, and communities throughout Oregon.

OSU Extension's one hundred year history developed in parallel with our electrical infrastructure. The advent of smarter grid paradigms is a unique opportunity to revisit the State's energy future while strengthening that co-development through direct, timely feedback from communities in every one of Oregon's 36 counties. These communities often sit at the end of the line in its utility's territory, and several types of rural facilities (e.g., farming, manufacturing) may have a high demand for electricity. This type of demand profile represents an anomalous, critical load that is unsupported by a meshed network as one would find in a typical urban area.

In this presentation we will discuss our collaborative project aiming to gather relevant data from rural communities across the state in order to accelerate the diffusion of smart grid technologies and energy efficiency policies. The pedagogical component of this project focuses on undergraduate research tasks for students from the OSU STEM Leaders program, and provides experiential learning opportunities in association with community-based Extension faculty. In addition to the boost in retention and graduation rates, our project also provides a solid bridge toward Electrical Engineering graduate school for underrepresented minorities.

Eduardo Cotilla-Sanchezi

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Dr. Eduardo Cotilla-Sanchez is an Assistant Professor at the School of Electrical Engineering and Computer Science, Oregon State University. His primary field of research is the vulnerability of electrical infrastructure, in particular, the study of cascading outages. This interest spires into several other research areas such as nonlinear dynamics, complex systems, smart grid, and big data. Cotilla-Sanchez is the Secretary of the IEEE Cascading Failure Working Group.

BREAKOUT SESSION 3

Track 2 - Communicating Energy through Extension

APRIL 9, 2015
11:30AM - 12:30PM

Harnessing the Power of Community Collaborations

Moderator -Milton Geiger,
University of Wyoming

Renewable Energy Development – Aiding Public Officials in the Decision Making Process

Eric Romich

Following its strongest year ever in 2012, the U.S experienced a massive drop in wind installations in 2013 with just 1,084 MW in new installations. However, the U.S. still ranks 2nd globally with a total generation capacity of more than 61 GW. The continued development of wind energy will depend not only on economics, but also on public acceptance. Survey evidence indicates that people's viewpoints are influenced by the nature of the planning and development process, the earlier, more open and participatory the process, the greater the likelihood of public support (Warren et al., 2005). As a source of unbiased research based educational programming, Extension is uniquely positioned to provide education on both the positive and negative community impacts of wind development.

In Ohio, as an increasing number of wind farms are proposed, county commissioners are faced with the difficult decision of approving or denying an alternative energy zone application. This decision can generate millions of dollars in local tax revenue, but will alter the landscape of the community for decades. To engage the community and guide informed decision-making by elected officials on a proposed wind farm in Wyandot County, OSU Extension partnered with the School of Environment and Natural Resource, the Wyandot County Board of Commissioners, and industry professionals in a collaborative survey research project. The project involved surveying 700 households to gather data on current knowledge, local support, attitudes, and opinions on emerging and potentially contentious energy and environmental issues.

This session will review a case study of an Ohio community that utilized a local survey to inform a wind energy outreach and engagement strategy. It will provide participants an overview of the project partnerships, outreach and engagement model, a summary of relevant survey findings, followed by a discussion on how to apply the approach in their community.

References:

Warren, C.R., Lumsden, C., O'Dowd, S., Birnie, R.V., 2005. 'Green on green': public perceptions of wind power in Scotland and Ireland. *Journal of Environmental Planning and Management* 48 (6), 851–873.

Eric Romich

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Eric Romich is an Ohio State University Extension Field Specialist for Energy Development. His background in renewable energy began during his former assignment as an OSU Extension Community Development Educator in Wyandot County. In this position he served as the Director of Wyandot County Office of Economic Development and was deeply involved in the details of finalizing the PSEG Wyandot Solar Project. The PSEG Wyandot Solar Project is a 12 MW 85 acre solar generation facility that is the largest solar facility in Ohio and one of the largest in the Midwest.

Romich focuses his Extension efforts in the areas of renewable energy development, energy policy, wind energy, solar energy, bioenergy resources, and shale energy development. He works with elected officials, community planners, community residents, and state and federal government agencies to deliver energy programs throughout Ohio.

