

Opportunities for and Barriers to Renewable Energy Outreach in Extension: A Mixed-Methods Needs Assessment

Abstract

This article illuminates the far-reaching applications of renewable energy programming for Extension's rural and urban clientele. An online survey of attendees of the inaugural National Extension Energy Summit revealed the need for increased energy programming in Extension. Following survey analysis, focus group interviews were conducted at the National Extension Sustainability Summit to determine the best way to address the reported need for energy programming. The results provide readers with an understanding of how renewable energy programming can expand the role and relevancy of Extension in the 21st century.

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Introduction

In the face of climate change, geopolitical tension, and diminishing returns on energy investments, a clean and secure energy supply is one of the most pressing societal issues of the 21st century. One of Extension's earliest energy outreach efforts involved the integration of electricity with rural homeownership and was conducted in partnership with the Rural Electrification Administration from the 1930s to the 1950s (Geiger, 2014). During the 1970s oil crisis, multiple authors of Extension publications began arguing that energy is an important area in which Extension should provide education and expertise (Born, 1980; Hamlen, 2012; Liles, 1978). Since the 1970s, many of Extension's energy programs have become sporadic or nonexistent (Western Extension Directors Association, 2008). Today, the mounting importance of a clean and secure energy supply is reflected by the Obama administration's policies, which have contributed to a doubling of the United States' renewable energy generation since 2008 (White House, 2012).

As the nation moves away from an economy of agrarian dominance, recent publications have questioned Extension's relevancy in the 21st century (Bull, Cote, Warner, & McKinnie, 2004; Extension Committee on Organization and Policy, 2002; Franz & Cox, 2012; McDowell, 2004). Renewable energy outreach and education could be the intersection at which Extension revives its relevancy by providing instruction and practical demonstration that applies to rural and urban individuals, households, and communities.

Given the rising societal relevance of renewable energy generation and growing interest in related information, a mixed-methods needs assessment was completed to examine what types of programming

Extension offered on the topic and associated opportunities and constraints. The goal was to better understand benefits of and barriers to renewable energy outreach in Extension as identified by the faculty who are pioneering this emerging field. This article discusses the results of that needs assessment.

Methods

The research study consisted of two parts: an online survey and focus group interviews. The online survey was distributed in March 2013 to all attendees of the inaugural National Energy Extension Summit in Fort Collins, Colorado. The summit included 57 eligible attendees, all of whom received the survey instrument via email. Participants were eligible if they worked for Extension and their primary job responsibilities involved energy programming, outreach, or education. The survey was designed around Dillman's tailored design method (Dillman, Smyth, & Christian, 2009), with minor modifications. Participants were electronically sent a prenotice letter, two follow-up reminder letters, and a postcompletion thank-you note (with approval of the Utah State University Institutional Review Board).

Extension faculty from Utah State University, the University of Wyoming, Colorado State University, and the University of Montana pilot tested the survey. The survey consisted of 27 questions, six of which were brief demographic questions. Due to the limited amount of literature on renewable energy programming in Extension, the survey used an exploratory approach. Topics covered in the survey included (a) opportunities and barriers related to renewable energy outreach in Extension, (b) the size and scale of renewable energy projects that Extension agents engage in, and (c) perceived clientele support for and interest in renewable energy programming.

Of the survey's 27 questions, 11 involved a 5-point Likert agreement scale for response choices. The survey also included ranked-order and open-ended question types. Results were analyzed using the Statistical Package for Social Sciences (SPSS) software package.

The focus group interviews were conducted October 2013 at the inaugural National Extension Sustainability Summit in Park City, Utah. The interviews served as an opportunity for respondents to further expound on the themes that emerged from the exploratory online survey distributed earlier that year. Interview facilitators were given nine questions to guide the discussion. The questions explored (a) the existence, role, and importance of renewable energy outreach in participants' respective Extension offices; (b) the opportunities for and constraints on renewable energy programming, outreach, and education in Extension; and (c) the message framing, marketing, and communication of renewable energy programs to clientele. Five facilitators conducted hour-long focus group interviews with 26 Extension employees from across the United States. Participants were selected on the basis of their roles in sustainable living programs; most had expertise in energy programming. The interviews were recorded and transcribed verbatim and then analyzed through the use of open, axial, and selective coding techniques (Neuman, 2013).

