Energy Transitions & the First West: The Complex Histories of Appalachia’s Emerging Futures

Betsy Taylor, Executive Director, Livelihoods Knowledge Exchange Network (LiKEN), www.likenknowledge.org

Solar array on the roof of the Kentucky Coal Museum, Benham, Harlan County, Kentucky
“[We must]...challenge the presumption that scholars can make simple, predictive models of social–ecological systems (SESs) and deduce universal solutions, panaceas, to problems of overuse or destruction of resources. Moving beyond panaceas to develop cumulative capacities to diagnose the problems and potentialities of linked SESs requires serious study of complex, multivariable, nonlinear, cross-scale, and changing systems.”


THE CHALLENGE OF ACTIONABLE SCIENCE

◆ “We should stop striving for simple answers to solve complex problems”

◆ “we need to recognize and understand the complexity [of SES] to develop diagnostic methods to identify combinations of variables that affect the incentives and actions of actors under diverse governance systems.”

◆ “To do this we need to examine the nested attributes of a resource system and the resource units generated by that system that jointly affect the incentives of users within a set of rules crafted by local, distal, or nested governance systems to affect interactions and outcomes over time.”

◆ “...we need to enable resource users and their officials to experiment with adaptive policies so as to gain feedback from a changing SES before a severe transformation adversely overcomes them.”

◆ [We must develop] “A nested framework for analyzing interactions and outcomes of linked SESs”
Goals of my presentation

- Ecological assets of Appalachia, in context of North American energy challenges in the 21st century

- Social and cultural assets in Appalachia, that provide resources for emerging innovations in energy transition

- “Wicked problems” of the coupled human / natural energy systems

- Sensitive intervention points, for untangling “wicked problems”
Limitations of my presentation

- **BROAD NOT DEEP:** Scope multiple causal factors entailed in this complex energy system, to clarify emergent research questions (including ones for which we don’t have answers)
- Focus primarily on North Central, Central, South Central Appalachia
- Focus on coal-impacted because of deep structural changes (crisis = opportunity and danger)
ECOLOGICAL ASSETS

CLIMATE STRESSORS, 21ST C. NORTH AMERICA

- Water scarcity (drought, contaminants, etc.)
- Extreme weather events, flooding
- Greenhouse gases accumulated from 2 centuries of carbon energy systems
- Climate migration (non-human & human)
- Phasing out of long supply chains
- Decentralized, distributed energy systems

APPALACHIAN ECOLOGICAL ASSETS

- High rainfall region
- Carbon sink potential
- Propinquity to major population centers of the east coast
- Climate refugia
- Megabiodiversity, buffering capacity, resilience
- Moderate capacity for renewable energy

(This is not part of the national narrative about Appalachia. Urgently need to amplify the public voice of physical geographers)
Appalachian mountains = key national ‘water tower’

Important source of freshwater

- Potomac River provides Washington D.C. with 90% of its water;
- Ohio River upstream of Cincinnati provides water to 10 million people alone.

“From the Forest to the Faucet” Ecosystem Services & Markets Program, USDA Forest Service, Cooperative Forestry, Washington, DC. 

https://www.fs.fed.us/ecosystemservices/FS_Efforts/forests2faucets.shtml


https://iwss.wvu.edu/files/d/c037fc50-9
Carbon sink & the Appalachian forest

- Cool soils
- High biodiversity
- Temperate rainforest

Figure 7.5, Chapter 7, in the Third National Climate
Carbon sinks: Appalachian forest soils

“Field measurements of litter and soil attributes in the Forest Inventory and Analysis program were used, for the first time, to develop predictions of litter and soil carbon (C) stocks and stock changes in U.S. forests. This work resulted in substantial increases in the contribution of the soil organic carbon (SOC) pool, from approximately 44 percent of the total forest ecosystem C stocks to 71 percent, in the forest C budget of the United States.”

