STATE OF NEW MEXICO
BEFORE THE ENVIRONMENTAL IMPROVEMENT BOARD

IN THE MATTER OF THE PETITION FOR HEARING TO ADOPT NEW REGULATIONS AND TO AMEND VARIOUS SECTIONS OF 20.2.1, 20.2.2, 20.2.70, and 20.2.72 NMAC, STATEWIDE CAP ON GREENHOUSE GAS EMISSIONS	)	No. EIB 08-19(R)

REBUTTAL TESTIMONY OF WINONA LADUKE

Q. PLEASE STATE YOUR NAME, TITLE AND CREDENTIALS.

A. Winona LaDuke. I am an Anishinaabe (Ojibwe) enrolled member of the Mississippi Band Anishinaabeg who lives and works on the White Earth Reservation. I am an internationally renowned activist working on issues of sustainable development, renewable energy and food systems. I live and work on the White Earth reservation in northern Minnesota, and am a two time vice presidential candidate with Ralph Nader for the Green Party.

As Executive Director of the Honor the Earth, I work nationally and internationally on the issues of climate change, renewable energy, and environmental justice with Indigenous communities.

In 2007, I was inducted into the National Women's Hall of Fame, recognized for my leadership and community commitment. In 1994, I was nominated by *Time* magazine as one of America's fifty most promising leaders under forty years of age. I have been awarded the Thomas Merton Award in 1996, *Ms.* Woman of the Year (with the Indigo Girls in 1997), and the Reebok Human Rights Award, with which in part I began the White Earth Land Recovery Project.

I received my Bachelors degree from Harvard University in Native Economic Development in 1982, and a Masters degree in Rural Economic Development from Antioch University in 1989.

I have received two Honorary degrees: Gustavus Adolphus College, Saint Peter, MN, (2001), Honorary Doctorate of Arts; and University of Minnesota, Duluth, (2002), Honorary Doctorate of Law.

I have written extensively on Native American and environmental issues. I am the author of five books, *Last Standing Woman* (fiction), *All Our Relations* (non-fiction), *In the Sugarbush* (children's non-fiction), and the collection of essays *The Winona LaDuke Reader*. My most recent book is *Recovering the Sacred: the Power of Naming and Claiming* (South End Press).

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I am a former board member of Greenpeace USA and am presently an advisory board member for the Trust for Public Lands Native Lands Program as well as a board member of the Christensen Fund. I have spoken at colleges and universities across the United States, and given lectures at many conferences and public forums, nationally and internationally, and have been widely recognized for my work on environmental and human rights issues.

Q. ON WHOSE BEHALF ARE YOU PRESENTING THIS TESTIOMNY?
A. I am presenting this testimony on behalf of New Energy Economy.

Q. HAVE YOU PREPARED A STATEMENT OF YOUR CREDENTIALS?
A. Yes I have. It is provided as an attachment and incorporated into my testimony. (Rebuttal Exhibit R21.) The main thrust of my career is as a Native American and environmental activist. I work on a national level to advocate, raise public support, and create funding for frontline native environmental groups, including facilitating the recovery of the community's original land base, while preserving and restoring traditional practices of sound land stewardship, language fluency, community development, and spiritual and cultural heritage. I began speaking about these issues at an early age, addressing the United Nations at age 18, and continue to devote myself to Native and environmental concerns, as well as political and women's issues.

The focus of my work for the last 30 years has included:
- The Next Energy Economy: Grassroots Strategies to Mitigate Global Climate Change and How We Move Ahead
- Climate Change, Green Jobs and the Future of our Communities
- Sustainability in a Reduced Carbon Economy
- Food Security in a Time of Climate Change
- Seed Sovereignty: Who Owns the Seeds of the World, Bio-Piracy, Genetic Engineering and Indigenous Peoples
- Indigenous Thinking on the New Millennium
- Creating a Multi-Cultural Democracy: Religion, Culture, and Identity in America
- Native Women and Politics
- Activism, Justice and Future Generations
- Recovering the Sacred: An American Holy Land, and Non-Christian Faith in America

Q. PLEASE LIST SOME OF THE PUBLICATIONS YOU HAVE AUTHORED REGARDING CLIMATE CHANGE AND SOCIETAL IMPACTS?
A. I have been published extensively on issues of Native economic development, environmental issues, and legal issues related to Native affairs. Published in magazines including: *Business and Society Review*, *Cultural Survival Quarterly*, *Indian Country Today*, *Insurgent Sociologist*, *Radcliffe Quarterly*, *Union of Radical Political Economics*, *Utne Reader Magazine* (News from Indian Country, Akwekon Journal), *Sierra Magazine*, Orion Magazine, and *Patagonia*.

Selected Publications (Articles and Chapters)

"Like Tributaries to a River", Sierra Magazine. Fall 1996

"Traditional Ecological Knowledge", in University of Colorado Journal of Environmental and International Law. Spring 1994.

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"Native America, The Political Economy of Radioactive Colonialism", Insurgent Sociologist, Vol 13, Spring 1986.

The Council of Energy Resource Tribes in "Native Americans and Energy Development II, (Joseph Jorgenson, Ed.), Anthropology Resource Center, Cambridge, MA, 1981.

"The Political Economy of Radioactive Colonization", Union of Radical Political Economists, Spring 1979.

Q. PLEASE PROVIDE AN OVERVIEW OF YOUR TESTIMONY

A. Ojibwe prophecies speak of a time during the seventh fire when our people will have a choice between two paths. The first path is well-worn and scorched. The second path is new and green. It is our choice as communities and as individuals how we will proceed.

We've already raised the average temperature of the globe one degree. The question is whether we can stop it from rising much more: **this is at the core of our survival.** It is essential for us to look at the world's economic and environmental realities in order to make critical decisions about our future. That means we must address issues such as climate change, peak oil and food insecurity. This new millennium is a time when we are facing the joint challenges of an industrial food system and a centralized energy system, both based on fossil fuels, and both of which are damaging the health of our peoples and the Earth at an alarming rate. In the US— historically the largest and most inefficient energy economy in the world— tribal communities have long supplied the raw materials for nuclear and coal plants, huge dam projects, and oil and gas development. These resources have been exploited to power far-off cities and towns, while people of color live in the energy sacrifice zone.

