



THE ASSOCIATED PRESS/MATTHEW BROWN

Using Public Lands for the Public Good

Rebalancing Coal and Renewable Electricity
With a Clean Resources Standard

Jessica Goad, Christy Goldfuss, and Tom Kenworthy

June 2012

Center for American Progress



Using Public Lands for the Public Good

Rebalancing Coal and Renewable Electricity
With a Clean Resources Standard

Jessica Goad, Christy Goldfuss, and Tom Kenworthy

June 2012

Contents

- 1 Introduction and summary**
- 5 A clean resources standard for public lands and waters**
- 7 Analysis: electricity sourced from public lands and waters**
- 13 Background on the dominance of coal**
- 17 Why balance is needed**
- 25 Conclusion**
- 27 Appendix A—Figure calculations**
- 31 Appendix B—Renewable energy projects on public lands and waters permitted by the Obama administration**
- 33 About the authors and acknowledgements**
- 34 Endnotes**

Introduction and summary

Federal public lands and waters are inextricably linked to our health and economic well-being as Americans. Although it may not be apparent on a daily basis, the decisions made regarding the more than 700 million acres of lands¹ and more than 1 billion acres of offshore waters² managed by the federal government on behalf of all Americans have very real impacts on the economy and society. As Gifford Pinchot, the first chief of the U.S. Forest Service (1905-1910) put it, the public estate can and should be managed to provide “the greatest good for the greatest number” of people. As such, public lands and waters have the potential to serve Americans in ways that ensure a healthier society and a stronger economy.

This progressive framework of land management can be seen on many protected areas that are open for everyone to visit and enjoy. Activities like recreation in a national park, hunting in a national wildlife refuge, or fishing near a national seashore are the result of land management for the public good. And, public lands that are managed for conservation—where development is rightfully restricted—can have positive economic impacts on small businesses and the economy. In 2010, for example, recreation on lands managed by the U.S. Department of the Interior provided 388,000 jobs.³ Additionally, the nation’s approximately 100 million acres of wilderness⁴ has been shown to afford a variety of economic benefits.⁵

But public lands that are managed for “multiple use”—where natural resource extraction is permitted—should also advance the public good, especially with regard to our country’s electricity needs. We extract or utilize many different raw materials from the federal estate that are then used to produce electricity. Currently, approximately 43 percent of all the coal and 20 percent of the natural gas produced in the United States comes from public lands or waters.⁶ The converse is true when it comes to renewable energy derived from them—despite their tremendous potential—only 1 percent of the country’s wind and practically none of its solar power are derived from the public estate. As of this writing, there was only one solar project generating electricity located on public lands, although 15 additional solar projects have been approved.

This small amount of renewable energy represents a missed opportunity to use public lands and waters to model a new energy future. Huge potential exists to responsibly develop publicly owned renewable resources that will help us move away from dirty fossil fuels toward cleaner electricity options that will support a healthier society.

To set us on a path for achieving this opportunity, we recommend that a “clean resources standard,” or CRS, for public lands and waters be implemented by executive order. This would require land management agencies to delineate what portion of publicly owned natural resources used for electricity generation will be clean and renewable—from wind, solar, geothermal, biomass, and small hydroelectricity. We recommend the entirely achievable target of 35 percent renewable electricity from public lands and waters by 2035.

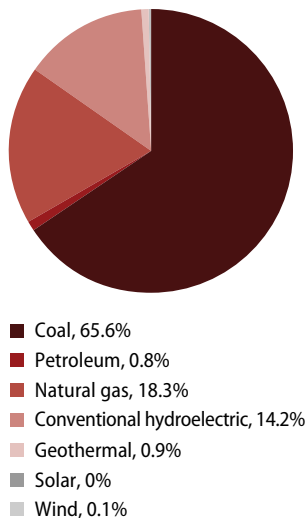
Of course, any energy development on public lands must be done in a way that avoids sensitive areas, uses the most modern technology, and is in full compliance with environmental laws. When done responsibly, energy development is an appropriate use of public lands, but it should not be done at the expense of the clean air, clean water, and the recreational opportunities that they provide.

To explore the prospects of and need for a clean resources standard, we analyzed the types and amounts of the publicly owned natural resources that are currently being used to help address the country’s electricity needs. To accomplish this, we imagined that the Interior Department and the Forest Service were an electric utility that “delivers” power to consumers by providing the raw materials for electricity generation.

Under this analogy, we looked at the entirety of resources extracted from public lands and waters that are used for electricity generation. We found that federal lands predominately provide coal for electricity—currently, approximately 66 percent of the electricity generated from the resources that belong to all Americans comes from coal, while 15 percent comes from renewable resources, including hydropower, and only 1 percent is derived from solar, wind, and geothermal projects combined. This composite is shown in the graph at left.

Our analysis shows that coal is the de facto priority for the use of the federal estate when it comes to power generation. This is a stunningly antiquated and out-of-balance view of our nation’s electricity needs because the scale is tipped in favor of a dirty electricity resource that has been shown to have serious health and environmental impacts. It also neglects the opportunity that federal lands and waters provide to reflect a vision for a clean energy future.

FIGURE 1
Current makeup of electricity generated from resources from public lands and waters



Decades of research about the impacts of the mining and combustion of coal has clearly demonstrated that it has negative impacts on our health and environment. Coal has significant environmental, health, and economic costs, leaving no doubt that we should decrease our dependence on it for electricity generation. As the late Paul Epstein of the Center for Health and the Global Environment at Harvard Medical School noted:

The public is unfairly paying for the impacts of coal use... Policymakers need to evaluate current energy options with these types of impacts in mind. Our reliance on fossil fuels is proving costly for society, negatively impacting our wallets and our quality of life.⁷

Coal is a major contributor to rising carbon pollution, which is already changing the natural world as we know it, potentially costing us billions of dollars in damage. This is especially the case with regard to our lands, waters, and oceans, which are beginning to feel the strain of rising global temperatures—from glaciers melting creating sea-level rise to flora and fauna migrating northward.

Also, coal benefits from a number of taxpayer subsidies that make its price artificially low, including loopholes in the tax code and an outdated leasing system on public lands that call into question whether or not Americans are receiving fair market value for the use of public resources. These issues will be further explored later in the report.

In addition to helping to avoid catastrophic global warming, the transition to a clean energy economy has the added benefit of improving our nation's infrastructure and creating more jobs. In a previous analysis, the Center for American Progress showed that solving global warming and moving toward a clean energy economy can “provide an opportunity for more broadly shared prosperity through better training, stronger local economies, and new career ladders into the middle class.”⁸ A clean energy economy could have wide impacts on markets, financing, infrastructure, and jobs across America.

The Obama administration has taken the first steps toward this transition using the resources found on public lands and waters—in addition to the handful of renewable projects already operating onshore, 29 new solar (concentrating solar and photovoltaic), wind, offshore wind, and geothermal projects were approved by the end of 2011.

Yet despite this progress, our analysis of federal land management agencies as if they were an electric utility clearly shows that renewable electricity on public

lands and waters is a mere whisper compared to the amount from coal produced from these areas. Even when we look at projections for solar, wind, and geothermal energy on public lands and waters over the next 20 years, we find that coal would still provide 57.3 percent of the electricity, with renewables, including hydropower constituting 25.9 percent, while wind, solar, and geothermal combined would provide only 13.5 percent. If we are to use public lands and waters to help grow a clean energy economy, additional policy steps will need to be taken.

In addition to the proposed clean resources standard described earlier, we also call for a number of additional policy initiatives that should be implemented to begin to adjust the balance of coal and renewables from public lands and waters used for electricity so that it adheres more closely to a progressive framework for land conservation, energy development, and climate change solutions.