BREAKOUT SESSION 3

Track 2 - Communicating Energy through Extension

APRIL 9, 2015
11:30AM - 12:30PM

Harnessing the Power of Community Collaborations

Moderator -Milton Geiger,
University of Wyoming

4 to 39: Environmental Protection Agency's Climate Showcase Communities & RI Public Energy Partnership

Kristina DiSanto

This presentation focuses on the evolution of a municipal-level energy efficiency program targeting 4 towns in RI into a larger state-wide program whose goal is to engage all 39 municipalities in RI.

Led by the RI Office of Energy Resources, the RI Public Energy Partnership (RIPEP) is a three-year, federally-funded grant geared towards creating a comprehensive inventory of energy consumption in the public sector, implementing energy efficiency measures in approximately 100 public buildings to attain an average of 20% energy reduction, and identifying and mitigating barriers to efficiency improvements in the public sector.

Prior to RIPEP, the Environmental Protection Agency (EPA) Climate Showcase Communities grant, herein referred to as the "EPA Project", was the first in Rhode Island to achieve greenhouse gas reductions in four communities through the implementation of large-scale efficiency projects and the promotion of sustainable energy consumption behaviors. The Outreach Center collected, analyzed, and presented over 5 years of energy consumption data, trained several hundred residents, business owners, and municipal officials in energy conservation practices, developed surveys to identify barriers to participation in efficiency programs, drafted energy policies and energy management guides, and implemented additional numerous municipal performance and outreach and education deliverables. Results of the EPA project include substantial GHG emission reductions, which led to the state-wide RI Public Energy Partnership (RIPEP).

Utilizing the experience we gained through the management of the smaller "EPA project", the URI Outreach Center now serves as a subcontractor to our state's energy office, who administers the RIPEP project. The Outreach Center's work to facilitate conversations between outside organizations and utility companies, conduct benchmarking data analysis, investigate barrier mitigation, and assist with policy design through both projects can be looked at as a model for organizations pursuing deep energy savings infrastructure at the municipal level.

Kristina DiSanto

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Kristina DiSanto currently coordinates the energy programs and projects offered by the URI Outreach Center as well as their two fellowship programs. She started working at the Outreach Center as an Energy Fellow in 2009. She worked through graduate school managing the EPA Climate Showcase Communities grant with four local municipalities, was a co-author on URI's Climate Action Plan, and now specializes in energy benchmarking for the RI Public Energy Partnership, a three-year federally funded grant led by the RI Office of Energy Resources. She earned both her degrees from URI- a Bachelor of Science in Environmental and Natural Resource Economics in 2010 and a Master of Science in Environmental and Natural Resource Economics in 2012. She continues to build passion each day in energy efficiency and behavior change as she works with her stakeholders and colleagues.

BREAKOUT SESSION 3

Track 3 - Bioenergy from Farm & Forests

APRIL 9, 2015
11:30AM - 12:30PM

New Frontiers in Wood Energy

Moderator -Orion Lekos, Washington State University

Small Scale Pellet Production as Alternative Bioenergy from Forest Residuals

Randy Brooks, Audra Cochran, Rob Keefe, & Armando MacDonald

Forests can readily supply feedstock for alternative bioenergy production to provide economic profit for landowners, contractors and forest managers. Feedstock removal also has the potential to benefit forest health and ecosystem services. However, many small landowners are faced with the challenge of managing forest residuals to meet slash compliance and fire regulations. Currently, most residuals are burned or left on site to decompose. Every year the five county area of the north-central Idaho region produces over 16 million dry tons of unutilized forest residues. Use of such residuals for bioenergy production via wood pellets is noteworthy. In a time where alternative energy sources are growing in demand, new approaches to utilize these residuals are being examined. Currently, the largest inhibiting factor of pellet production in the Pacific Northwest is the transportation costs of hauling the residuals. A potential solution is a portable, small-scale pellet mill that can be taken directly to the logging site. This study involves a unit with a chipper, a dryer unit, and a pellet mill. Green slash is chipped and transferred to the drying unit with a chain-flail drum to further reduce chip particle size. A blower and vacuum powered by a generator and heated with propane moves the materials into the heating unit where they are dried to approximately 15% moisture content. Dried and processed materials are then fed into the PTO-driven pellet mill, which is capable of producing 800 lbs/hr. The feedstock for pellet production does not compete with existing markets and is a value added system in addition to reducing forest slash burning and potential negative impacts on air quality. This presentation focuses on the quality and quantity of wood pellets manufactured by a portable pellet mill utilizing various forms of forest residuals.