The opposition witnesses represent industry interests that contribute to global warming through their emissions of large quantities of greenhouse gases. They have emitted large quantities of greenhouse gases and have done so for many years. The exploitation of these resources has created a carbon overload in the atmosphere. Members of New Mexico's Oil and Gas Association, Public Service of New Mexico, Tri-State Generation, the City Of Farmington and other opposition witnesses know that the harvesting of fossil fuels, such as the mining of coal and drilling for petroleum, cause large quantities of methane emissions. The combustion of fossil fuels adds large quantities of carbon to the atmosphere that cause global warming. These human-induced emissions of heat-trapping gases comes mainly from the burning of fossil fuels (coal, oil, and gas).[1] (Coalition Arizona/New Mexico Counties' witness Balgord argues that "[c]urrent warming (during 2nd half of 20th century) is not primarily due to greenhouse gases from either natural or man-made sources." (Coalition of Arizona/New Mexico Counties' witness Balgord 1).

Today, we are encountering unfamiliar weather-related changes as a result of the concentration of greenhouse gas in the atmosphere; this in turn, causes world-wide depletion

[1] Observations show that warming of the climate is unequivocal. http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf

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of various natural systems (e.g. soil fertility, aquifers, depleted ranching and agricultural lands, drought, and biological diversity in general). A two degree temperature change means massive loss of animal and plant diversity and the beginning of the collapse of ecosystems from coral reefs to ice caps. A three or four degree temperature change will mean an extreme loss of species and of food. Projected climate changes by mid- to late-century in New Mexico are an average air temperature that is warmer by 6-12°F[2]. Southwest water supplies will become increasingly scarce; droughts will be worsened by higher evaporation rates. It is well understood that water is vital to agriculture, hydroelectric power production, and ecosystems. (Coalition Arizona/New Mexico Counties' witness Balgord argues that "there is nothing particularly unique, exceptional or unprecedented about 20th century warming." (Coalition of Arizona/New Mexico Counties' witness Balgord 1).

Rapid landscape transformation due to vegetation die-off, wildfire, and loss of lakes, streams, and rivers. Decreased snow cover on the lower slopes of high mountains and the increased fraction of winter precipitation falling as rain and therefore running off more rapidly also increases flood risk.[3]

Rising temperatures also mean more risk to our families and children-- more vector borne diseases, such as malaria and West Nile Virus-- and more respiratory problems. Climate change is a huge health risk. Climate change impacts will disproportionately affect communities of color and low-income communities, raising issues of environmental justice; traditional subsistence systems (farming, grazing, hunting) are likely to be severely impacted by global warming and local extinctions of plants and animals integral to the cultural and spiritual life of Native American and traditional communities will be highly disruptive to their cultural identity.[4]

Recovering and restoring local food and energy production requires a conscious transformation and set of technological and economic leaps for our communities. The economy of the future is the green economy. The rising price of fossil fuels will create a mandate for efficiency and the challenge of addressing climate change will require a reduction in carbon emissions from power generation, transportation and agricultural sources. With lack of action by the federal government on climate change, many cities, states and a number of tribal communities nationally have adopted policies to limit and reduce their carbon emissions.

The Environmental Improvement Board ("EIB") finds itself at an important time in history with a regulatory decision that will have far-reaching effects. As the "gatekeeper," the EIB can usher in a critical and needed change in our energy paradigm that fosters a clean energy economy, stimulates dramatic growth in New Mexico's renewable energy businesses, and helps to solve global warming.

As U.S. Supreme Court Justice Louis Brandeis said "It is one of the happy incidents of the federal system that a single courageous State may, if its citizens choose, serve as a laboratory (of democracy.)" So, New Mexico has an opportunity to institute transformative

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[2] (http://www.nmenv.state.nm.us/aqb/cc/Potential_Effects_Climate_Change_NM.pdf)
[3] Regional Highlights from *Global Climate Change Impacts in the United States*, www.globalchange.gov/usimpacts
[4] (http://www.nmenv.state.nm.us/aqb/cc/Potential_Effects_Climate_Change_NM.pdf)

regulatory policy that will stabilize climate and create an energy efficiency and clean energy revolution. It could send us down the path for eradicating poverty and restoring the earth.

Q. COALITION OF ARIZONA/NEW MEXICO COUNTIES' WITNESS BALGORD TESTIFIES THAT "ECONOMIC EFFECTS OF MODEST WARMING ARE LIKELY TO BE POSITIVE , ON BALANCE" (Coalition of Arizona/New Mexico Counties' witness Balgord 2). CITY OF FARMINGTON WITNESS MAUDE GRANTHAM-RICHARDS REFERS TO NEW ENERGY ECONOMY'S CAP ON CARBON AS CAUSING A 'DEATH SPIRAL'" (Grantham-Richards at 10, 11). WHAT DO YOU SEE AS THE FINANCIAL COSTS OF CLIMATE CHANGE?[5]

A. It's undeniable that climate change is happening and that if we don't take action there will be serious financial, ecological and cultural consequences. There are several choices ahead:

1) Do nothing, and let governments and businesses make market-based decisions at a pace that does not mirror the urgency of the problem; 2) Be involved in mitigation, or reduction of carbon, as communities and Nations, and 3) Adapt for climate change and ultimately a climate-challenged world. The second and third options provide real opportunities to make a better future.

The costs of climate change are astounding. The US General Accounting Office warns that because "the frequency and severity of damaging weather-related events, such as flooding or drought" are expected to increase, economic losses will be significant. Swiss Re, a major international reinsuring company cautions that, "climate change presents an increasing risk to the world economy and social welfare."[6] In fact, climate change-related expenses could rise to 20% of world Gross Domestic Product (GDP), according to a British government-commissioned report.[7]

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[5] The Native Village of Kivalina is located on the tip of a low-lying barrier island on the Chukchi Sea – approximately eighty miles north of the Arctic Circle. The village's four hundred residents are primarily Inupiat Eskimo, and subsistence activities contribute significantly to the village's culture and economy.