We mostly focus on the actions that can be achieved with executive authority as Congress has already given the president and federal agencies broad authority to implement energy policies on public lands.

Some proposals, however, would require Congress to act. To achieve a balance between coal and renewable electricity we recommend policies that:

- Put a carbon price on coal mined on public lands
- Reform the leasing process for coal mined on public lands to achieve fair market value
- Establish renewable energy zones on public lands and waters
- Include public lands and waters in the executive order on sustainability to better track the government's carbon pollution
- Ensure that all federal environmental analyses include scientific carbon pollution studies

It is imperative that the administration and Congress take measurable steps to address the chasm between fossil and renewable electricity generated from public lands and waters. Land conservation—identifying places that are not appropriate for industrial energy development—while also an essential component of a balanced energy strategy, is for the purposes of this report a separate topic. A plan for a long-term phase-in of renewables and a subsequent rebalancing of fossil fuels sourced from the federal estate will help ensure the public's lands are actually being used for the public good.

A clean resources standard for public lands and waters

Our country needs a more balanced energy policy and federally managed areas provide a critical test case for how to make this happen. Because Congress has granted federal agencies authority over many aspects of energy policy on public lands and waters, their management can be generally independent of congressional gridlock. Additionally, the scale of the public estate ensures that the policies promulgated on it can have significant impacts—the Interior Department alone manages approximately one-fifth of the land mass of the United States, plus more than 1 billion acres offshore,⁹ while the Forest Service manages an additional 193 million acres.

As previously mentioned, currently there is only a very small amount of solar, wind, and geothermal electricity derived from public lands and waters. And, as will be further discussed in the analysis section of this paper, this miniscule amount looks even starker when compared to the enormous quantities of coal mined on the federal estate. This imbalance is a missed opportunity to use public lands and waters to model a new energy future and help us use fewer dirty fossil fuels.

As a first step to increasing the percentage of clean and renewable energy from the federal estate, we call upon the president to issue an executive order establishing a clean resources standard of 35 percent by 2035 for publicly owned natural resources. Such a standard could go a long way in prioritizing development of renewable energy from federal lands and waters by delineating dates by which a specific portion of the publicly owned resources used for electricity should come from clean, renewable energy resources, which we define as wind, solar, geothermal, biomass, and hydroelectricity.

While land management agencies—the Department of the Interior and the Forest Service—are not utilities, they in essence “deliver” power to consumers by providing the raw materials needed for electricity generation. Therefore, the agencies should be required to assess the mix of electricity resources coming from the lands that they manage and set achievable targets for clean electricity generation.

We call upon
the president
to issue an
executive order
establishing a
clean resources
standard of 35
percent by 2035
for publicly
owned natural
resources.

A precedent has been set for similar policy proposals, including a proposed national clean energy standard of 80 percent by 2050 that is supported by the Obama administration. And 29 states and the District of Columbia have passed state-level renewable electricity standards (also known as renewable portfolio standards) and eight additional states have nonbinding goals.¹⁰

Of course, any energy development on public lands must be in compliance with all applicable environmental laws, avoid sensitive places, and be undertaken with the most up-to-date technology. Additionally, some public lands and waters should be off-limits to energy development, and land conservation should be part of a balanced energy strategy. When done responsibly, using public lands and waters as the source for the raw materials needed for electricity generation is appropriate, but it should not be at the expense of their other assets like clean air, clean water, wildlife habitat, and recreation.

Increasingly, natural gas is an important component of our country's energy needs, and currently approximately 20 percent of all the natural gas produced in the United States comes from public lands and waters. This amount is likely to increase as coal-fired power plants are retired, and shale gas extraction technology continues to improve and expand.

And while natural gas is a cleaner burning fossil fuel than coal, it nevertheless is, like coal, a fossil fuel. There are a number of unanswered questions about natural gas, especially its lifecycle greenhouse gas emissions. It also can provide its own assortment of risks, and drilling must be done in a safe and responsible way. This means the disclosure of hydraulic fracturing chemicals at the beginning of an operation, the closing of loopholes in all applicable environmental laws, and the implementation of strong regulations for drilling well integrity and wastewater disposal. Until more is known about the carbon pollution of natural gas and its impacts on the environment, we do not recommend its inclusion in the clean resources standard.

To explore the prospects of and need for a clean resources standard, we took our analysis further and looked at the types and amounts of the publicly owned natural resources that are being used for electricity generation. We found that there is major imbalance between coal and renewables being used for electricity coming from public lands and waters, but we also found that there are great opportunities to utilize these publicly owned resources to model a clean energy future and thereby truly use our natural resources for the greatest good.

Analysis: electricity sourced from public lands and waters

While renewable energy projects can be physically located on public lands and waters, it is important to note that there are no traditional commercial power plants currently situated on them. Rather, in cases where fuel is combusted, public lands and waters are the source for the raw materials, including coal, natural gas, and biomass that are extracted and then burned to generate electricity in power plants. At the same time, solar, wind, geothermal, and hydroelectric resources have generation facilities that are sited on the federal estate, meaning that they must be sited in a responsible manner that avoids conflict with other uses of the lands.

At present, no data exists on the amount of actual electricity generated from fossil and renewable resources extracted from public lands and waters. That being the case, we extrapolated these numbers from production and installed generation capacity from several federal sources, including the U.S. Department of the Interior, the Energy Information Administration, and the Idaho National Laboratory.

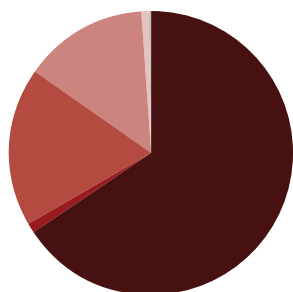
For the purposes of this report we treat the U.S. Department of Interior and the Forest Service as if they were an electric utility by looking at the composition of natural resources coming from them that are used for power generation. We imagined that the land management agencies in essence “deliver” power to consumers by providing the raw materials for electricity generation.

In Figure 2 we show the amount of electricity from each of the resources generated annually in the United States, in addition to the percentage derived from public lands (see Appendix A for sources and calculations). The fourth column in the chart represents the approximate amount of electricity generated from public lands and waters for each source. The fifth column of the chart is the percentages of this total amount.

Importantly, our calculations do not include electricity from nuclear power and woody biomass (trees, woody plants, leaves, and the byproducts of forest management) sourced from public lands because data are lacking, but both can be assumed

FIGURE 2

Electricity generation in the United States from resources from public lands and waters



- Coal
- Petroleum
- Natural gas
- Conventional hydroelectric
- Geothermal
- Solar
- Wind

Fuel source	Total U.S. electricity generated (thousand megawatt hours)	Percentage of total U.S. electricity from resources from public lands and waters	Electricity generated from resources from public lands and waters (thousand megawatt hours)	Percentage of the total electricity from public lands and waters
Coal	1,734,265	43.2%	749,203	65.6%
Petroleum	28,162	31.8%	8,955	0.8%
Natural gas	1,016,595	20.6%	209,419	18.3%
Conventional hydroelectric	325,074	50%	162,537	14.2%
Geothermal	16,700	60%	10,052	0.9%
Solar/PV	1,814	0%	0*	0
Wind	119,747	1.1%	1,263	0.1%
Total			1,141,429	100%

Sources: This data is from the Energy Information Administration, the U.S. Department of the Interior, and the Idaho National Laboratory. Data for "Total U.S. electricity generated" from 2011; Data for "Percentage of total U.S. electricity from resources from public lands and waters" from fiscal year 2011 for coal, petroleum, and natural gas; 2006 for hydroelectric; and 2011 for geothermal, solar and wind. Conventional hydroelectric power on the federal estate is defined as dams with hydropower capacity that are managed by seven federal agencies, the vast majority by the Army Corps of Engineers, the Bureau of Reclamation, and the Tennessee Valley Authority.