Randy Brooks

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Dr. Randy Brooks is a Professor in the Department of Forest, Rangeland, and Fires Sciences in the College of Natural Resources at the University of Idaho. He received his A.S. degree in Agriculture from Connors State College, a B.S. in Forest Management from Oklahoma State University, and a M.S. and Ph.D. in Forest Soils and Forest Sciences from Michigan Technological University. He began his career with the University of Idaho Extension since 1991. In 2011, he became the Extension Forestry Specialist based on the Moscow campus. Dr. Brooks leads the Extension and Outreach efforts in Forestry across the state of Idaho and is the Forestry Topic Team Leader. He manages several College of Agriculture and College of Natural Resources budgets, including the Idaho RREA budget. He teaches at and oversees the Idaho Pro Logger certification efforts headed by the Idaho Association of Logging Contractors. His extension efforts have garnered him several awards to include the Association of Natural Resource Extension Professionals Gold Award for Career Leadership in UI's Strengthening Forest Stewardship Skills. Dr. Brooks works with all Extension Forestry stakeholders, including family forest owners, loggers, natural resource professionals, youth and educators.

BREAKOUT SESSION 3

Track 3 - Bioenergy from Farm & Forests

APRIL 9, 2015
11:30AM - 12:30PM

New Frontiers in Wood Energy

Moderator -Orion Lekos, Washington State University

Mobile Pyrolysis, and the Utah Biomass Resources Group Darren McAvoy

The Utah Biomass Resources Group (UBRG) is conducting multistate demonstrations of a self-contained mobile pyrolysis trailer that converts wood chips into bio oil and biochar in the field. Pyrolysis involves cooking biomass under controlled temperatures and with limited oxygen to thermally decompose the material into three products; bio oil, biochar, and producer gas. Woody biomass is mostly carbon, air and water; field densification may be one of the keys to allowing economical transport of this material. Mountains of waste wood now sit unutilized, waiting to be turned into greenhouse gases through burning or decomposition. This technology captures that energy and transforms it into marketable products. Informal surveys indicate this is perhaps the most robust technology of its kind available today. By partnering with Amaron Energy we have been able to up-scale this new mobile rotary pyrolysis kiln technology to a production sized unit.

We are also conducting research on upgrading pyrolysis oil, biochar use in horticulture and mine reclamation, cofiring wood with coal, and other topics. Through research, field days, technology demonstrations, conferences, web presence and printed materials, the UBRG is improving the potential of biomass utilization in the Intermountain West.

Waste wood utilization from forest restoration and wildland fire hazard reduction projects can lead to diversified rural economies, job creation, and a reduction of our dependence on foreign and fossil fuels. These are the goals of the Utah Biomass Resources Group (UBRG.) This presentation will introduce the UBRG and detail our programs to date.

Darren McAvoy

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Darren has directed the Utah Forest Landowner Education Program at Utah State University since 1999. McAvoy co-founded and chairs the Utah Biomass Resources Group. For seven years he fulfilled a dream of being a forestry consultant and contractor in Sandpoint, Idaho. His fourteen seasons of wildland fire experience includes many shifts as a sawyer and squad leader on the Flathead Hotshot Crew out of Columbia Falls, Montana and on the Yaak District of the Kootenai National Forest in Montana. He holds a B.S. in Forestry from Colorado State University and a M.S. in Communication from Utah State University.