The village, which has a maximum elevation of ten feet above sea level, is significantly threatened by flooding from storm surges. According to the U.S. Army Corps of Engineers, environmental changes associated with global warming have exacerbated flooding and erosion threats to Kivalina and other coastal villages in the Arctic. Specifically, the Corps noted that sea ice, which offers seasonal protection from storm surges, has been forming later and melting earlier since the early 1980s. As a result, the village is increasingly exposed to winter storms which are increasing in severity and frequency. In 2006, the Corps noted that the situation in Kivalina is "dire" and that the entire town must be relocated within six years. The Corps estimates that relocating the entire village would cost between $123 million and $249 million. The U.S. Government Accountability Office estimates relocation costs between $100 and $400 million. http://www.martenlaw.com/newsletter/20080326-village-seeks-lifeline#_ftn4

[6] Castaldi, Andrew, Swiss Reinsurance America Corp. testimony before Senate Committee on H.S. and Governmental Affairs (April 19, 2007) available at http://www.swissre.com/resources/334d8400455c5e82aa73ba80a45d76a0Senate_testimony_Andrew_Castaldi_19_April_2007_final.pdf

[7] U.S. Government Accountability Office, "Climate Change: Financial Risks to Federal and Private Insurers in Coming Decades are Potentially Significant," (May 3, 2007) available at: http://www.gao.gov/products/GAO-07-820T

A cap on global warming pollution will help avoid escalating ecological and health risks of weather-related losses. Across all New Mexico's habitats, climate change is likely to exacerbate the effects of natural processes such as water quality and availability, flooding, mudslides and erosion, wildfires, and insect outbreaks and diseases. The economic losses include life and health insurance payments for heat wave and wildfire deaths, direct health costs, property damage, animal loss, and loss of biological diversity. Weather-related business interruptions and tourism dollar declines will continue to rise. Waiting to solve climate change will cost more and do more damage to ecosystems and economies alike.

Expert witnesses for New Mexico's Oil and Gas Association, Public Service of New Mexico, El Paso Electric (Patton at 8-10), the City Of Farmington (Grantham-Richards at 10, 11; Kappelmann at 10) and other opposition parties argue for a "business-as-usual" approach, that the cost of proposed policies is too great and the negative impact on an already troubled New Mexico economy is a luxury we can not afford. But without considering the costs of continuing with "business-as-usual," these arguments are incomplete. How much will it cost the average New Mexican household if we continue with business-as usual?

If no action is taken, researchers in the Program on Climate Economics of the Climate Leadership Initiative (CLI) estimate the minimum annual cost to each New Mexican household to be $3,430 by 2020 and $5,410 by 2040. With no changes in policies these costs could rise as high as $12,000 per household per year in 2080. The corresponding minimum total costs for New Mexico would be $3.2 billion in 2020, $6.3 billion in 2040 and $18.4 billion in 2080[8].

What are the sources of these costs? Climate change is expected to result in much hotter temperatures, which will increase the incidences of heat related illnesses and asthma[9]. Public-health related costs will be the largest contributors to the costs of climate change to New Mexico[10].

Q. PLEASE DESCRIBE WHAT SHIFTS NEEDS TO TAKE PLACE IN ORDER TO STABILIZE CLIMATE? (Coalition of Arizona/New Mexico Counties' witness Balgord 1-4; City of Farmington's Kappelmann at 25-27).

A. A growing number of scientists now believe that the global warming assessment by the Intergovernmental Panel on Climate Change (IPCC) carbon emission reduction recommendation of 25-40% below 1990 levels was too conservative[11]. The fact that climate change is now endangering human civilization itself requires us to act decisively and

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[8] "An Overview of Potential Economic Costs to New Mexico of a Business-As-Usual Approach to Climate Change," February 2009, www.ecy.wa.gov/climatechange/.../021609_ClimateEconomicsImpactsReport.pdf

[9] Ibid.

[10] Ibid.

[11] The world has been emitting more carbon dioxide than the worst-case scenario envisioned by the IPCC in its Fourth Assessment Report. Thus, two dangerous feedbacks loops will exacerbate climate change. First, drying forests will result in increased wildfires (as we are already witnessing), replacing carbon sinks with carbon sources. Even the Amazon, normally the largest absorber of carbon dioxide on the planet, has been experiencing drought, and of such proportions that in 2005 rather than absorbing 2 billion tons of CO_2, its normal absorption rate, it actually emitted over 3 billion tons of CO_2 into the atmosphere. To have the largest carbon absorber on the earth turn into a net producer of CO_2 is nothing less than astonishing. Second, melting permafrost in Siberia cause an enormous release of carbon, and 30 percent of that carbon is in the form of methane, which has 25 times the global warming potential of carbon dioxide.

immediately to solve the crisis. A 2009 study by MIT[12] states that if all the governments completely fulfill their current promises, which essentially are pointed toward reducing carbon emissions by 80% by 2050, we will have reached over 600 ppm of CO_2 by then and global temperatures will have risen at least 4 degrees Celsius[13].

Because climate is changing much faster than anticipated just a few years ago climate scientists now believe that we need to cut net carbon emissions 80% by 2020, not by 2050. "This would keep atmospheric CO2 levels from exceeding 400 parts per million (ppm), up only modestly from 386 ppm in 2008. This sets the stage for reducing CO2 concentrations to the 350 ppm that James Hansen and other climate scientists think is needed to avoid runaway climate change. It will also help keep future temperature rise to a minimum. Such a basic economic restructuring in time to avoid catastrophic climate disruption will be challenging, but how can we face the next generation if we do not try?[14]"

The first is a shift to policies and practices of conservation, and energy efficiency. The second is from an economy powered by oil, coal and natural gas to one powered by wind, solar and geothermal energy.

Conservation and energy efficiency.

Our climate change and peak oil problems are exacerbated by our inefficient energy practices. We produce great amounts of power at huge environmental and cultural costs and waste much of it. An average coal plant wastes more energy than it generates; only 1/3 of the fuel's energy is put to use, the other 2/3 is wasted.[15] Our infrastructure has become so inefficient that annual wasted energy from American electric power plants could fuel the entire country of Japan.[16]

Along with wasting vast amounts of energy in power production, we waste a great deal in transmission and in our inefficient buildings and homes. Twenty percent of the energy used in American industry and in commercial and residential buildings is wasted because of poor insulation and ventilation.[17] The cost of wasted energy contributes to our economic destabilization.