*Note: One solar energy project on public lands began producing electricity in May 2012, but the chart reflects year-end totals for 2011.

to provide only minimal amounts of electricity.¹¹ (see endnote for more explanation) Therefore, the data should not be interpreted to be the entirety of the electricity inputs coming from public lands, but just those that can be accurately tracked.

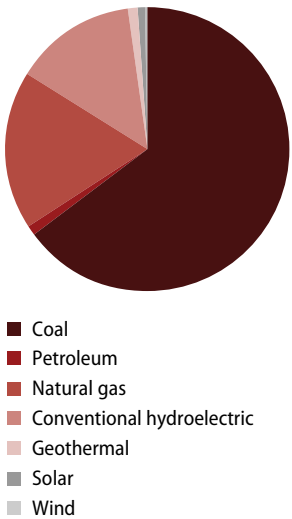
As shown in Figure 2, coal constitutes nearly 66 percent of the total electricity from public lands and waters, while renewables, including hydropower, make up about 15 percent of the total amount. Electricity generated from solar, wind, and geothermal make up only 1 percent of the total. Additionally, natural gas is nearly 20 percent of the mix, an amount that will likely rise as aging coal-fired power plants are replaced by cogeneration (combined heat and power) with natural gas. While we do not discuss the future growth of natural gas in this report, its mounting presence should be noted.

Figure 2 gives an overview of the electricity mix coming from public lands and waters today. But the story should be taken a step further: Over the last two years, a number of projects have been permitted on the federal estate that have not yet

FIGURE 3

Electricity generated from resources from public lands and waters, including 29 permitted solar, wind, and geothermal projects

Fuel source	Electricity generated from resources from public lands and waters, including 29 permitted projects (thousand megawatt hours)	Percentage of the total
Coal	749,203	64.8%
Petroleum	8,955	0.8%
Natural gas	209,419	18.1%
Conventional hydroelectric	162,537	14.1%
Geothermal	13,020	1.1%
Solar/PV	9,364	0.8%
Wind	4,275	0.4%
Total	1,156,773	100%



Sources: Energy Information Administration, the U.S. Department of the Interior, the U.S. Forest Service, and the Idaho National Laboratory.

been built or started generating electricity. The U.S. Department of the Interior has approved and permitted 28 solar, geothermal, wind, and offshore wind projects, while the Forest Service recently gave the green light to the first-ever wind project on a national forest, the Green Mountain National Forest in Vermont.

It is likely that at least some of these projects will be built in the near future, and therefore it is helpful to understand what the portfolio would look like including these 29 projects, which together constitute about 5,700 megawatts of renewable energy (see Appendix A for calculations and Appendix B for a list of these projects). Just because these projects were permitted does not mean they all will be built, as some are facing legal and financial challenges. Still, they give a reasonable idea of renewable energy’s near-term potential on public lands and waters.

Figure 3 holds the data for coal, petroleum, natural gas, and hydroelectricity constant (the same as Figure 2) but includes additional electricity outputs for the 29 solar, wind, and geothermal projects that have been permitted in the last two years.

Figure 3 shows that progress has been made in terms of permitting renewables on public lands and waters, but even with this progress, coal remains overwhelmingly the dominant stock for electricity generation. Even when the 29 permitted, but not yet generating, renewable projects are included in the analysis, 64.8 percent of the electricity generated from public lands and waters remains from coal. At the same time, the share of renewables, including hydropower remains at only 16.4 percent of the total, and solar, wind, and geothermal constitute only 2.3 percent.

Yet the real story of renewable energy is in its vast potential, as these technologies have only recently started to ramp up. It is useful, therefore, to look at what the electricity mix from public lands and waters might be over time as renewable projects continue to be permitted and built.

To analyze this longer-term outlook, we drew from the “reasonably foreseeable development” scenarios for renewable energy on public lands and waters calculated by government agencies, including the Department of the Interior’s Bureau of Land Management and Bureau of Ocean Energy Management and academia. Notably, we did not include future outlooks for the U.S. Forest Service because the agency has not undertaken such analyses for any type of renewable energy on its lands even though millions of acres have potential.¹²

FIGURE 4
Outlooks for solar, wind, and geothermal development on public lands and waters over 20 years

Fuel source	States covered	Agency	Outlook period/ analysis date	Development outlook (megawatts)	Source
Geothermal	12	BLM	20 years, analysis in 2005	12,140	Geothermal Resources Leasing Programmatic Environmental Impact Statement
Solar	6	BLM	20 years, analysis in 2011	24,000	Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States
Wind	11	BLM	20 years, analysis in 2005	3,240	Wind Energy Development Programmatic Environmental Impact Statement
Offshore wind	3	BOEM	Unstated, released 2012	6,780	Virginia Tech Advanced Research Institute

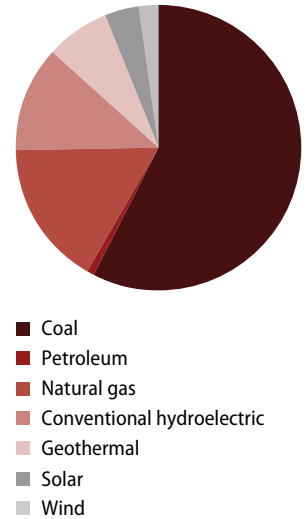
For context, one megawatt can power about 1,000 homes.

FIGURE 5

Electricity generated from resources from public lands and waters including outlooks for solar, wind, and geothermal development over 20 years

Fuel source	Electricity generated from resources from public lands and waters, including 20-year outlooks (thousand megawatt hours)	Percentage of the total
Coal	749,203	57.3%
Petroleum	8,955	0.7%
Natural gas	209,419	16%
Conventional hydroelectric	162,537	12.4%
Geothermal	95,712	7.3%
Solar/PV	52,560	4%
Wind	28,966	2.2%
Total	1,307,352	100%

Source: Data is from the Energy Information Administration, the U.S. Department of the Interior, the Forest Service, and the Idaho National Laboratory.



The outlooks, based on state renewable energy portfolio standards and other economic and policy indicators, are shown in Figure 4 (see Appendix A for sources and calculations).

They do not cover every state with renewable energy potential on public lands and waters and therefore should not be assumed to be the entire picture. Also, reasonably foreseeable development scenarios for offshore wind are nearly nonexistent and thus it is difficult to predict how much wind on the federally managed Outer Continental Shelf will be developed over the next 20 years. We include only projections for “wind energy areas” in Delaware, Maryland, and Virginia, and do not include those in New Jersey, Massachusetts, and Rhode Island due to lack of data.

The outlooks for electricity generation from inputs from public lands and waters over the next 20 years, as well as 2011 levels of coal, petroleum, natural gas, and hydroelectric electricity (the same as in Figure 2), are represented in Figure 5. Although the usage of coal for electricity generation in America is likely to decrease and the use of natural gas will increase over the next 20 years, we assume for the sake of argument and lack of reliable data that these levels remain the same in the chart and graph above.

As Figure 5 shows, even with 20-year projections for scaled-up solar, wind, and geothermal on public lands and waters (with the significant assumption that fossil fuel and hydropower levels remain stagnant), coal would maintain its lead as the number-one electricity resource with approximately 57.3 percent of the total. Renewables, including hydropower, could grow to become about 25.9 percent of the electricity mix or 13.5 percent with just solar, wind, and geothermal.