Results

The online survey achieved a 72% response rate, and the 26 focus group participants (and five facilitators) represented 52% of National Extension Sustainability Summit attendees who opted in to and met participant selection criteria for the interview.

Descriptive statistical analyses of the online survey results and focus group coding resulted in four common themes emerging from the data in each part of the study. Therefore, survey and focus group interview

results presented hereafter are merged, offering breadth and depth to the four themes that appeared most frequently in both data collection instruments. As the demand for renewable energy information increases, the four themes identified here can help further advocate for and direct Extension's efforts in renewable energy outreach and education.

1. There is a need for increased energy programming in Extension.

This theme was mentioned 62 times during the focus group interviews, whereas the second most frequently mentioned theme was mentioned 39 times. A focus group participant stated, "We have maybe a few people who know something about this [renewable energy outreach and education], but they may not know enough. I think some thoughtfulness needs to be given . . . to assembling the people who are experts within our system and then reaching out to others." The experts who are already delivering renewable energy programs in Extension have been well received. Their assessments of public reception to renewable energy programs are presented in Table 1.

Table 1.

Level of Agreement with Statements About Clientele Reception to Renewable Energy Programming in Extension

Statement	Level of agreement ^a					M	No.
	1	2	3	4	5		
The majority of my clientele are open to the idea of renewable energy as an alternative energy source.	0 (0%)	1 (3%)	10 (30%)	16 (49%)	6 (18%)	3.82	33
In teaching about renewable energy, I feel my approach connects well with my clientele.	0 (0%)	0 (0%)	7 (21%)	19 (58%)	7 (21%)	4.00	33
I receive more positive than negative feedback regarding the renewable energy outreach materials and training I have delivered.	0 (0%)	1 (3%)	5 (15%)	13 (39%)	14 (43%)	4.21	33

^a1 = *strongly disagree*; 5 = *strongly agree*.

2. Extension's history of providing unbiased, research-based information must remain central to renewable energy programming and outreach efforts.

Extension's purpose is to deliver useful, practical, research-based information to communities of all sizes (Cooperative Extension System Offices, 2014). This theme appeared multiple times in open-ended comments on the online survey and was highlighted frequently in all five focus group interviews. Extension employees perceived that this was their niche, or their strongest point of leverage and influence. A focus group participant summarized this sentiment by stating, "The advantage of Extension is that we have over 100

years of history being recognized as providing unbiased, research-documented information. We're not trying to sell anything or promote any particular product, and that's what we do best." Extension's reputation for objectivity makes the organization an ideal third party educator relative to homeowners/landowners and their utilities. Additionally, Extension has the opportunity to widen its influence by delivering information about distributed-scale renewable energy (i.e., the generation of electricity at some point or points other than a central station power plant) to agricultural landowners as well as urban dwellers.

3. Extension needs to form partnerships with outside existing energy entities to best serve the public.

The need for Extension to collaborate with local energy providers, nonprofits, and other outreach groups was mentioned 26 times during the focus group interviews. Partnering with other existing energy groups was cited as an opportunity for knowledge sharing and as a way to compensate for busy schedules with few opportunities for new or added responsibilities.

A focus group participant stated, "We always feel like our capacity isn't what we want it to be. I am a little shorthanded. I think that's a recurring theme that we've been hearing all day. There's so much to do." Collaboration between Extension offices and outside local energy stakeholders will foster communication between the two groups that prevents duplicated efforts. Partnerships also will ensure that Extension employees working in energy are making the most of their time.

4. Cost is the principal driver and barrier related to Extension clientele's renewable energy decisions.

The most frequently referenced issue that Extension respondents identified about their clientele was the financing of distributed-scale renewable energy projects. Financial decision making was often reported as the primary driver related to the completion of renewable energy projects in states with favorable incentives and regulations. Conversely, financial restrictions were more frequently cited as the chief barrier to distributed-scale (smaller-scale and modular devices) renewable energy transitions when energy prices were low and incentives were minimal. With regard to survey responses, Table 2 shows the top ranking that lack of financial resources garnered as a barrier related to clients' renewable energy decisions.

Table 2.