A report by McKinsey & Company, illustrated that we could eliminate 30% of our carbon emissions by 2030 by improving energy efficiency at no cost. If there were a more concentrated effort reductions perhaps as high as 50% could be accomplished, at no cost. It also found that the longer we wait to implement these time-perishable negative-cost options

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[12] A. P. Sokolov, P. H. Stone, C. E. Forest, R. Prinn, M. C. Sarofim, M. Webster, S. Palstev, AND C. A. Schlosser. Probabilistic Forecast for Twenty-First-Century Climate Based on Uncertainties in Emissions (Without Policy) and Climate Parameters, October 2009

[13] According to the 2006 Stern report, prepared by the former Head of the IPCC Nicholas Stern, a rise of 4 degrees Celsius would put upwards of 300 million more people at risk of coastal flooding each year, there would be a 30-50% reduction in water availability in southern Africa and the Mediterranean and increased droughts around the world, agricultural yields would decline by 15%-35% in Africa alone and the world would face severe food shortages, and 20%-50% of animal and plant species would face extinction. A 4C rise would also lead to the loss of 85% of the Amazon rainforest.

[14] Brown, Lester R. *Plan B 4.0*. New York: Norton & Company, 2009: p. 80.

[15] Native Agriculture & Food Systems Initiative, "Time for the Harvest: Renewing Native Food Systems," available at: www.firstnations.org/publications/NAFSIFinalPR92903.pdf

[16] Ibid.

[17] Ibid.

for energy efficiency the more we lose. Their 2009 research shows that the U.S. economy has the potential to reduce annual non-transportation energy consumption by roughly 23 percent by 2020, eliminating more than $1.2 trillion in waste – well beyond the $520 billion upfront investment (not including program costs) that would be required. The reduction in energy use would also result in the abatement of 1.1 gigatons of greenhouse gas emissions annually – the equivalent of taking the entire U.S. fleet of passenger vehicles and light trucks off the roads.[18] Sharply improved efficiency and eliminating subsidies for oil, gas and nuclear would make revenues available to stabilize the economy and invest in needed research and development, akin to the Apollo program, for the green economy[19].

I will cite a few real life examples about how efficiency gains could cut carbon emissions.

Lighting Technology:
Compact fluorescent lamps (CFLs) use 75 % less electricity than old-fashioned incandescents. Replacing inefficient incandescent bulbs with CFLs can reduce electricity used for lighting by three fourths. Even though a CFL costs twice as much as an incandescent, it lasts 10 times as long. Each one reduces energy use compared with an incandescent by the equivalent of 200 pounds of coal over its lifetime. In early 2009, the European Union approved a phase-out of incandescents, one that is expected to save an average consumer between 25-30 euros a year.[20]

The second major advance in lighting technology is the light-emitting diode (LEDs), which uses 85 percent less electricity than incandescents. LEDs are still quite costly, but they are taking over in specific markets like traffic lights (52% infiltration in US market) and exit signs (88% infiltration in US market). New York City replaced their traffic lights with LEDs and saved $6 million in maintenance and electricity costs. In 2009, Los Angeles Mayor Antonio Villaraigosa committed to replacing 140,000 streetlights with LEDs, saving taxpayers $48 million over the next seven years. It is estimated that the carbon emission reduction would be equivalent to removing 7,000 cars from the road.[21]

LEDs use dramatically less electricity and because they last 50 times as long as incandescents there is also an economic advantage to switching. LED efficiency projects are being adopted by University of California-Davis and the University of Arkansas.

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[18] http://www.mckinsey.com/clientservice/electricpowernaturalgas/US_energy_efficiency/
[19] U.S. energy intensity continues to lag behind other developed countries. Japan and Europe, for example, use about 20% to 30% less energy to produce a dollar of GDP. Gains in energy efficiency over the past 30 years are offsetting the need for 50 quadrillion Btus today, or roughly one-half of United States' total consumption. While improvements in technologies and higher energy prices account for the majority of these gains, public policies such as appliance and vehicle efficiency standards and building codes are responsible for at least 20% of the improvement. ... we need to do more. As it has been for the past three decades, public policy will be a key determinant in how quickly and widely we can improve the efficiency of our economy. ... It is not enough to make our buildings, appliances, lighting, and automobiles more efficient in their use of energy; we must also increase efficiency throughout the energy delivery chain through the use of new technology. The processes that mine coal and uranium; produce oil and natural gas; enrich and convert uranium into nuclear fuel; refine crude oil into gasoline and diesel; convert coal, natural gas, nuclear-generated steam, wind, geothermal heat, hydropower, and solar power into electricity; and the methods we use to distribute electricity and fuels can all be made more efficient. http://www.energyxxi.org/issues/Improve_Energy_Efficiency.aspx
[20] Brown, Lester R. *Plan B 4.0*. New York: Norton & Company, 2009: p. 82.
[21] Ibid.

LSI Industries, founded in 1976 in Cincinnati began with four employees determined to provide good lighting for service stations. In 2010, the company employs 1,400 at 14 facilities in the U.S. and Canada and specializes in LED manufacturing.[22]

Could PNM or Tri-State initiate an aggressive CFL and LED adoption rate amongst its residential and commercial customers? Saving electricity, reducing carbon and beginning with the lowest-income customers (relieving their overstressed budgets) is well within their means.

In addition to switching bulbs energy can be reduced with motion sensors and dimmers. Everything from turning off lights in unoccupied offices to dimming street light intensity can save electricity, cost and carbon. Shifting CFLs in homes and replacing LEDS in office buildings, commercial outlets and industry could cut world share of electricity used for lighting from 19 percent to 7 percent. This saving alone could close 705 of the world's 2,670 coal-fired plants, the greatest single source of carbon emissions.[23]

Innovation in Conservation, Recycling and Efficiency

Regulation is not a panacea, but it is a signal from government that will definitely spur investment, research and development. It will put us on a path of innovation. Investors worth $13 trillion released a statement, entitled: "2010 Investor Statement on Catalyzing Investment in Low-Carbon Economy: Investors Urge Policymakers to Act Swiftly." They stated that "Investors and businesses have been and will continue taking signficant action to address climate risks and opportunities, but to enable the necessary flows of private capital and allow us to fully assist in achieving a low-carbon and sustainable global economy, policymakers around the world must take rapid action..." The very first measures they deemed as "critical" were: "Short- and long-term emission reduction targets" and "policies that put an effective price on carbon such that businesses and investors reassess investment value and redirect their investments.[24]" Basically, the investors understand the issue of climate, are engaging companies to accelerate the transition to a low carbon economy and urge strong public policies on climate change and energy efficiency. Why? To limit the risk of their investment. What is the message? That prompt and effective regulatory measures spur investment. Opposition testimony claims that businesses will leave New Mexico if a cap on carbon is instituted. To the contrary, a cap on carbon will show investors world-wide that New Mexico is serious, that the race for development is on for clean technology and climate-related resolutions.