This potential is likely underestimated, in light of the fact that offshore wind development and Forest Service projections are largely unknown. Still it provides a basic idea of what can possibly be developed under current policy and economic regimes. So, more renewable energy than what is represented in Figure 4 could potentially be built, but such development would likely depend on significant technological, economic, and policy changes.

It is clear that without significant policy fixes, coal will remain the dominant use of publically owned lands and waters for electricity for at least the next two decades. Even considering the fact that renewable energy projects on public lands will continue to grow, they will not be the prevailing resource or achieve their vast potential. Which begs the question: Are public lands being used for the public good?

Background on the dominance of coal

Demand

As a nation we are using less and less coal, down to approximately 42 percent of our electricity mix at the end of 2011 compared to a 40-year peak of 56.8 percent at the end of 1987.¹³ Various factors are credited for this continuing decline, including a growing reliance on natural gas for electricity and public backlash against old polluting power plants. Despite this trend, the Obama administration has increased coal mining on public lands as evidenced by its March 2011 announcement to make available for lease more than 2 billion tons of coal.¹⁴

While the demand for coal declines across America, our demand for renewable electricity as a country is growing year after year. The U.S. Energy Information Administration predicts that the use of solar, wind, and geothermal energy will continue to rise over the next 25 years and will make up a significant portion of our energy growth.¹⁵ The increased demand is matched by high public support for developing renewable energy—for instance, a March 2012 Pew Research Center poll found that 63 percent of respondents favored developing renewable energy resources over fossil fuels.¹⁶

Exports

The continued supremacy of coal in America is likely even though electrical generation from it in the United States is expected to slowly decrease. This seeming contradiction is because coal mining—much of which is on public lands—has found a new market in fast-growing Asian nations. In 2011 U.S. coal exports reached their highest levels since 1991, according to the Associated Press using U.S. Department of Energy data.¹⁷

Coal mining—
much of which
is on public
lands—has
found a new
market in fast-
growing Asian
nations.

Rampant coal development on public lands—even if it is going overseas—has significant health and land use impacts here at home and stands in stark contrast to the climate change and environmental goals that our country has set. Further, coal exports from public lands present their own problems—potentially higher prices for American consumers, environmental and health impacts from the mining and transportation of coal, and the moral dilemma of exporting global warming pollution to other nations.¹⁸

Public lands

Public lands provide 43.2 percent of the nation’s coal,¹⁹ the vast majority of which is extracted from the Powder River Basin in Wyoming and Montana. Other states where the Bureau of Land Management produces coal from public lands are Colorado, New Mexico, Utah, Alabama, Kentucky, North Dakota, and Ohio.²⁰

Many companies have won or are currently operating leases to mine coal on public lands, mostly divided between major corporations and smaller companies that can have interests in particular regions or single mines. The biggest players include Arch Coal, Peabody Coal, Signal Peak Energy, and the American Power Corporation. The roster of smaller companies includes the Alton Coal Company, Bowie Resources, and the Bridger Coal Company, among others.

Subsidies

The American public is already paying the costs of coal’s most obvious impacts such as damage to the environment and public health issues caused by its mining and combustion. This presents the question of whether or not the American taxpayer is being properly compensated for the externalities of coal that comes from public lands.

What’s more, the coal industry also benefits from tax loopholes that incentivize its development. Coal companies, for example, receive billions of dollars in taxpayer subsidies via preferential tax treatments such as the ability to expense exploration and development costs, tax deductions to cover the costs of investments in mines, and favorable capital gains treatment on royalties.²¹

The coal industry also benefits from an outdated system that allows it to gain easy access to public lands and resources, an issue we will explore later in this report. In particular, the government's process for determining fair market value is secret, leaving no way to understand whether or not the public is receiving a fair return for its resources.

Why balance is needed

There are abundant reasons to address the vast incongruity highlighted in our earlier analysis between the use of coal and renewable resources from our federal lands and waters for electricity.

Most importantly, public lands should be used for the greatest public good. Many places on public lands and waters should be deemed off-limits for development to protect the clean air, clean water, and recreational opportunities that they provide. With that said, when done responsibly, energy development for electricity is an appropriate use of public lands. What is not appropriate, however, is to have the overall mix of electricity development on the places owned by all Americans dominated by fuels that cause long-term damage to the environment and negative impacts to public health.

We now have a much greater understanding of the costs associated with coal mining and combustion than we did when coal leasing guidelines on public lands were first established. Given the health impacts and risks associated with climate change, it is essential that taxpayers receive proper payment for the mining and burning of this fossil fuel that they own. It defies common sense that we would continue to heavily subsidize a dirty fuel that burdens Americans with environmental and health costs, while at the same time benefiting large, wealthy corporations. The public should not foot the bill for the consequences of coal mining on public lands, especially if coal companies plan to enrich themselves even further by exporting American resources overseas.

Furthermore, a number of leaders have called for significant action to address the well-established threat of global climate change, a goal that is significantly undercut by our government's continued advancement of coal production on our public lands. Both the president and U.S. Secretary of the Interior Kenneth Salazar have signed orders that direct government agencies to take steps to cut carbon and reduce global warming. The president has also pledged to reduce carbon emissions by 17

Both the president and U.S. Secretary of the Interior Kenneth Salazar have signed orders that direct government agencies to take steps to cut carbon and reduce global warming.

percent below 2005 levels by the year 2020. Meanwhile, Salazar stated in 2009 that, “carbon pollution is putting our world—and our way of life—in peril.”²²

Lastly, clean energy is a bright spot in our economy and when properly located, projects on public lands and waters could provide dramatic employment opportunities nationwide. Across America, the number of green jobs outnumbers those in the fossil fuel industry 4 to 1.²³ According to the U.S. Bureau of Labor Statistics, “green goods and services” accounted for 3.1 million U.S. jobs in 2010.²⁴ And a study by the Brookings Institution found that between 2008-2009, the clean energy economy grew by 8.3 percent—faster than the rest of the economy.²⁵

Policy solutions to balance electricity resources from public lands and waters

In addition to the new “clean resources standard” that was described earlier, we recommend five policy proposals that will help address the disproportionate share of the electricity mix that coal currently represents. These are:

- Put a carbon price on coal mined on public lands
- Reform the leasing process for coal mined on public lands to achieve fair market value
- Establish renewable energy zones on public lands and waters
- Include public lands and waters in the executive order on sustainability to better track the government’s carbon pollution
- Ensure that all federal environmental analyses include scientific carbon pollution studies

Put a carbon price for coal mined on public lands

Coal is one of the dirtiest forms of energy and encouraging its use poses extraordinary costs to public health, the environment, and the economy. Coal’s price is artificially low because it does not reflect the cost of its impacts such as smog, lung ailments, and climate change—which instead are borne by society at large. In effect, our health and environment subsidize coal. This tilts the playing field in terms of electricity to coal’s favor compared to cleaner, slightly more costly fuels

that do not have anywhere near the external costs of coal. This market failure—that coal is priced artificially low because it does not include the cost of external harms—should and must be corrected.