BREAKOUT SESSION 3

Track 3 - Bioenergy from Farm & Forests

APRIL 9, 2015
11:30AM - 12:30PM

New Frontiers in Wood Energy

Moderator -Orion Lekos, Washington State University

Extension's Role in Building Capacity for Wood Energy Policy Education: A Case Study

Jonathan Kays

Renewable energy development has tended to focus on solar, wind, and geothermal technologies, which has generated large industries with political influence and beneficial tax credits and grants. Wood energy development has not enjoyed similar success due to negative environmental perceptions, poor knowledge of technological improvements, and a lack of organization of partners needed to garner political influence. Extension can be an effective agent in building capacity for wood energy policy development by bringing together diverse groups with shared interests.

University of Maryland Extension (UME) organized the Maryland Wood Energy Coalition in April 2010 to overcome the lack of regulation, policy and educational programs that support or even allowed the use of commercial biomass boilers. Composed of representatives of state agencies, university extension, non-profits, and business committed to increasing the adoption of advanced wood energy technologies and developing wood markets to supply the developing industry. The Coalition believes the greatest potential for wood energy in Maryland is achieved through small to medium-sized commercial thermal applications for government, schools, and businesses as well as residential thermal applications. The Coalition used educational approaches for policymakers, regulators, nonprofits, forest and biomass industry professionals, which included a research-based prospectus, two statewide conferences for policymakers, industry professionals and others, and other efforts.

The presentation will provide successful techniques that has resulted in meeting four major statewide wood energy priorities including: 1) updated air quality regulations for biomass boiler; 2) a permanent residential wood grant program with educational outreach; 3) thermal renewable energy credits legislation, and 4) encouraging biomass boilers in public facilities. This presentation will demonstrate the effective role of extension policy education and serve as a model for states or organizations lacking a developed focus on wood energy policy. For more information go to: www.extension.umd.edu/woodland.

Jonathan Kays

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Jonathan Kays is a professional forester and Natural Resource Extension Specialist with the University of Maryland Extension since 1988. He has responsibility for development and implementation of extension programs in the following areas: forest stewardship, woodland owner volunteer training, wood energy, wildlife damage management, alternative income opportunities utilizing natural resources, and the use of biosolids to grow forest trees on gravel spoils. In April 2010 he organized the Maryland Wood Energy Coalition in cooperation with the Maryland DNR Forest Service, with the goal to increase the adoption of woody biomass for high-efficiency wood energy technologies in commercial and residential applications. He has authored many publications on wood energy and other related topics that are available at www.extensin.umd.edu/woodland.

Discussion 4

Moderator - Nora Haider, Washington State University

**The Role of the Extension Energy Professional –
So you're an Extension energy professional...now what?**

Cary Weiner & Milton Geiger

Although Extension has a long history of engaging energy issues, from rural electrification in the 1930s to conservation in the 1970s, the recent reemergence of energy as an area of focus for extension services offers a unique professional challenge for energy educators. In many states energy extension is often a novel, ancillary, and/or lightly supported activity. Many professionals are charged with "doing something" to address energy issues in their states but are often left wondering how best to establish a sustainable energy program or integrate energy education into their Extension organizational systems. The session will focus on issues related to energy extension program structure, organizational priorities, strategic planning, and assessment metrics.

Recognizing the need for structured yet interactive dialogue, the session will feature an alternating interview style, with Cary and Milt posing questions to each other before opening up those questions for a dialogue with the audience. The contributions of the audience will be sought through both instantaneous voting (e.g. Turning Point) and targeted discussion based on those responses. Representative questions include:

1. Where does energy fit organizationally in your Extension system and how does this affect your approach to programming?
2. Do you have an on-campus, applied research-base in energy to share with clientele, such as is common in other Extension areas of focus (e.g. agriculture)?
3. What is your intended outcome – behavior change, reduced fossil fuel use, energy literacy, informed decision making, etc.?
4. Who is your competition for clientele?
5. What would an ideal Extension energy program look like for you?

Through this conversation, the audience will have the opportunity to critically examine the "why" and "how" of extension energy programming, providing a fuller appreciation of the "what" offered in the other sessions. We will also share voting data with all attendees after the Summit.