Regulation That Effectively Stimulated Carbon Reduction: In New Hampshire they adopted a "pay-as-you-throw" program and reduced the flow of materials to landfills. In Lyme, the landfill tax raised the share of garbage recycled from 13 – 52 percent in one year. The recycled materials jumped from 89 tons in 2005 to 334 tons in 2006 and generated a cash flow from the recycled material.

Finland and the province of Prince Edward Island in Canada have banned nonrefillable (also known as "one-way") containers. This greatly reduced the heap at the landfill. This ban reduced material use, carbon emissions, air and water pollution, landfill costs, transportation

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[22] http://www.hivelocitymedia.com/innovationnews/?page=all
[23] Brown, Lester R. *Plan B 4.0*. New York: Norton & Company, 2009: pp. 83, 84.
[24] www.ceres.org/Document.Doc?id=520

costs, and more simultaneously.

Regulations in Japan now require appliances to be easily and cheaply dissembled for recycling. Finland-based Nokia, has designed a cell phone that will almost dissemble itself.

We can see business innovation with the clothing manufacturer, Patagonia, is not only recycling its own polyester garments but those of clothing competitors as well. It estimates that recycling this clothing uses one fourth of the energy. It is has now broadened its program to include cotton, nylon and wool garments as well.

Remanufacturing is even more efficient – the use of "old" parts inserted into new machines. Caterpillar's remanufacturing division boasted $1 billion in sales[25] and factories for remanufacturing have grown considerably in and outside the U.S.[26]

Boeing and Airbus are involved in the airplane recycling business. For a single jumbo jet, key components, such as galley ovens, landing gear, and many other items collectively sell for $4million.[27] Not only profitable, this process of reuse creates jobs and reduces carbon.

Available Technologies Could Improve Energy Efficiency

We have the tools to improve real-time monitoring and control of the grid with advanced information technology. We can use this IT to better manage energy on the lines, to reduce disruptions, and to respond flexibly to disruptions when they do occur.[28] These modern smart-grid technologies have the potential to reduce billions of dollars of costs attributable to power interruptions and fluctuations across the network. The 2003 blackout in the Northeast United States and Canada, for example, caused an estimated $7 billion to $10 billion in economic losses.[29] The Electric Power Research Institute, for example, estimates that electricity disruptions cost the economy upward of $100 billion each year in damages and lost business.[30] With new investments in technology, these losses are increasingly preventable. IT investments not only move electricity more efficiently in geographic terms, but also shifts loads from peak to off-peak demand.

Time based pricing of electricity coupled with education is a way to change consumer behavior and reduce load. "Baltimore Gas and Electric (BGE), for example conducted a pilot program in 2008 in which participating customers who permitted the utility to turn off their air conditioners for selected intervals during the hottest days were credited generously for the electricity saved. The going rate in the region is roughly 14 cents per kilowatt-hour.

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[25] http://www.castresource.com/news/30-fred-castron-inducted-into-sudbury-area-mining-supply-a-service-association-samssa-hall-of-fame

[26] "It is a fact that there are more people working in the automotive aftermarket and remanufacturing sectors (repairing older vehicles, remanufacturing components producing fewer emissions levels than newly manufactured products) in the UK than there are building new cars," says Brian Ludford, secretary of the UK-based Federation of Engine Remanufacturers.

[27] Brown, Lester R. *Plan B 4.0.* New York: Norton & Company, 2009: p. 101.

[28] http://www.americanprogress.org/issues/2009/02/wired_for_progress.html

[29] ICF Consulting, "The Economic Cost of the Blackout: An issue paper on the Northeastern Blackout, August 14, 2003," available at http://www.icfi .com/Markets/Energy/doc_fi les/blackout-economic-costs.pdf.

[30] Amin and Gellings, "The North American power delivery system: Balancing market restructuring and environmental economics with infrastructure security," Energy 31 (6-7) (May-June 2006): p. 967-999.

But for a kilowatt-hour saved during peak hours on peak days, customers were paid up to $1.75 – more than 12 times as much. Customers reduced peak electricity by as much as one-third, encouraging BGE to design a similar program with even more 'smart' technology for summer 2009.[31]"

It is commonly known that energy efficiency implementation has not achieved its technical or economically feasible potential in the United States, and many have attempted to quantify how much electricity the U.S. can save in the future. The electric productivity gap between the top performing states and the rest of the nation is immense. There is a huge gap in the implementation of efficiency. If the rest of the country achieved the normalized electric productivity of the top performing states, with 100 percent adoption, the country would save a total of ~1.2 million gigawatt-hours annually. 1.2 million gigawatt-hours is the equivalent of 30 percent of our annual electricity use, or 62 percent of our nation's coal fired electrical power. In 2020, if the United States can, on average, achieve the electric productivity of the top performing states today, we can anticipate a 34 percent reduction from business-as-usual in projected electricity demand, while maintaining 2.5 percent annual economic growth.[32]

A major cause of the current economic crisis is energy waste and inefficiency, but by the same logic radically improving energy efficiency and deploying solar and wind can be a major part of the solution. Capping carbon is one of the most cost efficient answers to a multitude of problems. It will lead to improving the economy, environment, health and business productivity.

Renewable Energy: wind, solar and geothermal energy.
Is it feasible to transform the world's energy systems? Yes. Will it be difficult? Yes. Impossible? No. Could it be accomplished in two decades? The answers depend on the technologies chosen, the availability of critical materials, and economic and political factors.