Recent studies have attempted to account for the true cost of coal. One such study, the “Full Cost Accounting for the Life Cycle of Coal” and published in the *Annals of the New York Academy of Sciences* in early 2011, found that “the total economically quantifiable costs” of coal range between an additional 9 cents to 26.89 cents per kilowatt-hour.²⁶ In comparison, the average residential price of electricity at the end of 2011 was 11.5 cents per kilowatt-hour.²⁷

Federal land management agencies must begin to calculate and assess the true costs of coal originating from our public lands. One of the simplest ways to do this is through a new carbon price for coal mined on the federal estate. The new revenues could then be used to mitigate the tremendous costs of coal to the public and their lands by funding mitigation and restoration projects. The Interior Department has the authority to account for this new carbon price in the following two ways:

- First, the royalty rate should be raised on new and existing federal coal leases when they come up for readjustment. Currently the rate is required to be “not less than” 12.5 percent from a surface mine and a fixed rate of 8 percent for an underground mine, which the statute allows to be “readjusted” for existing leases.²⁸ We recommend that in order to more accurately account for coal’s health, environmental, and economic costs, the royalty rate for both surface and underground mines be increased. For the sake of comparison, back-of-the-envelope calculations indicate increasing the royalty rate to 18.75 percent (the current rate for offshore drilling in federal waters) could be valued on the order of hundreds of millions of dollars.²⁹
- Secondly, the Interior Department could more fully account for the externalized costs of coal by including a price on carbon pollution in the calculations of fair market value that it undertakes before each lease sale. This change would affect only new leases. While we do not suggest a specific price, a 9-cent per kilowatt-hour increase (one of the lowest assessments as to the true cost of coal) would be the equivalent of an additional \$174.78 per short ton of coal—approximately 20 times the current domestic market rate of coal from the Powder River Basin.³⁰

Reform the leasing process for coal mined from public lands to achieve fair market value

The leasing process for coal mined on public lands is woefully out of date. The last time the Bureau of Land Management did a full programmatic environmental impact statement on its Federal Coal Management Program was in 1979.³¹ This means that today's coal leasing program most likely has significant shortcomings, especially related to determining fair market value.

Some have alleged that the Bureau of Land Management's process for defining fair market value during its leasing process is quite flawed,³² but it is difficult to know for sure. This is because a bidder for the rights to mine federal coal must meet what the bureau determines to be fair market value, but its process for determining that value is secret. We do know, however, that in addition to the royalties paid to the government for coal resources, the highest bid ever received on a federal coal lease in the Powder River Basin was just \$1.10 per short ton,³³ despite the fact that coal from the region sells at approximately \$10 per short ton³⁴ and even more when exported overseas.

To ensure that taxpayers are properly compensated for the use of their coal and to bring this process up to date, the secretary of the interior should order a full-scale programmatic review of the leasing process. The review should be open to public comment and allow experts the opportunity to weigh in on how the agency can best obtain fair market value of the use of taxpayer-owned lands.

Additionally, coal leasing in the Powder River Basin should be reformed. This area provides approximately 40 percent of the nation's coal,³⁵ but remarkably is not legally classified as a "coal-producing region." This classification means that the leasing process is not designed for competition and creates an environment in which tracts are almost never competitively leased thereby depriving American taxpayers of fair market value for the coal that they own. This flaw is evidenced on the ground—in the Powder River Basin there have been 25 coal lease sales over the last two decades and 20 of those sales attracted only one bidder. The Bureau of Land Management must reform this out-of-date system and not allow the coal industry to drive the leasing process, as is currently the case.

Establish renewable energy zones on public lands and waters

The amount of public land available in this country is finite and will become even more strained over time as our population grows. Even though many of our public lands and waters are managed under a “multiple use” mandate, industrial energy development is a de facto single-use because roads, transmission towers, construction of infrastructure, and other components of large-scale energy development fragment habitat, discourage recreation, and block public access to public lands.

With this as a consideration, federal land management agencies should take steps to ensure that future renewable energy development is situated in predetermined, designated zones that would minimize an industry’s footprint. Currently the Interior Department is finalizing a programmatic environmental impact statement for solar energy development on public lands. This would incentivize companies to site projects within designated solar energy zones that promise the fewest conflicts with wildlife, recreation, and other important values. It is a model that should be applied to all forms of renewable energy on public lands, as it is a radically different and much improved way to site energy projects that allows consideration of other uses of public lands besides industrial energy development.

Additionally, renewable energy zones must have the highest technical resources and the least potential for environmental and socioeconomic conflict. The development of these zones must take place under an open and transparent public process. Energy companies should be rewarded for locating projects in designated zones through mechanisms such as streamlined environmental review and lower fees, while at the same time be discouraged from locating outside of zones through the use of higher fees, lower priority environmental reviews, and other disincentives. In this way, energy development would be more efficient, companies would have more certainty, and special places would be shielded from harmful energy development.

Include public lands and waters in the executive order on sustainability to better track the government’s carbon pollution

President Obama signed Executive Order 13514 on October 5, 2009 to direct “federal leadership in environmental, energy, and economic performance.”³⁶ Under the order, all federal agencies were required to both account for and reduce

greenhouse gas emissions, including carbon pollution, the results of which were then reported by the White House Council on Environmental Quality, or CEQ, for the first time in April 2011.³⁷

Unfortunately, emissions from private activities on public lands and waters were not required to be included in the inventory, meaning that the carbon pollution from mining and drilling that takes place on public lands and waters are unaccounted for and not required to be reduced.

This exemption has potentially caused a vast under-reporting of the federal government's greenhouse gas emissions, specifically carbon. A report from Stratus Consulting commissioned by The Wilderness Society found that 23 percent of total U.S. emissions come from mining and drilling on public lands and waters and as such, the inventory could actually be more than 20 times greater than Council of Environmental Quality reported.³⁸ As part of a greater federal effort to reduce the carbon footprint and environmental impact of the government's activities, Executive Order 13514 should be modified to require the federal agencies responsible for leasing federal oil, natural gas, and coal resources to report on the contribution of the combustion of those resources to U.S. greenhouse gas emissions.

Ensure federal environmental analyses include scientific carbon pollution studies

In order to more properly account for the climate impacts of land management decisions, the Council on Environmental Quality should require any analysis of federal land management agency decisions under the National Environmental Policy Act, or NEPA, to include the impacts of carbon pollution.

In February 2010 the Council on Environmental Quality released its "Draft NEPA Guidance On Consideration Of The Effects Of Climate Change And Greenhouse Gas Emissions." But a major flaw exists—the guidance was not made applicable to "federal land and resource management actions." This should be rectified, especially because land management agencies have demonstrated that they have serious need for guidance in studying the impacts of climate change in the NEPA process.

Bureau of Land Management officials, for example, have stated with regard to the Powder River Basin that there is not sufficient science to quantify carbon pollution for specific projects,³⁹ but this is in fact not the case. The Bureau of Land

Management has demonstrated that it is capable of performing such an analysis—see for example in its calculations of carbon dioxide emissions for the environmental impact statement for the Wright Area Coal Lease Applications.⁴⁰

Additionally, the bureau did not consider the carbon pollution impacts of the Coal Hollow Mine in Utah in a draft environmental impact statement in November 2011, despite the fact that the proposed area houses around 50 million tons of recoverable coal.⁴¹ The bureau claimed that this was because “existing climate prediction models are not at a scale sufficient to estimate potential impacts of climate change within the analysis area.”⁴² Two climate scientists with the Climate Science Rapid Response Team, a group of 135 climate scientists dedicated to providing accurate information about climate change to policymakers and the media, noted that bureau’s analysis with regard to the Coal Hollow Mine “makes scientifically no sense” and that “the problem is irrelevant, because single-source impacts are globally shared.”⁴³

Evidently, clearer guidance is needed so that various agency representatives take carbon pollution into account in a more consistent manner. There are many potential benefits to be gained from better science-based guidance for the land management agencies with regard to carbon pollution. The Council on Environmental Quality must address this issue and help federal agencies account for the impacts that their decisions can have on public health and the environment.

Conclusion

Public lands and waters should be used for the greatest public good, and this is particularly true when it comes to energy and electricity. There is vast potential to use the places owned by all Americans to model a clean energy future, reducing our dependence on dirty fossil fuels and supporting emerging technologies needed to truly develop a diversified approach to energy development.