Milton Geiger

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Cary Weiner holds a Master of Public Administration from the University of New Mexico. Cary was selected as CSU's first dedicated Energy Specialist in 2010 and at that time was charged with developing energy programming to help consumers make more informed energy decisions. Since that time, the position has evolved, duties have expanded, and Cary is constantly exploring areas where Extension could add value to energy engagement and education in the state. He has developed and delivered energy programming to a wide range of audiences including the general public, volunteers, teachers, and agricultural producers.

Cary Weiner

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Milt Geiger serves as the Energy Extension Coordinator for UW Extension and the School of Energy Resources, a position he has held since 2009. In his role, he is tasked with building UW's inaugural energy extension effort, addressing energy efficiency, distributed renewables, and the impacts of large-scale energy development. Milt is a graduate of Colgate University (B.A. Environmental Economics) and the University of Wyoming (M.S. Agricultural and Applied Economics & Environment and Natural Resources), he is also a LEED Green Associate and an Association of Energy Engineers Certified Energy Manager (CEM) and Renewable Energy Professional (REP).

BREAKOUT SESSION 4

Track 2 - Communicating Energy through Extension

APRIL 9, 2015
1:30PM - 3:00PM

Community Scale Energy Projects

Moderator - Roslynn Brain, Utah State University

E-Conservation Residential Energy Education, Audit, and Retrofit Program

Laura Langham & Sarah Kirby

This presentation will share results of the North Carolina Cooperative Extension E-Conservation energy education, assessment, and retrofit program. The E-Conservation Program educates citizens about ways to increase energy efficiency and reduce energy use in the home. The program also provides a limited amount of energy assessments conducted by Home Energy Rating System contractors. These assessments are designed to help homeowners identify areas where home efficiency, comfort, and durability can be improved. In order to receive an assessment, all homeowners must attend a basic energy education workshop. Results from previous year's evaluation of home energy assessments indicated that homeowners do not always make recommended retrofits or improvements after their home's evaluation due to lack of knowledge, time, and/or financial resources. In 2014, the E-Conservation program expanded its assessment program to include simple home retrofits. Each homeowner receiving an assessment also receives \$600 worth of energy saving retrofits, which may include items or actions such as: installing weather-stripping on the attic access, replacing inefficient lighting with CFL's or LED bulbs, sealing plumbing penetrations, installing new dryer duct terminations, installing low flow showerheads, adjusting and/or insulating the hot water tank, and installing weather-stripping on doors. These retrofits are completed immediately after the home assessments, so homeowners can begin to directly reap energy savings and comfort benefits. Homeowners are also provided a list of additional low cost and high cost items that can be completed in order to save energy. An online energy data management system, called *Resispeak*, is used to track homeowner energy use over time. This allows the E-Conservation program to determine the impact of the retrofits on energy use.

Laura Langham

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Laura Langham, M.S. Environmental Sciences, Sustainable Development Program Manager, Energy Conservation Professional experience in sustainable development, energy conservation, program management, youth development, conflict resolution and mediation. As the North Carolina Cooperative Extension Energy Conservation Program Manager, Ms. Langham incorporates education, collaboration, outreach, operations, and research, working with Extension professionals, government organizations, statisticians, energy conservation professionals, and North Carolina residents. Ms. Langham has experience in energy conservation, natural resource management, sustainable development, watershed conservation, ecology, geology, forestry, conflict resolution, mediation, and adult education, and curriculum development.

Sarah Kirby

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Sarah Kirby is an Associate Professor, Housing Specialist and Department Extension Leader in the Department of Youth, Family, and Community Sciences. She is the Director of the E-Conservation Consumer Energy Education program that teaches consumers to reduce home energy consumption and save money through no-and low-cost energy efficiency measures, behavioral changes and home retrofits. She is the State Coordinator for the Healthy Homes Partnership focusing on improving the health and safety homes by reducing housing hazards that cause injury and disease. Dr. Kirby is involved in educational programs related to preparation, response and recovery after natural disasters.