In an article published in November 2009, in Scientific American, authors Mark Z. Jacobson and Mark A. Delucchi, wrote *A Path to Sustainable Energy by 2030*[33], which describes how wind, water and solar technologies can provide 100 percent of the world's energy, eliminating all fossil fuels. They submit that supplies of wind and solar energy on accessible land dwarf the energy consumed by people around the globe. Their plan calls for 3.8 million large wind turbines, 90,000 solar plants and numerous geothermal, tidal and rooftop photovoltaic installations worldwide. The cost of generating and transmitting power would be less than the projected cost per kilowatt-hour for fossil fuel and nuclear power. "A new infrastructure must provide energy on demand at least as reliably as the existing infrastructure. Water, Wind and Sun technologies generally suffer less downtime than traditional sources. The average U.S. coal plant is offline 12.5% of the years for scheduled and unscheduled maintenance. Modern wind turbines have a down time of less than 2% on land and less than 5% at sea. Photovoltaic systems are also at less than 2 percent. Moreover, when an individual wind, solar, or wave device is down, only a small fraction of production is affected; when a coal, nuclear or natural gas plant goes offline, a large chunk of generation is lost. ... Combining wind and solar can go a long way toward meeting demand, especially when geothermal provides a steady base and hydroelectric can be called in to fill

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[31] Brown, Lester R. *Plan B 4.0.* New York: Norton & Company, 2009: pp. 105, 106.
[32] Natalie Mims, Mathias Bell, and Stephen Doig, *Assessing the Electric Productivity Gap and the U.S. Efficiency Opportunity* (Snowmass, CO: Rocky Mountain Institute, January 2009)
[33] http://www.scientificamerican.com/article.cfm?id=powering-a-green-planet

the gaps."[34] The main hurdle is the political will to transition from a fossil fuel based energy economy to a renewable energy economy. (PNM's witness Darnell at 17)

City of Farmington's witness Kappelmann (at 10) testifies that "unilateral state action" "will find its citizens and economic base at a competitive disadvantage." But I don't think this is true.New Mexico, and especially Native communities, are uniquely positioned to lead the way in developing a clean food and energy economy, one that doesn't depend on constant resource extraction, the burning of dirty fossil fuels, and the invasion of other peoples' territories to meet our food and energy needs. Harnessing our renewable potential, utilizing Indigenous knowledge to build resilient local food economies and increasing efficiency will create meaningful jobs and a community infrastructure that will benefit our society and the coming generations.

New Mexico has some of the most abundant renewable energy potential in the world. New Mexico is second in the nation for solar potential. Its world-class solar energy resource, have effectively positioned the state as a focal point for this rapidly emerging industry – both in terms of operating Concentrating Solar Power (CSP) facilities and CSP-related component manufacturing. Straddling the eastern and western transmission interconnects, New Mexico is ideally located to export CSP power to out-of-state markets, driven by other states' Renewable Portfolio Standards and the likelihood of the future need for carbon-neutral electric power generation.

The potential for electricity generation from wind is enormous in some areas of New Mexico, especially on the eastern plains.[35] New Mexico ranks twelfth in wind electric potential and is among twelve states in the midsection of the country that, together, have 90% of the total commercial wind electric potential in the contiguous United States. The annual wind energy potential of New Mexico has been estimated to be 435 billion kWh. New Mexico has the potential to produce many times its own electrical consumption, which puts it in a position to export wind electric power.[36] If New Mexico adopts a regulatory cap on carbon it will substantially stimulate development of utility-scale CSP projects and wind development throughout the state.

Small-scale, sustainable hydro development can be an exceptionally dependable and cost-effective source of clean, renewable energy to consider if you live in a location with falling water from a river or stream. Since there is no loss of water in the generation process, micro-hydro has a minimal environmental impact on local ecosystems.[37]

A Model Diversified Tribal Energy Economy: Shakopee Mdewakanton Sioux Community
The Shakopee Mdewakanton Sioux Community (SMSC) in Minnesota is a leader in utilizing the sun, wind and plants to restore a sustainable way of life. The tribe produces enough biodiesel from waste oil to meet 100% of their needs in summer months and part of

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[34] Ibid, at 63.
[35] http://www.emnrd.state.nm.us/ECMD/renewableenergy/solar.htm
[36] http://www.emnrd.state.nm.us/ECMD/renewableenergy/wind.htm
[37] The Yurok Reservation is rich in fast-moving creeks, tumbling down steep mountains, the ideal location to efficiently produce micro-hydroelectric power. A local elder had been making these systems for years out of car alternators. The Yurok community has a high percentage of homes without electricity, and many community members were excited to learn about the system, how much it cost to install, and the installation process. Community members helped one another obtain the materials, labor, and resources to install more systems, and good connections and friends were made.

their needs during winter months when weather condition require a blend with conventional diesel so it won't congeal. In addition, the tribe utilizes solar water heaters, waste heat, and a geothermal system for efficient heating and cooling. The tribe is also a partner in Koda Energy, which produces heat and power at a biomass plant utilizing recycled cereal hulls. In addition, SMSC also installed a 1.5 MW wind turbine that will meet most of the community's residential electricity demand. The Shakopee community has shown vision in implementing a set of innovative sustainable technologies that increase self-sufficiency, reliability, reduce costs and honor Unci Maka (Grandmother Earth).[38] (PNM's witness Darnell at 17)

Renewable Energy Growth

Wind energy is the fastest growing energy source in the world.[39] In 2008, US wind power production shattered all previous records with the installation of 8,358 MW of new wind generating capacity,[40] the equivalent of producing power for two million households. This represented 42% of the newly installed power-generation capacity in the US for the year and an infusion of some $17 billion into the economy.[41]

Growth in all sectors of the wind industry, from manufacturing to installation, is projected to continue.[42] We are on our way, causing new green jobs from clean sources, but we need the right regulatory policies to complement and ramp up investment and development. "In the United States, new wind-generating capacity of 8,400 megawatts in 2008 dwarfed the 1,400 megawatts from coal."[43]

The solar power industry boomed globally between 2004 and 2008, with a 51% compound annual growth rate.[44] In 2008, the industry grew by 17% in the US alone.[45] Technological advances continue to offer breakthrough demonstrations that solar is a cost-competitive and reliable source of power.[46] Solar power has the added benefit of bringing access to electricity without power lines to remote communities, especially for Native communities in New Mexico. Market analysts are forecasting robust growth in the solar industry over the

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[38] "Energy Solutions," Shakopee Mdewakanton Sioux Community Website, available at: http://www.shakopeedakota.org/3energy.html

[39] Alliant Energy, "Wind Power The Fastest-Growing Energy Source Anywhere,"Alberta Lea Tribune (May 30, 2009) available at: http:// www.albertleatribune.com/news/2009/may/30/wind-power-fastest-growing-energy-source-anywhere/

[40] "Wind: AWEA Trumpets Success, CanWEA Laments 'Failure,'" Clean Break (Jan. 28, 2009) available at: http://www.cleanbreak.ca/2009/01/28/wind-awea-trumpets-success-canwea-laments-failure/

[41] Ibid.