In order to use publicly owned places as a test case for a balanced energy policy, we recommend that the president establish a clean resources standard of 35 percent by 2035 for public lands. This standard would dictate what portion of the publicly owned resources used for electricity generation should come from clean resources that include wind, solar, geothermal, biomass, and small hydroelectricity.

This clean resources standard is desperately needed—despite efforts to ramp up renewable energy development on public lands and waters, our analysis treating public land management agencies as a utility shows that coal is by far the dominant player when it comes to electricity generation from resources from public lands and waters. Coal comprises nearly 66 percent of the total electricity coming from public lands and waters, while renewables including hydroelectricity make up only about 15 percent. Wind, solar, and geothermal combined currently make up only 1 percent of the total.

Even under 20-year renewable energy development scenarios, coal remains at 57.3 percent of the electricity share while solar, wind, and geothermal make up 13.5 percent. Without significant action on the part of Congress and the administration to address this discrepancy, taxpayer-owned coal will continue to pollute, and renewable development on public lands and waters may not reach its potential.

There are ample reasons to begin transitioning from this coal-dominant framework to one that is better balanced by clean energy. These include the fact that the public estate should be used for the greatest good, the American public deserves proper return

on coal especially when it is sourced from taxpayer-owned lands, it will help address carbon pollution, and clean energy can provide dramatic employment opportunities.

To address the discrepancy between coal and renewable energy on public lands and waters, the administration and Congress should use their broad authorities to make significant policy changes. In addition to establishing a clean resources standard, they should: put a carbon price on coal mined on public lands; reform the leasing process for coal mined from public lands to achieve fair market value; establish renewable energy zones on public lands and waters; include public lands in the executive order on sustainability to better track the government's carbon pollution; and, ensure that federal environmental analyses include impacts of carbon pollution.

Public lands and waters have the potential to serve the public in ways that ensure a stronger economy and healthier society. But the administration and Congress must take concrete steps to make this happen and to ensure that the public's resources are actually being used for the public good.

Appendix A—Figure calculations

Figure 2

Total U.S. electricity generated (thousand megawatt hours)

- EIA 2012, using data from 2011, “Net Generation by Energy Source: Total (All sectors). Release Date: March 28, 2012 | Data from: Monthly Energy Review. Production, consumption, exports, imports, and stocks for the last 2+ years.”
- <http://www.eia.gov/electricity/data.cfm#generation>

Percentage of total U.S. electricity from resources from public lands and waters

- Coal, petroleum, natural gas: EIA, using data from FY 2011.
 - Source: <http://www.eia.gov/analysis/requests/federallands/pdf/eia-federal-landsales.pdf>
- Hydroelectric: Idaho National Lab, June 2006 (using data from 1998, the most recent available)
 - Source: http://hydropower.inel.gov/hydrofacts/pdfs/a_study_of_united_states_hydroelectric_plant_ownership.pdf
- Geothermal, solar, wind: percentage calculations derived from current installed capacity (next column of chart)

Electricity generated from resources from public lands and waters (thousand megawatt hours)

- Coal, petroleum, natural gas: calculations using EIA percentages (previous column of chart)
- Hydroelectric: calculations using Idaho National Lab percentages (previous column of chart)

- Geothermal: Bureau of Land Management Data.
 - $1,275 \text{ MW} * 8760 \text{ (hours in a year)} * .9 \text{ (capacity factor)} = 10,052,100 \text{ mwh} = 10,052 \text{ thousand mwh.}$
 - Sources: http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/energy.Par.74240.File.dat/Fact_Sheet_Geothermal_Oct_2011.pdf; <http://www1.eere.energy.gov/geothermal/pdfs/40665.pdf>
- Wind: Department of the Interior Data.
 - $437 \text{ MW} * 8760 \text{ (hours in a year)} * .33 \text{ (capacity factor)} = 1,263,280 \text{ mwh} = 1,263 \text{ thousand mwh.}$
 - Sources: http://www.blm.gov/wo/st/en/prog/energy/renewable_energy.html; http://archive.awea.org/faq/wwt_basics.html

Figure 3

- See Appendix B for list of permitted projects and sources
- Geothermal: $1,275 \text{ MW installed} + 376.5 \text{ MW permitted} = 1,651.5 \text{ MW}$
 - $1,651.5 \text{ MW} * 8760 \text{ (hours in a year)} * .9 \text{ (EIA capacity factor)} = 13,020,426 \text{ mwh} = 13,020 \text{ thousand mwh.}$
- Solar: $0 \text{ MW installed} + 4,276 \text{ MW permitted} = 4,276 \text{ MW}$
 - $4,276 \text{ MW} * 8760 \text{ (hours in a year)} * .25 \text{ (capacity factor)} = 9,364,440 \text{ mwh} = 9,364 \text{ thousand mwh}$
- Wind: $437 \text{ MW installed} + 1,042 \text{ MW permitted} = 1,479 \text{ MW}$
 - $1,479 \text{ MW} * 8760 \text{ (hours in a year)} * .33 \text{ (AWEA capacity factor)} = 4,275,493.2 \text{ mwh} = 4,275 \text{ thousand mwh.}$

Figure 5

- Solar:
 - 24,000 MW
 - Source: http://solareis.anl.gov/documents/supp/Supplement_to_the_Draft_Solar_PEIS.pdf

- Calculations: $24,000 \text{ MW} * 8760 \text{ (hours in a year)} * .25 \text{ (capacity factor)} = 52,560,000 \text{ mwh} = 52,560 \text{ thousand mwh}$
- Wind:
 - 3,240 MW
 - Source: <http://windeis.anl.gov/documents/fpeis/maintext/Vol1/Vol1Ch5.pdf>
 - Calculations: $3,240 \text{ MW} * 8760 \text{ (hours in a year)} * .33 \text{ (AWEA capacity factor)} = 9,366,192 \text{ mwh} = 9,366 \text{ thousand mwh}$
- Offshore wind:
 - 2,180 MW (Delaware) + 1,660 MW (Maryland) + 2,940 MW (Virginia) = 6,780 MW
 - Note: does not include New Jersey, Massachusetts, and Rhode Island Wind Energy Areas
 - Source: <http://www.boemre.gov/offshore/RenewableEnergy/PDFs/stateactivities/VA/Call-for-Information-and-Nominations-Discussion-Hagerman.pdf>
 - Calculations: $6,780 \text{ MW} * 8760 \text{ (hours in a year)} * .33 \text{ (capacity factor)} = 19,599,624 \text{ mwh} = 19,600 \text{ thousand mwh}$
- Total wind: $9,366 + 19,600 = 28,966 \text{ thousand mwh}$
- Geothermal
 - 12,140 MW
 - Source: <http://www.blm.gov/wo/st/en/prog/energy/geothermal.html>
 - Calculations: $12,140 \text{ MW} * 8760 \text{ (hours in a year)} * .9 \text{ (EIA capacity factor)} = 95,711,760 \text{ mwh} = 95,712 \text{ thousand mwh}$

Appendix B—Renewable energy projects on public lands and waters permitted by the Obama administration