Key factors in successful community energy initiatives: A comparative study

Shiba P. Kar

Community energy initiatives such as local community-based renewable energy production and energy efficiency improvement play an important role in transitioning from fossil fuel based economy to a more sustainable energy future. To encourage local energy independence and socioeconomic development, many states in the U.S. adopted energy programs focusing on community energy initiatives. While some of these initiatives were successful, many of them could not achieve desired goals. To identify and evaluate key incentives and barriers to a successful community energy initiative, this study compares two nationally-recognized community energy programs: Green Communities in Massachusetts and Energy Independent Communities in Wisconsin. Based on existing literature review, this research applies several methods including online survey of community energy participants, comparative case studies, and phone interviews. Expected outcomes include (i) key barriers to adopting community energy initiatives explored, (ii) constraints to strengthening community capacity with technical assistance and financial investments evaluated, and (iii) influential policies and incentives identified. These findings will guide energy extension educators to support local communities interested in adopting successful energy initiatives.

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Shiba Kar is an Assistant Professor of Natural Resource Planning and Policy at the University of Wisconsin-Stevens Point (UWSP) and a Sustainable Energy Specialist with the University of Wisconsin-Extension. Shiba earned his Ph.D. in Forest Resources from Pennsylvania State University and Masters in Environmental Management and Development from Australian National University.

Dr. Kar has a strong background and interest in teaching, collaborative research and outreach in energy policy and natural resources sustainability. His research focuses on socioeconomic and regulatory incentives of sustainable energy, environmental and policy impacts of bioenergy, forest land use and community development, and policy and practices in climate change adaptation. Prior to joining the UWSP, Shiba worked with Washington State University Extension as a faculty member of Hardwood Biofuels initiative and his postdoctoral work at Penn State emphasized policy and practices of forest bioenergy.

BREAKOUT SESSION 4

Track 2 - Communicating Energy through Extension

APRIL 9, 2015
1:30PM - 3:00PM

Community Scale Energy Projects

Moderator -Roslynn Brain, Utah State University

Creating Sustainable Community Energy Plans through Citizen Engagement

Eric Romich, Myra Moss, Nancy Bowen-Ellzey, & Cindy Bond

Sustainable planning, based on the cornerstones of inclusion, long-term, multidimensionality and balancing social, economic and environmental considerations, is becoming frequently used in communities throughout the U.S. Sustainability planning seeks to engage a wide range of community interests to create shared visions, consensus goals, and broad buy in leading to holistic outcomes.

Energy rich rural communities, especially those experiencing growth due to the wave of Shale Oil and Gas production in the U.S., are often unprepared to address the myriad of impacts that result from these unconventional energy extraction technologies. Impacts occur not only in the economic realm, but also in the social and environmental sectors of community. They are both short-term and long-term, and can be beneficial or detrimental to the overall fabric of community. For example, shale-related job growth and new economic activity can benefit the existing workforce and local businesses, but it can also create more wage competition and higher retail rents. Shale development can mean population growth for stagnant rural areas, but can also result in higher housing costs, displacement of lower income residents and increased demands, without accompanying revenues, for education and social services. Built environment demands for improved infrastructure and natural environment stresses such as habitat fragmentation and reduction in farmland productivity can create long-term economic impacts in a community. Experiencing a boom-bust cycle typical of natural resource based economic growth is a real challenge that must be overcome.

We will present a model of sustainable community development planning that has been used in Ohio to engage residents in the creation of long-term plans that address and balance the social, environmental and economic impacts of energy development. This sustainability model can be used not only in shale rich communities, but also in those reliant on most types of natural resource based economic growth.

Eric Romich

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Eric Romich is an Ohio State University Extension Field Specialist for Energy Development. His background in renewable energy began during his former assignment as an OSU Extension Community Development Educator in Wyandot County. In this position he served as the Director of Wyandot County Office of Economic Development and was deeply involved in the details of finalizing the PSEG Wyandot Solar Project. The PSEG Wyandot Solar Project is a 12 MW 85 acre solar generation facility that is the largest solar facility in Ohio and one of the largest in the Midwest.

Romich focuses his Extension efforts in the areas of renewable energy development, energy policy, wind energy, solar energy, bioenergy resources, and shale energy development. He works with elected officials, community planners, community residents, and state and federal government agencies to deliver energy programs throughout Ohio.

