One Thing That Should be Done: Energy

Teaching

- Provide training to Extension agents so they may perform energy audits
- Establish inter-college degree or certificate programs on sustainable energy systems
- Aggressive search for internship, work experience, & undergraduate research for all students
- Incorporate bio-energy in agricultural educational events
- Develop courses in life-cycle analyses of alternative energy systems (e.g., carbon footprint)

Research

- Identify impacts of land use restrictions limiting energy development
- Develop funding for multidisciplinary teams to research energy development
- Research if /how energy development can happen without loss of ecosystem services
- Provide economic assessment of energy company plans for community decision making and for individual land owners
- Research carbon capture technology
- Research reclamation, especially reclamation bonding (e.g., environmental bonds to ensure reclamation—financial security for reclamation post-project)
- Research national power grid improvement to effectively use green technology, e.g., ensure green power from the grid to rural communities
- Research how rural communities can be producers, economically benefit from access to national grid
- Research production & sustainability of alternative fuel crops
- Provide funding for research on developing feed stocks for energy
- Effects of energy subsidies to energy producers skewing market demand

Extension

- partner with local electric company
- assessment of ag waste for potential energy production
- create region-wide energy network (share info)
- further develop/empower western energy group; convene National Extension Energy Summit
- Engage whole university in helping communities deal with energy development (esp. engineering)
- Help develop conflict management skills to help communities facilitate energy conflicts; help facilitate these conflicts
- Create DOE Extension Service and/or fund existing systems.

Breakout #2 — **RESEARCH** Hawaii — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a*: Rural Energy	CARET member is developing small local grid for his region, and has raised costs of energy as major factor in farming	Need materials for Extension to educate & work w/ growers on energy options & costs. Need research & outreach on economic options for farms & communities.
Critical Issue *b*: Energy Sources	1. Research on jatropha and other oil crops. 2. Research on pyrolisis and biochar production for farm energy production. Research on selection of grass species and varieties. Research on co-products of biofuel production	Need to use economics to define focus in biofuels (pyrolisis, oil crops, biomass).
Critical Issue *c*: Impacts & mitigation	Research on economics of biofuel production. Established Sun Grant subcenter. - Research on use of biproducts of biofuel production. - Research on balancing pyrolisis for energy and biochar production - Research on use of invasive plants for biomass and pyrolisis	

Breakout #2 — **RESEARCH** CA _______________ — Energy

Critical Issues	What *is* being done? across all issues	What *should* be done? across all –
Critical Issue *a:* rural energy effects of devel costs need	1. 2. 3. (1) Campus-based energy efficiency work (incl rural research + extension centers) 4. 5. (2) Research on solar, wind, bio-digesters	1. 2. 3. (1) Need focus/targeted research in these areas 4. 5.
Critical Issue *b:* Diverse E sources need infrastructure optimize benefits for rural devel New E economy	1. 2. 3. 4. (3) implementation of research results from (2) to Campus + RECs system w/in UC 5. (4) rural economy research	1. 2. (2) cost/benefit analyses 3. (3) ecological impact analyses 4. 5. (4) continued funding for
Critical Issue *c:* impacts of E devel mitigation strategies EIS impacts land use	1. 2. 3. 4. conducted through AES & CE @ Berkeley, Davis and other centers/institutes UCLA 5.	1. 2. basic research on green technologies 3. 4. 5. (5) analyses w/ recommendations to improve the national power grid so that the opportunities for producing + effectively utilizing green technologies are improved

Breakout #2 — **RESEARCH** WYOMING — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a*: MITIGATION/RECLAIMATION CARBON CAPTURE/CLIMATE IMPACTS	1. VERY LITTLE (ALMOST NO 2. SCIENTIFIC LIT.) 3. A LOT, but WITHOUT 4. MUCH PROGRESS 5.	1. MORE RESEARCH ON CURRENT 2. REC. POLICIES SUCH AS REC. BONDING AND METHODS 3. TO INSURE ENV. REC. 4. ~~A FOCUS MORE ACKNOWLEDGE~~ CRITICAL ISSUE IN NEED 5. OF MORE DEFINITIVE RESULTS
Critical Issue *b*:	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *c*:	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.