[42] "Growth in Wind Power Will Create 'Green Collar' Jobs, According to Duke Study," Duke University Website (describing study by Duke University's Center for Globalization, Governance & Competitiveness (CGGC) entitled "Wind Power: Generating Electricity and Employment,") available at: http://news.duke.edu/2009/09/windpower.html

[43] Brown, Lester R. *Plan B 4.0.* New York: Norton & Company, 2009: p.79.

[44] Devlin, Katy, "Solar market suffers in the face of lost incentives and the recession," Glass (Oct. 27, 2009) available at: http://www.glass- magazine.com/news-item/commercial/solar-market-suffers-face-lost-incentives-and-recession

[45] Galbraith, Kate, "Solar Industry Posts Strong Growth in 2008," The New York Times (March 19, 2009) available at: http://greeninc.blogs.nytimes.com/2009/03/19/solar-industry-posts-strong-growth-in-2008/

[46] Rascoe, Ayesha, "Recession Cools Solar Energy Growth," Reuters (March 18, 2009) available at: http://www.reuters.com/article/idUS-TRE52H4PC20090318

coming years.[47]

Q. CAN NEW ENERGY ECONMY'S REGULATION PROVIDE AN ECONOMIC STIMULUS – ESPECIALLY GREEN JOBS? (City of Farmington's witness Kappelmann at 21)

A. Yes. Improving energy efficiency and developing renewable sources of energy are both much more labor intensive than burning fossil fuels – hence the impetus for putting more people back to work.

Weatherization is an important way to create jobs while cutting energy bills. The average low-income family spends 14% of gross income on energy bills and in many cases energy costs can exceed 20% of the family budget. Unanticipated energy bills are the second-leading cause of foreclosures among low-income homeowners[48]. The implementation of cost-effective energy efficiency measures such as adding insulation, sealing leaks, and replacing inefficient appliances can reduce home energy consumption by 15 to 30 percent and generate savings of $360 a year on the typical residential energy bill.[49] Creating tens of thousands of good, green weatherization jobs will require changes to the existing system, including imposing labor and responsibility standards to raise job quality, and eliminating state requirements that agencies select the lowest (rather than the best) bidder when issuing contracts. Weatherization programs need to be measured not only by the number of homes served but also by the number of good jobs created, total energy savings realized, and total carbon emissions avoided.

"Reduce, reuse, recycle." This has long been a fundamental principle of the environmental movement, and it takes on new importance with the growing climate crisis. While the calls for reducing consumption and reusing products focus mostly on consumer behavior, recycling is also a business and thus a source of job creation. In fact, the processing of recycled materials can be considered one of the first green occupations.[50] Overall, the EPA

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[47] Osborne, Mark, "U.S. solar market to top 440MW in '09, says GTM Research: 50% annual growth through 2012," PV-Tech.org (Dec. 8, 2009) available at: http://www.pvtech.org/news/_a/u.s._solar_market_to_top_440mw_in_09_says_gtm_research_50_annual_growth_thr/

[48] Elena Foshay, "Data Points: Energy Efficiency," Apollo Alliance News Service, November 24. 2008; online at http://apolloalliance.org/news/data-points/data-points-energy-efficiency/ (viewed January 26, 2009).

[49] Ibid.

[50] Norcal has evolved into one of the most advanced recyclers in the country and offers some of the highest wages and benefits in the industry. "Norcal is the largest employee-owned company in the solid waste industry, providing waste management services to more than 570,000 residential and 55,000 commercial customers." Norcal invested heavily in advanced recycling ranging from composting of food to construction debris recycling. Norcal understood that recycling isn't simply technology plus labor; it also requires incentives and popular education. The company believes in setting an example, and in 2007 it switched its entire fleet of 400 trucks to B20 biodiesel fuel. In fact, Norcal is so devoted to wooing the community that, since 1990, the company has sponsored an artist-in-residence program. During their four-month residency, local artists receive a stipend and access to a well-equipped studio to create works out of trash and display them in a gallery at the recycling facility. Norcal took a major step toward green and worker-friendly industry five years ago when it opened a new state-of-the art recycling center capable of sorting and baling single-stream and co-mingled materials. Since Norcal's Recycle Central opened, San Francisco has achieved a recycling rate of nearly 70 percent, the highest in the nation. The $38 million facility recycles an average of 750 tons of paper, plastic and other hard materials a day. Teamster Local 350 organized the workers and negotiated one of the best labor contracts in the industry with Norcal. The starting wage is $20 an hour and double for overtime. Norcal website, "About Norcal," http://www.norcalwaste.com/profile/index.htm;

estimates, one-third of consumer waste is now recovered for recycling or composting. According to the National Recycling Coalition, this results in an annual reduction in greenhouse gas emissions equivalent to 50 million metric tons of carbon.[51]

Like energy efficiency and recycling, renewable energy has excellent potential to create living-wage, dignified jobs. Wind and solar energy generate 40 percent more jobs per dollar invested than coal mining. The solar and wind industries create about 5.7 jobs per million dollars invested over a ten-year period, compared to the coal industry, which creates only 3.96 jobs per million dollars.[52] A study prepared for the American Solar Energy Society (ASES) finds that the United States can reduce carbon emissions and generate more than 4.5 million net jobs by 2030 if U.S. policymakers aggressively commit to programs that support energy efficiency and renewable energy.[53]

Emerging clean-energy markets could help to reverse the decline in manufacturing employment, and perhaps even wage stagnation. The generation and distribution of renewable energy—along with a major push to realize gains in energy efficiency—will require an array of new products and components that could be manufactured in the United States. Domestic markets for renewable energy and energy efficiency products and services are relatively small and will likely remain so until government enacts regulation for carbon emissions reduction. A major facet of the emergence of a new green economy can be seen in the production of the components and materials used in the generation of wind and solar energy.