State	Project name	Technology	Potential output (MW)	Year approved
NV	Coyote Canyon	Geo	62	2011
NV	Salt Wells	Geo	40	2011
NV	Salt Wells	Geo	120	2011
NV	McGinness Hills	Geo	90	2011
NV	Hot Sulfur Springs / Tuscarora	Geo	15	2011
NV	Blue Mountain Geothermal Power Plant	Geo	49.5	2010
NV	Ormat, Jersey Valley	Geo	30	2010
TOTAL GEOTHERMAL			376.5	
AZ	Sonoran Solar Project	Solar	300	2011
CA	Desert Sunlight Solar Farm	Solar	550	2011
CA	Rice Solar Energy	Solar	150	2011
CA	Abengoa Mojave Solar	Solar	250	2011
CA	C Solar West	Solar	250	2011
CA	C Solar South	Solar	200	2011
CA	Centinela Solar Energy Project	Solar	275	2011
CA	Imperial Valley Solar Project	Solar	709	2010
CA	Ivanpah Solar Electric Generating System (SEGS)	Solar	370	2010
CA	Blythe Solar Power Project	Solar	1000	2010
CA	Calico Solar Energy Project	Solar	663	2010
CA	Genesis Solar Energy Project	Solar	250	2010
CA	Lucerne Valley Solar Project - (Chevron Energy Solutions)	Solar	45	2010
NV	Silver State Solar Energy Project (North)	Solar	60	2010
NV	Crescent Dunes Solar Project	Solar	110	2010
NV	Amargosa Farm Road Solar Project	Solar	464	2010

TOTAL SOLAR			4,276	
CA	Tule Wind	Wind	186	2011
OR	West Butte Wind	Wind	104	2011
OR	Echanis Wind / North Steens Transmission	Wind	104	2011
NV	Spring Valley Wind, Spring Valley	Wind	150	2010
MA	Cape Wind	Offshore wind	468	2011
VT	Deerfield Wind	Wind (FS)	30	2012
TOTAL WIND			1,042	

Sources: http://www.blm.gov/wo/st/en/prog/energy/renewable_energy/approved_projects.html; http://www.blm.gov/wo/st/en/prog/energy/renewable_energy/prior; <http://boem.gov/Renewable-Energy-Program/Current-Projects/Index.aspx>; http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/9046_FSPLT2_071031.pdf

About the authors

Jessica Goad is the Manager of Research and Outreach for the Center for American Progress's Public Lands Project. Previously she was on staff at The Wilderness Society, where she focused on fossil and renewable energy on public lands. Her interest in land conservation stems from her experience growing up in Golden, Colorado at the base of the Rocky Mountains. Jessica holds a degree in political science and environmental and technology studies from Carleton College in Northfield, Minnesota.

Christy Goldfuss is the Public Lands Project Director at the Center for American Progress. Prior to joining CAP, she was a legislative staffer for the House Committee on Natural Resources, where she focused on policies and legislation affecting the U.S. Forest Service and the Bureau of Land Management. She first started working on lands issues as the federal preservation advocate for Environment America. As a television reporter in California and Nevada, Christy covered many stories from communities neighboring public lands. Through telling those stories, she became interested in lands policies. She holds a bachelor's degree in political science from Brown University.

Tom Kenworthy is a Senior Fellow at the Center for American Progress. He joined CAP after spending two years as a senior fellow at Western Progress, a regional non-partisan policy institute, where he focused on renewable energy and environmental issues. Tom spent more than three decades as a newspaper reporter, the majority of that time with *The Washington Post* and *USA Today*. He has reported on a wide variety of subjects, including state and national government and politics, Congress, the environment, and the states of the Rocky Mountain West. His longtime specialties were public lands, natural resources, and energy issues, which he covered as a Denver-based national correspondent beginning in 1995. His environmental reporting has won awards from the Society of American Foresters and the Sierra Club. As a policy analyst, Tom has written commentaries and articles for a variety of national and regional publications. Tom holds a bachelor's degree in history from Cornell University. He lives in Golden, Colorado with his wife, Nancy.

Acknowledgements

The authors would like to thank Jim Lyons, John Leshy, Dave Alberswerth, Chase Huntley, Kate Gordon, Richard Caperton, and Dan Weiss for their comments, input, and guidance.

Endnotes

- 1 "About the Department of the Interior," available at <http://www.doi.gov/facts.html> (last accessed May 2012); "U.S. Forest Service," available at <http://www.fs.fed.us/> (last accessed May 2012).
- 2 "About the Department of the Interior," available at <http://www.doi.gov/facts.html> (last accessed May 2012).
- 3 Department of the Interior, "The Department of the Interior's Economic Contributions" (2011), p. 70, Table A1-1, available at <http://www.doi.gov/news/pressreleases/upload/DOL-Econ-Report-6-21-2011.pdf>.
- 4 "Wilderness Preservation System," available at <http://www.wilderness.net/index.cfm?fuse=NWPS&sec=fastfacts>, (last accessed May 2012).
- 5 See, for example: Headwaters Economics, "Wilderness and Economics: What Research and Careful Analysis Say About the Economic Impact of Wilderness" (2011), available at http://headwaterseconomics.org/wphw/wp-content/uploads/Value_Wilderness_Studies.pdf.
- 6 Energy Information Administration, *Sales of Fossil Fuels Produced from Federal and Indian Lands, FY 2003 through FY 2011* (Department of Energy, 2012), page 6, Table 1-14, available at <http://www.eia.gov/analysis/requests/federalandsales/pdf/eia-federalandsales.pdf>.
- 7 Joe Romm, "Life-cycle study: Accounting for total harm from coal would add 'close to 17.8¢/kWh of electricity generated," Climate Progress, February 16, 2011, available at <http://thinkprogress.org/romm/2011/02/16/207534/life-cycle-study-coal-harvard-epstein-health/>.
- 8 John Podesta, Kate Gordon, Bracken Hendricks, and Benjamin Goldstein, "The Clean-Energy Investment Agenda: A Comprehensive Approach to Building the Low-Carbon Economy" (Washington: Center for American Progress, 2009) available at http://www.americanprogress.org/issues/2009/09/clean_energy_investment.html.
- 9 "About the Department of the Interior," available at <http://www.doi.gov/facts.html> (last accessed May 2012).
- 10 "RPS Policies," available at http://www.dsireusa.org/documents/summarymaps/RPS_map.pdf (last accessed May 2012).
- 11 Our country's 104 nuclear reactors currently provide about 20 percent of the nation's electricity. However, it is nearly impossible to quantify the amount of uranium specifically from public lands that is used in U.S. nuclear power plants because federal land management agencies do not track and report this information. According to the Government Accountability Office, neither the Interior Department nor the Forest Service collects data on the "extent to which hardrock (locatable) minerals have been extracted from federal lands." However, we can assume that the amount is quite small. According to the U.S. Geological Survey, each year 27,500 tons of uranium oxides are used in nuclear reactors, and 1,750 -2,250 tons are mined domestically; most is imported from Canada. Back of the envelope calculations demonstrate that on the order of 1-5 percent of electricity sourced from public lands comes from uranium, so Charts 1a and 1b would not be extremely different if nuclear power were to be included in the analysis.
- 12 U.S. Forest Service, *Assessing the Potential for Renewable Energy on National Forest System Lands* (Department of Agriculture), page C-1, Appendix C, available at <http://www.nrel.gov/docs/fy05osti/36759.pdf>.
- 13 "Net Generation by Energy Source: Total (All Sectors), Release Data: April 27, 2012," available at <http://www.eia.gov/electricity/data.cfm#generation>.
- 14 Bureau of Land Management, "Salazar Announces Coal Lease Sales in Wyoming," Press release, March 22, 2011, available at http://www.blm.gov/wo/st/en/info/newsroom/2011/march/NR_03_22_2011.html.
- 15 Energy Information Administration, *Annual Energy Outlook 2012 Early Release Overview* (Department of Energy, 2012), p. 10, available at <http://www.eia.gov/forecasts/aeo/er/pdf/0383er%282012%29.pdf>.
- 16 Pew Research Center, "As Gas Prices Pinch, Support for Oil and Gas Production Grows" (2012), available at <http://www.people-press.org/2012/03/19/as-gas-prices-pinch-support-for-oil-and-gas-production-grows/?src=prc-number>.
- 17 Matthew Brown, "Coal exports surge to highest level since 1991," Associated Press, April 10, 2012, available at <http://finance.yahoo.com/news/coal-exports-surge-highest-level-145835437.html>.
- 18 Tom Kenworthy and Kate Gordon, "A moral crossroads," *The Daily Herald*, August 7, 2011, available at <http://heraldnet.com/article/20110807/OPINION03/708079968/1122/news01>.
- 19 Energy Information Administration, *Sales of Fossil Fuels Produced from Federal and Indian Lands, FY 2003 through FY 2011*, (Department of Energy, 2012), p. 6, Table 1-14, available at <http://www.eia.gov/analysis/requests/federalandsales/pdf/eia-federalandsales.pdf>.
- 20 Department of the Interior, "The Department of the Interior's Economic Contributions."
- 21 Department of the Treasury, *General Explanations of the Administration's Fiscal Year 2013 Revenue Proposals*, (Department of the Treasury, 2012), p. 120, available at <http://www.treasury.gov/resource-center/tax-policy/Documents/General-Explanations-FY2013.pdf>.
- 22 Secretary of the Interior Ken Salazar, "New Energy Future: The Role of Public Lands in Clean Energy Production and Carbon Capture," UN Conference on Climate Change, December 10, 2009, available at http://www.doi.gov/news/speeches/2009_12_10_speech.cfm.
- 23 Jorge Madrid and Adam James, "Bureau of Labor Statistics Reports 3.1 Million U.S. Green Jobs: Top 5 Takeaways," Climate Progress, March 23, 2012, available at <http://thinkprogress.org/climate/2012/03/23/450776/bureau-of-labor-statistics-reports-31-million-us-green-jobs-top-5-takeaways/>.

