

**A PRAIRIE PERSPECTIVE ON GLOBAL WARMING AND
CLIMATE CHANGE: THE USE OF LAW, TECHNOLOGY,
AND ECONOMICS TO ESTABLISH PRIVATE SECTOR
MARKETS TO COMPLIMENT KYOTO**

RONALD C. GRIFFIN*

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* Professor of Law, Washburn University School of Law. B.S., Hampton Institute, J.D., Howard University, L.L.M. University of Virginia School of Law. The author can be reached at ronald.griffin@washburn.edu.

I. INTRODUCTION

We are in the midst of an environmental calamity that few perceive as grave. The climate is changing. Civilization is suffering. One person can do little to cope with these problems on a global scale. But farmers can do something about their farming operations to contribute less to climate change.

Today, two percent of the population feeds us.¹ With mechanical advancements,² new farm machinery,³ innovative practices, products,⁴ commodities,⁵ securities,⁶ and markets⁷ folk can do something to reward farmers for their efforts to slow the pace of climate change.

II. LIFE CYCLE

Today, farmers can decipher nature's life cycle better than anybody. Life depends upon the circulation of organic compounds, namely nitrogen.⁸ Nitrogen is fixed in humus by bacteria and algae living symbiotically with plant roots;⁹ the element enters the soil from decaying

¹ WILLIAM J. BERNSTEIN, *THE BIRTH OF PLENTY: HOW THE MODERN ECONOMIC WORLD WAS LAUNCHED* 22 (2004).

² See NATIONAL FARMERS UNION CARBON CREDIT PROGRAM, MANAGEMENT GUIDELINES FOR NO-TILL CROP PRODUCTION PRACTICE, <http://carboncredit.ndfu.org/PDFS/tillageguidelines.pdf> [hereinafter MANAGEMENT GUIDELINES] (last visited Feb. 15, 2009).

³ *Id.*

⁴ See Greg Bachmeier, *Manure-Able Energy*, *THE PLANET*, 2005, <http://planet.wvu.edu/archives/2005/articles/winter/manureable-energy.html> (last visited Feb. 15, 2009).

⁵ *Id.*

⁶ See, e.g., Chicago Climate Exchange (CCX), Key Features, <http://www.chicagoclimatex.com/content.jsf?id=25> [hereinafter Key Features] (last visited Feb. 15, 2009).

⁷ See, e.g., Chicago Climate Exchange (CCX), Overview, <http://www.chicagoclimatex.com/index.jsf> [hereinafter Overview] (last visited Feb. 15, 2009).

⁸ BARRY COMMONER, *THE CLOSING CIRCLE: NATURE, MAN, AND TECHNOLOGY* 17 (1971) [hereinafter COMMONER, *CLOSING CIRCLE*]; see James Gustave Speth, *EPA Must Help Lead an Environmental Revolution in Technology*, 21 ENVTL. L. 1425, 1430 (1991).

⁹ *Id.* at 21; see NANCY M. TRAUTMANN ET AL., PESTICIDE MGMT EDUC. PROGRAM, NITROGEN: THE ESSENTIAL ELEMENT, <http://pmep.cce.cornell.edu/facts-slides-self/facts/nit-el-grw89.html> (last visited Feb. 15, 2009).

plants and animal waste with the help of carbon dioxide and sunlight.¹⁰ The nitrogen is converted into nitrate by plants for continued growth and development.¹¹ Thereafter the plants become food for animals, and recharge and restart the nitrogen cycle as animal waste.¹²

In aquatic habitats, fish provide necessary nutrition by producing waste.¹³ As waterborne micro-organisms feed on the fish waste, nitrogen is produced.¹⁴ When oxygen is combined with nitrogen, nitrate is produced.¹⁵ Algae convert the nitrate into organic compounds, that become food for fish¹⁶ and humans.¹⁷

In the life cycle, carbon dioxide produces infrared sunlight that is partially absorbed by the soil as heat.¹⁸ Plants ventilate oxygen to make room for carbon dioxide.¹⁹ The oxygen emitted into the atmosphere is used to sustain all animals on the planet.²⁰

Folks engaged in farming operations realize that “everything is connected to everything else,”²¹ “everything must go somewhere,”²²

¹⁰ COMMONER, CLOSING CIRCLE, *supra* note 8, at 18-19, 21; *see* TRAUTMANN, *supra* note 9.