Breakout #2 — **RESEARCH** _______________ — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* rural Energy	1. 2. Geothermal energy 3. systems in greenhouse 4. culture: Pagosa springs 5.	1. Help rural communities 2. redefine themselves to ~~put~~ be an energy source 3. & put energy on grid. Wind, oil, 4. natural gas. 5.
Critical Issue *b:* Energy Sources	1. fracking is a huge issue 2. in Colorado. Studying the 3. impact on land, wildlife, 4. water - bio fuel production; oil seed 5. crops; sweet sorghum - methane capture	1. determine the ecological & 2. human health impact of 3. fracking. Much concern by 4. citizenry. 5.
Critical Issue *c:* Impacts of energy development	1. fracking solutions on 2. H_2O quality, soil stability, 3. etc. 4. 5.	1. see issue b. 2. 3. 4. 5.

Breakout #2 — **RESEARCH** Montana — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Rural Energy	1. 2. 3. 4. 5.	1. More research on impact of 2. energy production on 3. rural communities 4. 5.
Critical Issue *b:* Sources	1. Alternative crops (biodiesel) 2. 3. 4. 5.	1. Sustainability of crops and 2. disposal of residue make 3. more market 4. 5.
Critical Issue *c:* Strategies	1. Reclamation of mines and 2. energy fields 3. 4. 5.	1. Evaluation of energy production 2. on water quality / ESA. 3. 4. 5.

Alaska

Breakout #2 — **RESEARCH**

______________________ — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Rural Energy	1. Not much on the research side in AK 2. 3. 4. 5.	1. Research on off-the grid energy systems - ~~a~~ 2 foci within that - 2. ~~alter~~ viable alternative energy - more efficient ~~use~~ energy usage 3. 4. 5.
Critical Issue *b:* Energy sources	1. ~~Some wk At~~ At AES - some work on biomass. Engineering school 2. doing lots of research on small-scale 3. alternative energy sources, ranging for in-stream hydro to solar, etc. 4. 5.	1. ~~Need to~~ ~~Need~~ Research to develop low tech solutions ~~r~~ really important for 2. small, off the grid, off the road systems communities 3. ~~with little~~ which often lack skilled labor. 4. 5.
Critical Issue *c:* Impacts of energy development/mitigation strategies	1. Land reclamation follow oil/coal extraction 2. 3. 4. 5.	1. Research to better understand environmental impacts of various kinds of energy development 2. + ways to minimize 3. Ecosystem reclamation following major disturbances caused by energy development 4. 5. maybe a better way to state it - Can energy development successfully occur without significant loss of ecosystem services?

Breakout #2 — **RESEARCH** NM ____________________ — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* RURAL ENERGY	1. PROVIDING TRAINING ON ENERGY EFFICIENCY TO RURAL COMMUNITIES. 2. 3. 4. 5.	1. SHOULD BE EXPLORING OPTIONS TO MAKE RURAL COMMUNITIES MORE SELF-RELIANT. 2. - FIND WAYS TO DECREASE COST OF OFF-THE GRID ENERGY SYSTEMS. 3. 4. - IDENTIFY REGION SPECIFIC ALTERNATIVE ENERGY SOURCES 5.
Critical Issue *b:* DIVERSE ENERGY SOURCES	1. ALGAE BIOFUELS RESEARCH BOTH CLOSED AND OPEN SYSTEMS 2. DAIRY BIODIGESTERS. 3. 4. 5.	1. - PROMOTE THE SPACE AND SUN NECESSARY FOR SOLAR EXPANSION. 2. - HELP FIND SOLUTIONS TO LAND ACCESS IN THE DIVERSE LAND OWNERSHIP SITUATIONS COMMON IN THE WEST. 3. 4. - PROVIDE INDEPENDENT ASSESSMENT OF CONTRACTS W/ ENERGY COMPANIES TO HELP INFORM CONSTITUENTS OF THEIR RIGHTS 5.
Critical Issue *c:* IMPACTS OF ENERGY DEVELOPMENT	1. MANY ENVIRONMENTAL ASSESSMENTS ASSOCIATED WITH WILDLIFE IMPACTS. 2. 3. 4. 5.	1. - GIVE SUPPORT TO COMMUNITIES STRUGGLING TO ADAPT TO THE INCREASED WEALTH AND ASSOCIATED PROBLEMS/BENEFITS. 2. - STUDY THE IMPACTS ON THE ENVIRONMENT THAT ARE HAPPENING AND COMPARE THIS TO WHAT HAS BEEN MODELED/SPECULATED. 3. 4. 5.