From Maps to Megawatts -Using GIS to Identify Opportunities for Utility-Scale Solar Projects in Arizona

Mark Apel

The Renewable Energy Opportunity Analysis (REOA) strategy is a GIS-based land use modeling effort modified to specifically target the potential of rural communities in Arizona for the development of scaled renewable energy projects, namely solar. The model incorporates basic requirements and parameters for utility-scaled solar projects such as insolation factors, slope, aspect, soils, and proximity to transmission lines and roads and then produces a range of base suitability for any given geographic area at a resolution of 1100 square feet. Other local constraints, such as wildlife corridors and floodplains, are then taken into account giving a community a graphic as well as quantitative analysis of potential acreage available for utility-scaled renewable energy development. Initial feasibility studies are often cost-prohibitive for underfunded communities with large expanses of undeveloped land. Arizona Cooperative Extension in partnership with UA's School of Landscape Architecture and Planning, and funded by a US Department of Commerce, Economic Development Administration grant, is using the results to help rural communities interested, as a first step, in pursuing renewable energy development in their community as a viable economic and infrastructure development strategy. The resulting maps and analysis provide a community with the basis for an economic development portfolio to pursue with outside development interests, as well as the basis for community discussions on the appropriateness and viability of such pursuits.

Learning Objectives

1. Extension professionals will have a better understanding of how GIS modeling tools can be used for analyzing land use suitability on large landscapes, with regard to scaled solar projects.
2. Extension professionals will learn how complex modeling and data can be translated for outreach purposes, especially as it pertains to local decision-makers and community organizations.
3. Extension professionals will learn how to track the impacts of this kind of analysis and how it is being used.

Mark Apel

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Mark Apel is an Area Extension Agent in Community Resource Development with the University of Arizona Cooperative Extension in southeastern Arizona where he implements programs in land use planning, sustainable development, small acreage landowner assistance and regional economic development. Mark has been a Peace Corps Volunteer (Morocco), worked for the National Park Service and the Nature Conservancy, and as a private consultant and a county planner. Mark is a member of the National Network for Sustainable Living Education (NNSLE). He holds a B.S. in Environmental Resource Management (Pennsylvania State University, 1982) and an M.A. in International Affairs (Ohio University, 1987).

More Than Knowledge: Promoting Critical Thinking and Values Exploration to Increase Energy Literacy

Karla Eitel

This presentation will describe science communication and educational efforts developed for teachers and conducted as part of the Northwest Advance Renewables Alliance (NARA), with the goal of increasing energy literacy, and built on best practices as identified in the literature.

Scholars have pointed to low levels of energy literacy as a challenge needing to be addressed in the United States as we face increased population and increased demand for energy (DeWaters and Powers, 2011). DeWaters and Powers caution that of the several dimensions of energy literacy (cognitive, affective, behavior and self-efficacy), knowledge is the least likely to be associated with the other components. In other words, it is not sufficient to focus solely on knowledge, but rather educational interventions need to address students' attitudes and values about energy.

Our approach is grounded in a public science outreach model, the benefits of which are thought to include increased public support for science, more sophisticated decision-making on the part of the public, and bringing new perspectives to scientific research by engaging with audiences beyond those who are intimately familiar with the work (Varner, 2014). However, public outreach has often been approached as a one-way dissemination of information from "expert" to "audience". This "deficit-model" of outreach education has been criticized for a number of reasons, including the assumption that bridging a knowledge gap is sufficient to make real change in public opinion and behavior regarding complex environmental issues (Varner, 2014). This is in line with DeWaters and Powers findings that increased knowledge is not sufficient to support true energy literacy.

In this presentation, we explore a model of teacher professional development based on best practices for science communication and energy literacy development, and we report on outcomes of these efforts for both the teachers and the scientists as participants engaged in science communication.

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Karla Bradley Eitel is an Assistant Professor in the Conservation Social Sciences Department of the University of Idaho and the Director of Education for the McCall Outdoor Science School, a graduate residency and K12 teacher professional development and outreach program operated by the University of Idaho's College of Natural Resources. She holds a PhD in Natural Resources, an M.S. in Conservation Social Sciences and an M.Ed. in Curriculum and Instruction all from the University of Idaho. She earned her BA in Studio Art and American Studies from Williams College.