- 24 Bureau of Labor Statistics, "Green Goods and Services Summary," Press release, March 22, 2012, available at <http://www.bls.gov/news.release/gggcew.nr0.htm>.
- 25 Mark Muro, Jonathan Rothwell, and Devashree Saha, "Sizing the Clean Economy: A National and Regional Green Jobs Assessment" (Washington: Brookings Institution, 2011), available at http://www.brookings.edu/~media/series/resources/0713_clean_economy.pdf.
- 26 Joe Romm, "Life-cycle study: Accounting for total harm from coal would add "close to 17.8¢/kWh of electricity generated," Climate Progress, February 16, 2011, available at <http://thinkprogress.org/romm/2011/02/16/207534/life-cycle-study-coal-harvard-epstein-health/>.
- 27 U.S. Energy Information Administration, *Electric Power Monthly April 2012*, (Department of Energy, 2012), p. 106, Table 5.3, available at <http://205.254.135.7/electricity/monthly/pdf/chap5.pdf>.
- 28 Pamela Baldwin, "Fair Market Value for Wind and Solar Development on Public Land," (Washington: The Wilderness Society and Taxpayers for Common Sense, 2010), available at <http://wilderness.org/files/Fair-Market-Value-Whitepaper.pdf>.
- 29 Based off the fact that \$774 million in royalty revenues were collected from federal coal leases in fiscal year 2001. "Reported Royalty Revenue by Category," available at http://www.onrr.gov/ONRRWebStats/Disbursements_Royalties.aspx?report=ReportedRoyaltyRevenuebyCategory&yeartype=FY&year=2011&datatype=AY (last accessed May 2012).
- 30 1 short ton of coal = 1,942 kwh. "How much coal, natural gas, or petroleum is used to generate a kilowatt-hour of electricity?" available at <http://www.eia.gov/tools/faqs/faq.cfm?id=667&t=2>; "Coal News and Markets," available at http://www.eia.gov/coal/news_markets/.
- 31 Letter from Robert Abbey to Jeremy Nichols, January 28, 2011, available at http://www.wildearthguardians.org/site/DocServer/BLM_Director_response_Jan_28_2011.pdf.
- 32 "Declaration of Tom Sanzillo," *WildEarth Guardians et al v. Salazar et al*, Civ. No. 1:11-cv-00670-CKK, available at <http://climatewest.files.wordpress.com/2012/01/tom-affidavitvfn.pdf>.
- 33 Jeremy Fugleberg, "With record bid, Alpha wins battle for Powder River coal in Wyoming," *Casper Star-Tribune*, August 18, 2011, available at http://trib.com/news/state-and-regional/article_443fc5f0-f0b7-5435-8982-2992866b3928.html.
- 34 "Coal News and Markets," available at http://www.eia.gov/coal/news_markets/.
- 35 Tom Kenworthy, "The Obama Administration's Disconnect on Coal" (Washington: Center for American Progress, 2011), available at http://www.americanprogress.org/issues/2011/12/administration_coal.html.
- 36 The White House, "President Obama signs an Executive Order Focused on Federal Leadership in Environmental, Energy, and Economic Performance," Press release, October 5, 2009, available at http://www.whitehouse.gov/the_press_office/President-Obama-signs-an-Executive-Order-Focused-on-Federal-Leadership-in-Environmental-Energy-and-Economic-Performance.
- 37 White House Council on Environmental Quality, "Federal Agencies Release Performance Benchmarks for Energy and Sustainability Goals," Press release, April 19, 2011, available at http://www.whitehouse.gov/administration/eop/ceq/Press_Releases/April_19_2011.
- 38 Stratus Consulting for The Wilderness Society, "Greenhouse Gas Emissions from Fossil Energy Extracted from Federal Lands and Waters: Final Report" (2012), available at <http://wilderness.org/files/FINAL%20STRATUS%20REPORT.pdf>.
- 39 Letter from Robert Abbey to Jeremy Nichols, January 28, 2011, available at http://www.wildearthguardians.org/site/DocServer/BLM_Director_response_Jan_28_2011.pdf.
- 40 Bureau of Land Management, *DRAFT Environmental Impact Statement for the Wright Area Coal Lease Applications: Volume 2 of 2, Chapters 4 - 8 and Appendices* (Department of the Interior, 2009), p. 140, Section 4.2.14.2, available at <http://www.blm.gov/pgdata/etc/medialib/blm/wy/information/NEPA/hpdo/Wright-Coal/feis.Par.67430.File.dat/08chap4.pdf>.
- 41 Josh Loftin, "BLM releases study on coal mine near Bryce Canyon," *Desert News*, November 4, 2011, available at <http://www.deseretnews.com/article/700194761/BLM-releases-study-on-coal-mine-near-Bryce-Canyon.html>.
- 42 Bureau of Land Management, *Alton Coal Tract Lease By Application Draft Environmental Impact Statement Chapter 3* (Department of the Interior 2011), p. 3-21, Section 3.3.3.6, available at http://www.blm.gov/pgdata/etc/medialib/blm/ut/lands_and_minerals/coal/alton_coal_project.Par.62082.File.dat/8_Alton%20DEIS%20Chapter%203.pdf.
- 43 Brad Johnson, "Scientists Slam BLM's Coal-Friendly Slant On Climate Change," Climate Progress, November 18, 2011, available at <http://thinkprogress.org/green/2011/11/18/370124/scientists-slam-blms-coal-friendly-slant-on-climate-change/>.

The Center for American Progress is a nonpartisan research and educational institute dedicated to promoting a strong, just, and free America that ensures opportunity for all. We believe that Americans are bound together by a common commitment to these values and we aspire to ensure that our national policies reflect these values. We work to find progressive and pragmatic solutions to significant domestic and international problems and develop policy proposals that foster a government that is “of the people, by the people, and for the people.”

Center for American Progress