Breakout #2 — **RESEARCH** Nevada — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Rural Energy	1. Economic Impacts of energy 2. foodstock 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *b:* Energy Sources	1. * Developing Biofuels from plant sources - gum weed, Camellina, algae. 2. 3. Basic Biotechnology (gene modification) 4. * Developing alternative sources of rubber from rabbit brush etc. 5.	1. 2. Create a research ~~[illegible]~~ ~~[illegible]~~ initiative, targeted to develop new feedstocks through biotechnology. 3. 4. fund it on a competitive basis, include peer-review. 5. Include technology to
Critical Issue *c:* Impacts of Energy Development/ mitigation strategies	1. 2. 3. 4. 5.	1. Develop funding sources to create a multi-discipline team (including social scientists) to ~~[illegible]~~ research the impacts of energy development on communities and environment and mitigation strategies for ~~any~~ negative impacts. Include economics. 2. 3. 4. 5.

Atsep

Breakout #2 — **RESEARCH**

______________________ — Energy

Critical Issues	What *is* being done?	Develop What *should* be done?
Critical Issue *a:*	1. 2. 3. 4. 5.	1. ~~Study~~ Implement strategies to deal with boom/bust cycles. 2. 3. Identify economic impacts of off-grid energy systems. 4. 5. Public/private dedicating public lands are tied up.
Critical Issue *b:*	1. 2. 3. 4. 5.	1. 2. Identify impacts of land use restrictions - both on public and private land. 3. 4. 5. ~~For~~ Examine benefits/costs of ESA.
Critical Issue *c:*	1. 2. 3. 4. 5.	1. Identify ~~b~~ effects of subsidies on energy industry. 2. 3. 4. 5.

Breakout #3 — **EXTENSION**

New Mexico — Energy

Critical Issues	**What *is* being done?**	**What *should* be done?**
Critical Issue *a:* Effects Energy Development Rural communities	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *b:* Energy Sources	1. working w/ College Engineering 2. to develop educational materials 3. on alternative Energy 4. Algae Biofuels 5. Dairy biowaste programs	1. Continue to support & Expand 2. EA3 Program 3. "Exploring Energy/ Efficiency & Alternatives" 4. 5.
Critical Issue *c:* Impacts Energy development / Mitigation strategies	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.

Breakout #3 — **EXTENSION** UNIV OF CALIFORNIA — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:*	1. Evaluation of ~~xxx~~ fracking on ground water quality. 2. 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *b:*	1. Applied research and education on suitability of various crops for 2. bioenergy and ability to produce across various environments. 3. Evaluation of solar energy products in ag production systems. 4. Potential for energy production systems 5. from dairy waste.	1. Assessment of use of variety of ag waste for large scale (biomass) energy 2. production. 3. 4. 5.
Critical Issue *c:*	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.

Breakout #3 — **EXTENSION**

Wyoming — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Rural Energy Rural Economy High cost to comm off grid	1. off grid demonstrations wind / solar 2. 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *b:* Energy Sources alternate	1. Small Scale uses of alternative 2. 3. 4. 5.	1. Ag Waste Large Scale energy production 2. 3. 4. 5.
Critical Issue *c:* Impact of Energy Develop & mitigation Strategies	1. Community assistance for energy impacted communities 2. 3. 4. 5.	1. 2. 3. 4. 5.