Propinquity to major population centers of the east coast

- Climate impacts are already changing U.S. agriculture & might open different niches for Appalachia within national food economy
- Relocalizing, post-carbon supply chains
- Lowered carbon footprint for transport
- Amenity-based development and recreation
Crucial importance of Appalachian climate refugia over millenia

- Urgent need to reframe the national narrative about Central Appalachian forest
- To amplify public voices of physical geography, historical ecology
- To communicate the unique nature and value of the “mother forest” & the great climate dramas of the past that took place there
- To communicate Native American forest practices and traditional ecological knowledges of the Appalachian forests

“...the world's oldest and biologically richest temperate zone hardwood system [on which] the pioneering ecologist E. Lucy Braun conferred the name "mixed mesophytic."

Centered in southern West Virginia, the mesophytic has issued for more than a hundred million years from the black, unglaciated loam of the Central Appalachian coves...these coves are the likely ancestral source of most temperate-zone forest species in the eastern United States. Ecologists are calling it the "mother forest."

Whereas most forest types are dominated by two or three species, the mixed mesophytic harbors eighty woody species in its canopy and understory...Yet the coherence of this forest region remains one of America's better kept secrets.

If, as Braun argued, the central Appalachian coves sheltered biodiversity against the extreme cold that interrupted the evolution of surrounding forests, it follows that the same coves could again become banks of species diversity, sustaining heat-intolerant plants in a period of global warming.”

**Global climate refugia**

**PAST ROLE OF APPALACHIAN REFUGIA FOR NORTH AMERICA**
- LENGTH AND COMPLEX RIDGING OF MOUNTAINS enables climate migration and refugia-within-refugia (Davis, 1981; Delcourt and Delcourt, 1981; Soltis et al., 2006)

**FUTURE ROLE OF APPALACHIAN REFUGIA FOR NORTH AMERICA: many uncertainties**
- Christopher Ulrey et al. “Life at the top: Long-term demography, microclimatic refugia, and responses to climate change for a high-elevation southern Appalachian endemic plant” *Biological Conservation* 200 (2016) 80–92

**ASIAN / APPALACHIA CONNECTION**
- “Based on genetic studies and palaeoecological surveys, the main Korean mountain range, the so-called ‘Baekdudaegan’, has been recently suggested to be a major glacial refugium at the Last Glacial Maximum for the boreal and temperate flora of northeastern Asia. On the basis of its shared role as a glacial refugium, and on a series of striking similarities in floristic richness and orographic features, the BDDG would constitute a sort of “eastern counterpart” of the Southern Appalachians. Given its floristic, biogeographic, and cultural value, the BDDG merits high priority for conservation.”
Renewable energy

Most recent regional study found a lack of systematic data: “...collective knowledge is severely lacking on the role and potential of clean energy in Appalachia, and the ways in which this region is uniquely suited to benefit from clean energy initiatives. “ (p. 4, Central Appalachian Network.2019. “Central Appalachian Clean Energy Economic Impact Inventory”. January)

Solar: Appalachia isn’t a particularly good region for solar power compared to the rest of the nation. The Appalachian region has moderate to low solar capability, relative to the rest of the country, due to its geography and resulting cloud cover and cooler temperatures. “ (p. 8, Central Appalachian Network.2019. “Central Appalachian Clean Energy Economic Impact Inventory”. January)

- Nonetheless, solar energy still has potential for both thermal use and electricity generation using photovoltaic (PV) panels.
- The job creation potential of expanded PV energy generation is significant due to the fact that the bulk of new employment occurs in the manufacturing phase of industry development.
WIND POWER IN APPALACHIA

“Overall, this resource appears to be the greatest potential source of renewable power for the eastern U.S.”

Small and low impact hydroelectric capability is another largely undeveloped energy resource in the ARC region.