C6 BioFarm: A Sustainability Game for Learning the Role of a Bio-based Economy**Jay Staker**

C6 BioFarm Sustainability Game is a 2D simulation game, to be published online via web browser and mobile applications (Android and iOS). The game has an accompanying classroom curriculum and iBook all being developed as an Extension and Outreach portion of the CenUSA Bioenergy Grant supported by Agriculture and Food Research Initiative Competitive Grant No. 011-68005-30411 from the USDA National Institute of Food and Agriculture. The iBook provides supportive content for the science, economics, engineering, agricultural practices, and sociological implications of a bio-based economy that can be used by the players to supplement their game experience with research-based learning content presented in an iBook format. The format allows user flexibility to interact with content and is includes supportive media and evaluations. Players interact with the land, Farmville-style, deciding how to implement sustainability technology. Gameplay takes place over a series of rounds (years) and players are able to see the cumulative effects of their decisions and gain a better understanding of the economic realities of sustainability using accurate demonstrations of sustainability technology and its effects. The game has the potential for later expansion into further topics and a wider audience age range. This game provides educators a tool to explore the issues that are involved with using sustainable practices while also providing food, fuel, fiber, and the products we need.

The curriculum for use in vocational agricultural or STEM classrooms is being developed in cooperation with Purdue and University of Nebraska and examines bioenergy from a carbon perspective. The curriculum is aligned with Next Generation Science Standards and Ag Ed standards.

Explore the science, engineering, economics, and agricultural practices in an educational game setting that explore energy and environment.

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Director of the Extension, Science, Engineering, and Technology Program, Iowa State University Extension and Outreach, Associate Director for Education of the Iowa Space Grant Consortium. Experience includes 24 years as a science teacher prior to working at ISU. Staker works with argument-based inquiry, how youth learn science, and structuring learning to improve learning. He provides STEM professional development supporting implementation of improved STEM learning experiences and tools. Staker also works with 4-H staff and volunteers to increase youth participation in STEM, program design and professional development working with STEM in the formal and informal science learning arenas.

4-H Science: Energy Literacy for In and After-School, Club, and Camp**Janet Nagele**

4-H Science can serve a crucial role in helping youth understand the world around them, practice science inquiry and engineering skills, become better stewards of our natural resources, and achieve academic success. 4-H Science helps students explore related careers, and develop self-confidence and problem-solving skills. Participants in this session will explore the NEW Renewable Energy Education and Career Exploration Program. This program includes a 14 module curriculum, teaching kits, episodic volunteer recruitment and management model, and information on partnering with schools and energy professionals.

The Renewable Energy Education and Career Exploration Program:

- Builds 4-H partnerships with schools and industry professionals for science education and career exploration
- Addresses the national "Next Generation Science Standards"
- Integrates experiential learning, science inquiry, place-based education, and best practices for high quality programs and measurable impacts
- Develops the capacity of 4-H science volunteers and teachers to deliver 4-H Science Programs in a variety of settings. Teachers report that the program enhances student achievement, inspires student conservation of energy, is engaging, and assists teachers in teaching science and engineering, while integrating science education. This session will share the resulting newly-piloted curriculum, teaching kits, training, and volunteer support system that have made the program popular with both students and teachers. Lessons target middle school science and science engineering Educational Standards and Benchmarks, but can be adapted for upper elementary as well. Participants will have free access to lesson plans, visuals, student handouts, and assessment tools for all 14 lessons. During the session, participants will experience engaging and fun science inquiry & engineering design lessons related to energy transformation, energy conservation, and solar engineering applications. Other lessons topics include energy forms & sources, circuits & switches, turbine generators, static electricity, electricity from batteries, and photovoltaics .

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Janet Nagele, Oregon State University, 4-H Youth Development Faculty. Ms. Nagele has a Master of Science in Extension Education with a focus in Natural Resource Development from Michigan State University, and a Bachelor of Science in Natural Resources from Cornell University. She has 28 years of combined experience with the Extension Service in Michigan and Oregon, with an expertise in Natural Resource Education and School-based Programs. She has developed and implemented a wide range of experiential, place-based Science and Engineering programs for youth and teachers.