Breakout #3 — **EXTENSION** Montana State — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:*	1. 2. 3. 4. 5.	1. facilitate university engagement 2. in communities affected by development 3. 4. 5.
Critical Issue *b:*	1. - Ag Energy Audits 2. - Development of EA3 3. Educational Program 4. (Exploring Energy ~~Alternatives~~ 5. Efficiency and Alternatives)	1. 2. 3. 4. 5.
Critical Issue *c:*	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.

Breakout #3 — **EXTENSION** Utah — Community & Economic Development

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Economic Diversity	1. Risk Management. 2. 3. 4. 5.	1. New Crops. / Alternative crops. 2. Local / reduced inputs. 3. 4. 5.
Critical Issue *b:* Economic Development	1. 2. 3. 4. 5.	1. Facilitation 2. 3. 4. 5.
Critical Issue *c:* work force Development.	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.

Univ. Hawaii - Manoa

Breakout #3 — **EXTENSION**

______________________ — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Rural Energy	1. 2. 3. 4. 5.	1. Education on the true cost of energy & work on 2. conservation & then development. 3. 4. Partnering with local electric Co. 5.
Critical Issue *b:* Energy Sources	1. Sun Center (subcenter) 2. Sugarcane & other large grass alternatives 3. 4. Hydro, wind, geothermal, solar 5.	1. Energy specialists 2. 3. 4. 5.
Critical Issue *c:* Impacts of Energy/ Development/ mitigation Strategies	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.

Breakout #3 — **EXTENSION** Region — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Rural Energy	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *b:* Energy Sources	1. 2. 3. 4. 5.	1. Connect w/ Engineering Depts to do education programs on alternative energy options 2. 3. 4. Develop energy projects for 4H 5.
Critical Issue *c:* Impact of energy development mitigation strategies	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.

Breakout #3 — **EXTENSION** OREGON — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* RURAL ENERGY	1. 2. 3. 4. 5.	1. BUDGETING ~~[illegible]~~ ENERGY 2. (USAGE OVER TIME) 3. 4. FRONT & CENTER 5. TRAIN HOUSEHOLD ENERGY AUDITORS
Critical Issue *b:* ENERGY SOURCES	1. 2. 3. 4. 5.	1. DECISION SUPPORT TOOLS 2. FOR COMMUNITY LEADERS 3. i.e., ALTERNATIVES & 4. CONSEQUENCES 5.
Critical Issue *c:* IMPACTS OF DEVELOPMENT	1. 2. 3. 4. 5.	1. CASE STUDIES IN 2. REPRESENTATIVE ENVIRONMENTS 3. 4. 5.

Breakout #3 — **EXTENSION** Oregon — Community & Economic Development

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Fostering Econ Dvmt	1. 2. 3. 4. 5.	1. Develop peer support system 2. among small businesses 3. ie. shared accounting 4. system 5.
Critical Issue *b:* Sustainable Communities	1. 2. 3. 4. 5.	1. Rural - Urban Exchanges 2. 3. 4. 5.
Critical Issue *c:* Workforce Dvmt	1. 2. 3. 4. 5.	1. Online Degree-Completion 2. 3. 4. 5.

Breakout #3 — **EXTENSION** University of NV — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Rural energy	1. • Research on effects of construction transmission lines on endangered species. 2. 3. • Research on effect of wind production on wildlife 4. 5.	1. Promote conflict resolution skills, 2. 3. • ~~[illegible]~~ Facilitation skills 4. 5. • Apply community planning skills
Critical Issue *b:* Energy Source	1. Woody biomass as an energy source — pilot efforts. 2. 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *c:* Impacts of energy development	1. ~~Drilling [illegible]~~ 2. 3. 4. 5.	1. 2. 3. 4. 5.

Breakout #1 — **TEACHING** Penny Diebel - OSU — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a*: Rural Energy	1. 2. 3. 4. 5.	1. 2. Work w/ Extension on workshops 3. 4. 5.
Critical Issue *b*: Diverse Energy Sources	1. offering a lower division and upper division course on Renewable Energy 2. 3. 4. 5.	1. Develop Graduate Concentration/ Certification on energy 2. 3. 4. 5.
Critical Issue *c*: Impacts of Development	1. Covered a little within Nat-Res Econ classes 2. 3. 4. 5.	1. 2. 3. 4. 5.