Table 1.2: Estimated Small and Low Power Hydropower by ARC State

<table>
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<th>State</th>
<th>Total (MWA)</th>
<th>Small Hydro (MWA)</th>
<th>Conventional Turbines (MWA)</th>
<th>Unconventional Systems (MWA)</th>
<th>Microhydro (MWA)</th>
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Civic, social, cultural assets for energy transition

- Importance of imagination, narratival reframing, and sense of common purpose
- Burgeoning and quiet movement for economic and energy transition
- Builds on the rich ‘civic compost’ of waves of social movements over many decades
  - Rich history of labor struggles, sense of solidarity, leadership skills
  - Black lung movement
  - Anti-strip mining movements (1970s, 1980s)
  - Economic diversification & just transition movements (1990s-present)
  - Civil rights movement (1950s-60s)
  - Anti-MTR movement (2000s)
Working class, rural sensibility in which care for the land and place articulates with economic justice struggles

Photo from “To Save the Land and People”, a film about struggles against stripmining and the broad form deed. Directed by Anne Lewis & produced by Appalshop, a vibrant media collective in eastern KY.

Women have been key leaders in grassroots environmental and social justice movements in the region (cf. Shannon Bell. 2013. *Our Roots Run Deep as Ironweed: Appalachian Women and the Fight for Environmental Justice.*)
Highlander Research & Education Center

At time of Highlander founding, became involved in the Wilder coal mining strike. Workers in Fentress County went on strike to protest low pay and unsafe working conditions, leading to extreme violence over several years.

Photo, taken by an FBI agent, shows Martin Luther King Jr., Pete Seeger, Rosa Parks and Ralph Abernathy at Highlander in 1957. PHOTO: Highlander Research and Education Center
Photos from collection “Tending the Commons: Folklife and Landscape in Southern West Virginia”, Library of Congress, compiled by public folklorist, Mary Hufford.

Photos by Lyntha Scott Eiler

Natalie Pettry with her seng ginseng hoe. Horse Creek Raleigh County West Virginia

Ginseng Drying in a Window. Pettry Bottom Raleigh County West Virginia
Wicked problems: deeply rutted paths of development

THEORETICAL FRAMEWORK

Appalachian Studies → International ‘resource curse’ literatures → Coupled human / natural systems

KEY FEEDBACK MECHANISMS THAT ‘LOCK IN’ ENERGY REGIMES

- Poorly designed public revenue structures
- Land inequality
- Governance problems
- Etiolated public services and public goods, serving vulnerable and low resource populations
- Legacy costs
GOOD REVENUE DESIGN

- Counter-cyclic ‘smoothing’ to offset the boom & bust swings of global markets
- Financialization & diversification into independently managed and distributed funds
- Priority given to social investment (education, workforce development, planning for future)
- National, accurate, and transparent social and environmental accounting of impacts on local communities

U.S. PUBLIC REVENUE STRUCTURES

- Early archaic structures of land and finances in the ‘first West’ of Appalachia
- Speculation in land & resources in 1800s-1910s: Appalachia = the Wall Street of rising classes of eastern seaboard cities
- Revenue design improves from east to west, in later and more sophisticated development over the decades
- Lack transparency (variation between states, fragmented and siloed funds that are opaque to citizens and hard to aggregate)
- Production based severance tied to boom & bust ("fiscal diabetes")
- Huge energy debt: America / Appalachia
Who Owns Appalachia? The 1979 Study

- Appalachian Alliance formed after 1977 floods (KY, WV, VA)
- Task Force on Appalachian Land Ownership
- First meeting: Highlander Center, 1978
- ARC funded (~ $130,000) study from 1979-1980
- Participatory Action Research
- Detailed state and county reports now digitized in Special Collections, Appalachian State Univ
- Galvanized multiple grassroots organizations

Key Findings:

• The top 1% of owners own 44% of the land
• Of the 13 million acres of surface land sampled, 72% is absentee owned
• 80% of the mineral rights are absentee owned
• Over 75% of the mineral owners pay less than 25 cents per acre in property taxes
• 41% of the land and minerals owned by the 300,000 owners in the survey are held by only 50 private owners and 10 government agencies
• 46 of the top 50 owners are corporations, most of them absentee
• The federal government is the largest single landowner in Appalachia, holding over two million acres
• Tied under-taxation to poverty rates, changing land use
  • In Martin County, KY, the largest landowner (an absentee railway corporation) owned more than half of surface and mineral rights but paid less than 13 cents per acre in taxes; likewise Harvard University owned 9,720 acres of oil and gas rights in Martin Co. but paid no taxes on them at all as a non-profit.
  • In the 1970’s about 1/3 of farm land surveyed in the 80 counties was taken out of production and half the farmers quit farming
Inequality & governance

- Ratio of income of top 20% to bottom 20% shows 2 tier class structure
- Power of local elites from vertical flows of resources


Political volatility & disconnection

2016 Voter Turnout
Data Source: Measure of America
https://measureofamerica.org/maps/

% Voter Turnout
- 15.96 - 47.93
- 47.93 - 55.99
- 55.99 - 63.20
- 63.20 - 71.52
- 71.52 - 96.59
“Sticky wages” & underinvestment in schools and other public services
Paradox of too much government & too little government

SNAP Benefits
Data Source: 2011-2015 U.S. Census Bureau American Community Survey via Measure of America
https://measureofamerica.org/maps/

% of Residents Receiving SNAP Benefits
- 0 - 8.9
- 8.9 - 14.0
- 14.0 - 19.5
- 19.5 - 27.7
- 27.7 - 54.1
Wayne Coombs. “Carrying That Allostatic Load: Hillbillies and the Consequences of Historical Trauma”. Manuscript under review.
Surface Mining Control & Reclamation Act (SMCRA) and legacy costs

**Intent of law**
- Integrated stewardship of ecological, cultural, and economic assets

**Administrative law**
- Lack of triggers to connect agencies responsible for economic development with reclamation as an engineering challenge
- Weak triggers and forums for public participation

**Legacy costs**
- Fragmented governmental supports for community transitions & economic diversification
- URGENT: Poorly managed and designed public water systems
Solutions

- Government transparency & inter-agency cooperation
- Horizontal, regional linkages between local projects
- Participatory action research
- Intergenerational
Appalachian Transition Fellowship, of the Highlander Center in eastern TN

◆ IN-DEPTH LOCAL FOCUS: For one year, young people from the region work on a transition project with a grassroots organization

◆ HORIZONTAL, TRANS-LOCAL SOCIAL LEARNING: Close and warm community among fellows who meet regularly for peer mentoring and training

◆ Highlander’s wealth of pedagogies in liberatory analysis of root causes and structural transformation
The Central Appalachian Network (CAN) is a network of nonprofit organizations working to develop a more just and sustainable Appalachia.

Since 1993, the Central Appalachian Network (CAN) has been dedicated to working for a more just and sustainable Appalachia. We work to advance the economic transition of the region by fostering the development of enterprises, organizations, and policies that promote and protect the health of our local economies, communities, and environment. For almost 20 years, CAN member organizations have been coming together to learn, build relationships, and collaborate to build capacity and impact on a regional scale.
A leading nonprofit advocate for a just economy and healthy environment in the Appalachian region and a driving force in America’s shift from fossil fuels to clean, renewable energy.

Based in Boone N.C., Charlottesville and Wise County, Va., and Knoxville, Tenn., we combine grassroots organizing, policy advocacy and technical expertise to hold decisionmakers accountable in courtrooms, in state capitals and in Washington D.C. to effect positive change in the region.

- Appalachian Voices’ Solar Workgroup of Southwest Virginia is developing a multi-faceted strategy for establishing a vibrant solar energy hub in the coalfields of far Southwest Virginia to:
  - Accessing capital and financing options
  - Promoting policies that support the solar industry
  - Building workforce development and solar value chain opportunities
  - Maximizing community education
“Agency-mapping” method developed by Alliance for Appalachia

The Alliance for Appalachia is a regional coalition of grassroots, non-profit organizations with the goals of ending mountaintop removal, putting a halt to destructive coal technologies, and creating a sustainable, just Appalachia.