¹¹ COMMONER, CLOSING CIRCLE, *supra* note 8, at 21; *see* Jodi Soyars Windham, *Putting Your Money Where Your Mouth Is: Perverse Food Subsidies, Social Responsibility & America's 2007 Farm Bill*, 31 ENVIRONS ENVTL. L. & POL'Y J. 1, 8 (2007).

¹² COMMONER, CLOSING CIRCLE, *supra* note 8, at 21.

¹³ *Id.* at 23.

¹⁴ *Id.*

¹⁵ *Id.*; *see* EPA Ground Water & Drinking Water, Consumer Factsheet on: Nitrates/Nitrites, http://www.epa.gov/OGWDW/contaminants/dw_contamfs/nitrates.html (last visited Feb. 15, 2009).

¹⁶ COMMONER, CLOSING CIRCLE, *supra* note 8, at 21.

¹⁷ *Id.* at 28-29; *see* EPA Ground Water, *supra* note 17.

¹⁸ COMMONER, CLOSING CIRCLE, *supra* note 8, at 26.

¹⁹ *Id.* at 27. The generally accepted photosynthetic equation is: carbon dioxide + water + light energy results in carbohydrates + oxygen + water; plants consume carbon dioxide and release oxygen as a result of photosynthesis. *See* James A. Basham et al., *The Path of Carbon in Photosynthesis*, 185 J. BIOL. CHEM. 781, 782 (1950) (A description of carbon dioxide's path during photosynthesis, identifying the relevance of carbon dioxide to plant respiration, and ostensibly introducing the Calvin Cycle to modern botany.); B. Botkin, *Global Warming: What it is, What is Controversial About it, and What We Might do in Response to it*, 9 UCLA J. ENVTL. L. & POL'Y 119, 133 (1991) (discussing the theory posited by some that global warming's increased levels of carbon dioxide will produce beneficial conditions for enhanced plant growth rates).

²⁰ COMMONER, CLOSING CIRCLE, *supra* note 8, at 27-29, 36.

²¹ *Id.* at 33.

“[n]ature knows best,” and “there is no free lunch.”²³ We have a global ecosystem; the system is an interconnected whole.²⁴ It is not subject to improvement; nothing can be gained or lost; and anything extracted by human effort must be replaced. There are fees to pay for human extraction, and the use of natural resources and, while some costs can be delayed,²⁵ none can be avoided.²⁶

III. FARMING

To begin, we should cast our sights back to the rough times, when “no one worried about cholesterol or food-borne carcinogens.”²⁷ Back then, “people didn’t live long enough to get heart disease or cancer; those who managed to avoid infant mortality . . . usually succumbed to typhus, cholera, diphtheria, galloping consumption, influenza, [and] . . . traditional diseases first.”²⁸

“There were . . . occupational hazards; military service . . . took its toll . . .”²⁹ Coal miners succumbed to “black lung” disease, while wool sorters battled anthrax.³⁰ Venereal disease took peoples’ minds and lives.³¹ “Non-lethal afflictions” were treated by doctors with “toxic mercury salts, or, if you were lucky, leeches, [which] in many cases mercifully convert[ed] the lesser [original malady] into a terminal one.”³² Anyone born with diabetes, cystic fibrosis, or muscular dystrophy was

²² *Id.* at 39.

²³ *Id.* at 41, 45.

²⁴ *Id.* at 35.

²⁵ *Id.*

²⁶ COMMONER, CLOSING CIRCLE, *supra* note 8, at 37-40.

²⁷ ALAN MCHUGHEN, PANDORA’S PICNIC BASKET: THE POTENTIAL AND HAZARDS OF GENETICALLY MODIFIED FOODS 102-03 (2000) (setting the scene at a time over 100 years ago when causes of death were quite different than those most common today).