The vast majority of jobs created through a green economic recovery program are in the same areas of employment that people already work in today, in every region and state of the country. Constructing wind farms, for example, creates jobs for sheet metal workers, machinists, and truck drivers, among many others. Increasing the energy efficiency of buildings through retrofitting requires roofers, insulators, and building inspectors. Expanding utility efficiency employs civil engineers, electricians, and dispatchers. More generally, this green recovery program will provide a major boost to the construction and manufacturing sectors.

By acting now to cap carbon, New Mexico businesses and workers will have adequate time and opportunities to be well positioned to take advantage of the low-carbon economy by developing a well-trained workforce and to make necessary investments in clean technology. These green jobs will not be outsourced and offer the potential of long term careers.

Q: DO YOU HAVE AN OPINION ABOUT WHAT IS TO BE DONE?

Jim Johnson, "No Reservations Needed," Waste News, April 30, 2007; online at http://wastenews.texterity.com/wastenews/20070430/?pg=38; "Cleaning Up," The Teamster, March/April 2007.

[51] National Recycling Coalition, "Recycling and Climate Change," online at http://www.nrcrecycle.org/Data/Sites/1/Climate%20Change/NRC%20CLIMATE%20CHANGE%20White%20Paper%2002222008.doc

[52] "Renewable Energy Development Creates More Jobs than Fossil Fuels: A Summary of Recent Research" by Green for All and the Ella Baker Center for Human Rights, http://www.greenforall.org/resources/summary-of-research-on-the-job-creating-potential/download.

[53] Bezdek, Roger H., *Estimating the Jobs Impacts of Tackling Climate Change*, American Solar Energy Society, October 2009. www.azsolarcenter.org/.../ed/ases-misi-jobs-impacts-summary-2009-10.pdf

A: Inaction today presents very real and growing costs. To allow a climate crisis to proceed unchecked will directly harm people's lives, and the prosperity of the global economy. Global warming presents the threat of lost agricultural productivity, drought and reduced supplies of fresh drinking water, the migration of environmental refugees (creating new global conflicts), and substantial economic damages and lost property for coastal communities. At the same time, our nation's growing reliance on oil is a major national security concern. Yet solutions to these mounting crises offer real opportunity as well. Any solution that seriously seeks to address concerns about climate change, energy security, and rising energy costs will need to make energy efficiency the first and foremost component in a portfolio of solutions.

Simultaneously, we need to immediately reduce electricity usage from fossil fuels and nuclear because the electric power industry is responsible for emitting approximately one-third of all greenhouse gas emissions (GHG) in the country. We can meet demand through energy efficiency, renewables, demand response, and distributed generation. (See Attached and Incorporated Rebuttal Exhibits R22 & R23)

There are no credible studies that say that a 350 ppm stabilization target will destroy the economy; there are no studies that claim that it is desirable to wait any longer before taking action on climate protection. On the contrary, there is definitive, widespread endorsement for policies to promote energy conservation, development of new energy technologies, and price incentives and other economic measures that will redirect the world economy onto a low-carbon path to sustainability.[54]

Hundreds of cities, local governments, colleges and universities are developing policies to reduce carbon emissions and adapt to a changing climate. Opposition witnesses claim that "go it alone" efforts amount to nothing, but the contrary is the case. (City of Farmington's witnesses Kappelmann at 10; Grantham-Richards at 10, 11) These state leaders and policy innovators gain a first mover advantage and other states and institutions follow their innovation. By acting now the ingenuity of New Mexicans will be unleashed in developing the technologies to reduce greenhouse gas emissions; technologies that will be needed throughout the world as all nations seek to mitigate climate change. This will provide New Mexico with an economic advantage over states that choose not to act to reduce greenhouse gas emissions.

In recognizing the links between health, food, fuel scarcity and poverty, energy, and green jobs, we can address the global challenge of climate change and peak oil and the economic and health challenges afflicting our communities. "The best answer to our ecological crisis also responds to our socioeconomic crisis. The surest path to safe streets and peaceful communities is not more [war], police and prisons, but ecologically sound economic development. And that same path can lead us to a new green economy – one with the power to lift people out of poverty while respecting and repairing the environment."[55] By investing in energy efficiency, more efficient buildings, renewable energy and local food systems, we can help secure a place in the developing green economy and ensure a sustainable future.

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[54] Frank Ackerman, Elizabeth A. Stanton, Stephen J. DeCanio, Eban Goodstein, Richard B. Howarth, Richard B. Norgaard, Catherine S. Norman, Kristen A. Sheeran. *The Economics of 350: The Benefits and Costs of Climate Stabilization.* October 2009. www.e3network.org/papers/Economics_of_350.pdf

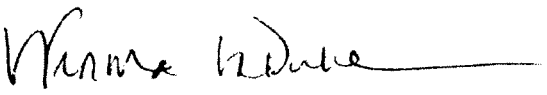
[55] Jones, Van. *The Green Collar Economy*, New York: Harper Collins, 2008.

The long-term health of any economy is contingent on the environment. And although companies may tout that this regulation will have astoundingly negative economic impacts, the long-term impacts of corporate degradation to the land will have much broader implications. In essence, the costs of fossil fuel energy production do not take into account the *true* costs of economic wealth and health of our society. A durable economy is based on the green economy.

We have a lot of work to do; Thomas Berry calls it the "great work." We need to work and to clean up the toxic waste caused by the opposition companies. No longer do we want to live in the shadow of their lethal pollution and without our own sources of heat or electricity. Its time for our communities to recognize the linkages between corporate profit and the earth's destruction. Because when we destroy the Earth, we destroy our selves. So, we must create sustainable energy and food economies for this millennium and for the generations yet to come.

In all cases, we are looking at the creation of local economies, using the resources available – not in dominance or extraction, but with the realization that we are all connected. Recovering and restoring local food and energy production requires a conscious transformation and set of ecological and economic leaps for our communities. **We must decide whether we want to determine our own future or lease it out for royalties.** In the end, developing food and energy sovereignty is a means to determine our own destiny.

The benefits of a carbon cap are that it will encourage investment in both efficiency and carbon-free sources of energy. This will be profound for New Mexico and the next seven generations.



Winona LaDuke

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