In 2015, Highlander fellows with A4A & ACLC produced a popular education study of AML program
House Natural Resources Committee will vote this week on the RECLAIM Act

The RECLAIM Act - HR 2156 - commits $1 billion to projects that clean up abandoned coal mines and waters polluted by them. It prioritizes public input and community participation on which projects are chosen and how they are run.

Strong bipartisan support in Congress and from dozens of local governments.

FROM THE ALLIANCE FOR APPALACHIA:

“The funds would strategically reclaim sites that are linked to a long-term economic project driven by local communities, such as agriculture, renewable energy, wildlife habitat, and recreational tourism projects. These locations could serve as long-term economic opportunities to create permanent local jobs, helping to lay a foundation for future economic development and diversification in coal communities.”
The new Appalachian Land Study
www.appalachianlandstudy.org

County Community Researcher Teams (currently forming in:
Harlan and Martin Counties, KY; Mingo, Logan, Boone, WV; Claiborne County, TN)

State (Highlander Center Economic Transition Fellows coordinating outreach in VA & KY in 2017-18 & currently in WV and TN. NC activating a state committee)

Participatory data

Using power mapping and community mapping with Highlander Fellow, Terran Young, and her host organizations, Southern Appalachian Mountain Stewards in VA – developed the idea of the “Land Matrix” which has become central concept in the Land Study.

The “land matrix” refers to everything that maintains land inequality—including webs of power, money, public revenues and policies, as well as mindsets and values.
Participatory data

We did power mapping and community mapping to:

• Identify stakeholders

• Identify causal scenarios

Highlander Fellow, Terran Young develops a power map for the “land matrix” in Wise County VA.
Participatory data

In our day long workshops, we made power maps, and then went through multiple rounds of deliberation to distill:
--root causes
--vicious cycles that make change hard
--openings for positive change

Photo: Mary Hufford (LiKEN) and Kristie Rodgers (Highlander Fellow working in Harlan County KY) analyze causal scenarios
Stakeholder assessment, Pipestem WV
Stakeholder assessment, Harlan County KY

- Local land owners
- Agriculture; both large and small farmers
- Wildcrafting businesses (i.e. “House of Roots”)
- Hemp/Cannabis growers
- Squatters
- Tourism (i.e. “Adventure Tourism” in Evarts, etc)
- Artists of all sorts including photographers, crafters, etc
- Bookstores and other cultural businesses
- Clean energy businesses (i.e. solar and wind entrepreneurs)
- People holding onto land and not using it, either individuals or corporations
- Families who “control” events in the county
- Funeral homes
- Bianchi family, i.e. land grab in trade for funeral services (gathering land in trade beyond the value of the funeral costs)
- Cemetery owners
- Harlan County
- Judges
- Army Corp or Engineers
- Local government in each town or community (i.e. mayors, city councils, etc)
- Schools, College
- Public institutions
- Malls & other large businesses with large lots of land
- Railroads
- Timber companies
- Land holding companies
- Construction companies
- Homeless
- Substance abusers
- Mining corporations
Timeline of the ‘land matrix’, Pipestem WV
Participatory action research methods can be game-like
Stories of Place = a spin-off project of the Land Study

Gathers stories of home—the forests, coves, waterways, and species that shape life in Central Appalachia:

• To bring youth and elders in Appalachia together to share their memories and visions of the future;
• To catalyze community involvement in deciding how land and resources meaningful to communities might be managed collaboratively.

Stories of Place students locating their homes and special places on a map of Martin County during the first meeting. Photo by Allison Leip.
Need for integrated knowledge systems to develop ‘diagnostic frameworks’ (Ostrom) to understand complex socio-ecological systems of energy transitions