²⁸ *Id.* at 103.

²⁹ *Id.*

³⁰ *Id.* (providing examples of especially dangerous occupations over 100 years ago).

³¹ *Id.*

³² *Id.* (providing examples of common treatments that existed for non-lethal medical situations over 100 years ago).

“doomed.”³³ Of course some people pine for the past, but nostalgia, like the smell of good cologne, masks the stink of old-fashioned farming.

Though regional food supply was adequate throughout the country, food distribution was a problem.³⁴ There was no mass transportation.³⁵ The breadth of people’s diets was a limited affair.³⁶ Food preservation was rudimentary.³⁷ “Nutritional deficiencies abounded - rickets, scurvy, and ordinary malnourishment.”³⁸ In America, life expectancy didn’t rise until the late nineteenth century.³⁹ Infant mortality rates fell in the twentieth century.⁴⁰

Though life was simpler and families closer in many ways, wishing for the past would be madness. In 2008, technology has taken much of the grind out of life. It has tackled diseases, simplified farming tasks, increased crop yields, limited people’s exposure to carcinogens, facilitated the distribution of food, and last but not least, provided folks with a variety of ways to identify foods that are dangerous to consume.⁴¹

IV. HISTORY

A. Dust Bowl

Let’s shift our focus. In the 1930s, things turned sour in the Midwest.⁴² Living in the Plains was dreadful.⁴³ Farming was terrible.⁴⁴

³³ MCHUGHEN, *supra* note 27, at 103 (noting that diseases at birth were especially deadly over 100 years ago).

³⁴ *Id.*

³⁵ *Id.*; see Mike O’Sullivan, *Author Traces Transformation of Early 19th Century America*, VOICE OF AM., Dec. 3, 2007, <http://www.voanews.com/english/archive/2007-12/2007-12-03voa50.cfm?CFID=220098072&CFTOKEN=46888884>.

³⁶ MCHUGHEN, *supra* note 27, at 103.

³⁷ *Id.*

³⁸ *Id.*

³⁹ SAMUEL H. PRESTON & MICHAEL R. HAINES, *FATAL YEARS: CHILD MORTALITY IN LATE NINETEENTH-CENTURY AMERICA 208-09* (Robert W. Fogel & Clayne L. Pope eds., Princeton Univ. Press 1991).

⁴⁰ See *Defining Health and Wellness – Life Expectancy*, <http://www.libraryindex.com/pages/2948/Defining-Health-Wellness-LIFE-EXPECTANCY.html> (last visited Feb. 15, 2009).

⁴¹ See MCHUGHEN, *supra* note 27, at 103.

⁴² *Disasters: The Dust Bowl*, <http://www.u-s-history.com/pages/h1583.html> [hereinafter *Dust Bowl*] (last visited Feb. 15, 2009); see Zeynep K. Hansen & Gary D. Libecap, *Small Farms*,

The drought upset social attitudes.⁴⁵ Nativism poisoned politics.⁴⁶ Government was fragmented, disoriented, and decentralized.⁴⁷ Then, badly damaged liberties (the option to implement life plans unimpeded by government), freedoms (the individual's option to work out his economic welfare unimpeded by the impulse of others to work it out for him), and equal opportunity (the option to plow promising ideas into the nation's landscape to produce something worthwhile) drove everybody astray.⁴⁸

If wealth and property had been widely distributed among folks, (if farmers had a real hand in their own affairs and a legitimate stake in their own future) there might have been a chance for people to grapple with natural disasters and work themselves out of the forthcoming mess. Sadly, untrammelled freedom to farm came to an end in Kansas.⁴⁹ At the same time, banks withered away,⁵⁰ corporate farmers drove sharecroppers off the land,⁵¹ credit dried up, and small businesses gave way to big businesses.⁵²

Externalities, and The Dust Bowl of the 1930s, 112 J. POL. ECON. 665, 666 (2004) (“The Dust Bowl was one of the most severe environmental crises in North America in the 20th century.”).