Breakout #1 — **TEACHING**

CMK - Hawaii — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Rural Energy	1. 2. 3. 4. 5.	1. - Provide training to 2. extension agents so they 3. may perform energy 4. audits on farms and 5. processing operations.
Critical Issue *b:* Diverse energy sources	1. 2. 3. 4. 5.	1. - Establish inter-college degree or 2. certificate programs on 3. sustainable energy systems 4. 5.
Critical Issue *c:* Impacts	1. 2. 3. 4. 5.	1. - Develop courses in 2. Life Cycle Analysis of 3. alternative energy 4. systems. 5.

Breakout #1 — **TEACHING** Idaho — Energy

Larry

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Rural Energy - Cost - Off-grid (local energy)	1. 2. ~~Not aware~~ 3. ~~anything~~ 4. on-farm Bio-fuels 5.	1. 2. 3. 4. 5.
Critical Issue *b:* Diverse Energy Sources - ~~Cost~~ at all sources - new energy economy	1. 2. Bio fuels Program 3. - education & research 4. 5.	1. 2. 3. educate on alternative energy methods/systems 4. 5.
Critical Issue *c:* Impact of Energy Development & mitigation	1. 2. None 3. 4. 5.	1. 2. 3. 4. 5.

Breakout #1 — **TEACHING** CSU Fresno CA — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Rural Energy – Community Impacts High cost	1. 2. 3. 4. 5. Exploring Solar integration in farm communities. Working for clearing a path way for dairy digesters to be viable in CA.	1. 2. 3. 4. 5.
Critical Issue *b:* Diverse Energy Sources	1. 2. 3. 4. 5. Developing with private sector → Energy beets as alternative to corn for EtOH production – Advantages for marginal lands – rotational crop.	1. 2. 3. 4. 5. ?
Critical Issue *c:* Impacts of energy development/ mitigation strategies	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.

Breakout #1 — **TEACHING** WYOMING. — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* RURAL ENERGY	1. COLLABORATE WITH THE SCHOOL OF ENERGY RESOURCES on course offerings and the degree in Energy Resource Mgt. + Development 2. 3. 4. 5.	1. 2. 3. ? See group sheets 4. 5.
Critical Issue *b:* DIVERSE ENERGY SOURCES	1. 2. 3. ? 4. 5.	1. 2. See group sheets 3. ? 4. 5.
Critical Issue *c:* IMPACTS OF ENERGY DEVELOPMENT/ MITIGATION STRATEGIES.	1. 2. 3. ? 4. 5. Restoration and Reclamation Graduate Certificate.	1. 2. See group sheets. 3. ? 4. 5.

Nancy Irlbeck CSU — College of Ag

Breakout #1 — **TEACHING** ______________________ — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Rural Energy	1. SOCR classes 2. DARE classes 3. BSPM classes (minimal addressing the topic) 4. 5.	1. 2. 3. 4. 5.
Critical Issue *b:* Diverse Energy Sources	1. Again Being addressed 2. in classroom Some internships 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *c:* Impact of energy development/mitigation strategies.	1. 2. minimal 3. 4. 5.	1. 2. 3. 4. 5.

- All of these should could be addressed in many classes in many disciplines.
- New courses need to be offered
- Aggressive search for internship
- UG research and work experience
- Graduate level courses for same.
- Provide training to extension for energy audits services to producers

Breakout #1 — **TEACHING**

Nevada — Energy

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Rural Energy	1. 2. 3. Have minor program in Renewable Energy 4. 5.	1. Develop 2. 3. 4. 5.
Critical Issue *b:* Diverse energy Sources	1. We have an alternative 2. energy group that crosses the College of Ag, 3. College of Business & the 4. College of Engineering 5.	1. ~~Develop cross college~~ 2. ~~programs to address~~ 3. 4. 5.
Critical Issue *c:* Impacts	1. We have Grad students 2. looking at the environ- 3. mental impact of 4. Solar & Wind Farms 5.	1. 2. 3. 4. 5.