Barriers Related to Extension Clients' Renewable Energy Decisions

Barrier	Rating ^{a, b}					M	No.
	1	2	3	4	5		
Lack of financial resources	23 (74%)	3 (10%)	3 (10%)	2 (6%)	0 (0%)	1.48	31
Lack of understanding of technology	4 (13%)	18 (58%)	5 (16%)	3 (10%)	1 (3%)	2.32	31
Lack of access to the technology	1 (3%)	11 (36%)	14 (45%)	4 (13%)	1 (3%)	2.77	31
Lack of renewable energy sources (e.g., sunlight, wind)	0 (0%)	1 (3%)	8 (26%)	14 (45%)	8 (26%)	3.94	31
Opposed to renewable	2	1	4	5	19	4.23	31

energy (6%) (3%) (13%) (16%) (61%)

^a1 = extreme barrier, 5 = not a barrier. ^bPercentages may not sum to 100% due to rounding.

The high start-up costs of renewable energy systems are commonly cited as a challenging adoption barrier in public attitude and opinion research (Fratanduono, Steelman, & Petersen, 2013; International Economic Development Council, 2011; Reddy & Painuly, 2004). Extension can play an important role with farmers, ranchers, and homeowners by communicating state and federal incentives, geographical considerations, and loan options.

Applications for Extension Employees

A nationwide inventory of renewable energy programmatic efforts was conducted as a preliminary measure of this mixed-methods needs assessment. Key personnel were identified from each Extension program and then were contacted by electronic mail or phone to confirm what type, if any, of renewable energy programs their offices offer (Table 3).

Table 3.
Nationwide Inventory of Energy Programs in Extension

State	Centralized or distinct energy program	Energy specialist or similar title	Energy involvement without distinct program	No reported energy involvement or specialist
Alabama		X		
Alaska	X	X		
Arizona	X	X		
Arkansas			X	
California			X	
Colorado	X	X		
Connecticut			X	
Delaware				X
Florida			X	
Georgia			X	
Hawaii				X
Idaho			X	
Illinois	X	X		
Indiana	X	X		
Iowa	X	X		

Kansas				X
Kentucky			X	
Louisiana	X	X		
Maine	X	X		
Maryland		X	X	
Massachusetts	X	X		
Michigan	X	X		
Minnesota	X	X		
Mississippi			X	
Missouri	X	X		
Montana	X	X		
Nebraska	X	X		
Nevada			X	
New Hampshire			X	
New Jersey	X	X		
New Mexico			X	
New York	X	X		
North Carolina			X	
North Dakota	X	X		
Ohio	X	X		
Oklahoma			X	
Oregon			X	
Pennsylvania	X	X		
Rhode Island	X	X		
South Carolina			X	
South Dakota				X
Tennessee	X	X		
Texas				X
Utah	X			
Vermont			X	
Virginia	X	X		
Washington	X	X		

West Virginia			X
Wisconsin	X		X
Wyoming	X		X

Table 3 shows that 26 out of 50 states (52%) have centralized or distinct Extension energy programs in place. The 18 states considered to have "energy involvement without a distinct program" participated in sporadic or dated energy activities that are not recognized as core programs. These states often provided out-of-date fact sheets or had one-time grant funding relating to renewable energy. It would be a missed opportunity for approximately half of the nation's Extension programs not to provide expertise on one of the biggest issues of our time.

The International Energy Agency (2014) projects that renewable energy sources, specifically solar, will be the world's biggest single source of electricity by 2050. Renewable energy expertise, training, and programming will ensure that Extension is at the forefront of solving the nation's energy challenges. Connecting renewable energy to traditional Extension focuses will

- reinforce Extension's role of disseminating research-based and unbiased information to the public,
- illuminate Extension's energy role among federal and state entities, and
- bolster Extension's relevancy in the 21st century.

As an open-ended comment from the online survey stated, "The key is to determine how to broaden Extension's audience regarding clean energy. " A clean and secure energy supply has universal relevance—its importance is not limited to agricultural producers or landowners. Therefore, renewable energy programming, outreach, and education offer reinforcement to Extension's relevancy.

This article may be used as a framework for Extension offices that do not yet offer energy programming. For those already engaging clientele in renewable energy information, the four themes may serve as points on which to anchor programmatic efforts:

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.
4. Cost is the principal driver and barrier related to Extension clientele's renewable energy decisions.

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