⁴³ See CRAIG MINER, *KANSAS: THE HISTORY OF THE SUNFLOWER STATE, 1854-2000*, at 275-77 (2002).

⁴⁴ *Id.*; see Neil Maher, *Crazy Quilt Farming on Round Land: The Great Depression, the Soil Conservation Service, and the Politics of Landscape Change on the Great Plains During the New Deal Era*, 31 W. HIST. Q. 332 (2000).

⁴⁵ MINER, *supra*, note 43, at 284, 288.

⁴⁶ *Id.* at 279.

⁴⁷ See MORRIS JANOWITZ, *THE LAST HALF-CENTURY: SOCIETAL CHANGE AND POLITICS IN AMERICA* 237 (1978) (discussing the government's gradual emergence as a regulating mechanism).

⁴⁸ *Id.*

⁴⁹ MINER, *supra* note 43, at 278-79.

⁵⁰ See David C. Wheelock, *Regulation, Market Structure, and the Bank Failures of the Great Depression*, REV., Mar./Apr. 1995, at 27-29, available at http://research.stlouisfed.org/publications/review/95/03/Regulation_Mar_Apr1995.pdf.

⁵¹ MINER, *supra* note 43, at 284-85.

⁵² *Id.* at 278-79.

B. Haskell County, Kansas

The plight of people in Haskell County, Kansas, highlights what happened to everybody on the Great Plains and the gloom that hung in the air.⁵³ In Haskell County, “agriculture dominate[d] . . . existence and influence[d] [everybody’s] attitudes.”⁵⁴ In southwest Kansas, “settlers [plowed] the native prairie and planted wheat. Adequate moisture and the adoption of . . . new wheat variet[ies] enhanced production. . . . With the exodus of many settlers during the droughts of 1893-97 and 1904-07, agricultural production gravitated towards activities better suited to the arid climate.”⁵⁵

Though “sorghum and cattle seemed likely to replace wheat as the primary agricultural products,” unrest was in the wind.⁵⁶ “[K]ey technological and [temporal] economic changes” quickly pushed farmers back to wheat.⁵⁷ “The railroad[s] [came to the county] in 1912, providing [farmers] better access to markets. Tractors replaced horses and provided the [raw] power to . . . break the sod. Then wheat prices soared during World War I, and the acres planted [with wheat] began to increase.”⁵⁸

“In 1919, the combination of adequate moisture, a good wheat crop, and high prices set the stage for a renewed push” to make wheat production *the industry* for the county.⁵⁹ “The introduction of the combine in the early 1920s completed the [mechanization process].”⁶⁰ “[M]oisture and wheat prices[] remained favorable [through] the 1920s.

⁵³ See Duane D. Williams & Leonard E. Bloomquist, *From Dust Bowl to Green Circles: A Case Study of Haskell County, Kansas* 8 (Kan. Agric. Experiment Station, Contribution No. 96-472-B, 1996), available at <http://www.oznet.ksu.edu/library/agec2/sb662.pdf> [hereinafter Williams & Bloomquist, Haskell County].

⁵⁴ *Id.* at 9 (quoting EARL H. BELL, *CULTURE OF A CONTEMPORARY RURAL COMMUNITY: SUBLETTE, KANSAS* 55 (1942)); see Pamela Riney-Kehrberg, *In God We Trusted, In Kansas We Busted. . . Again*, 63 *AGRIC. HIST.* 187, 191-92 (1989).

⁵⁵ Williams & Bloomquist, Haskell County, *supra* note 53, at 9.

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ *Id.*; see Leslie Hewes, *Early Suitcase Farming in the Central Great Plains*, 51 *AGRIC. HIST.* 23, 24 (1977).

⁵⁹ Williams & Bloomquist, Haskell County, *supra* note 53, at 9.

⁶⁰ *Id.* (citing EARL H. BELL, *CULTURE OF A CONTEMPORARY RURAL COMMUNITY: SUBLETTE, KANSAS* 55 (1942)).

Wealth and [business] attitudes soared.”⁶¹ Sadly, when the drought began in the late 1920s, everything fell apart.⁶²

The drought blistered the minds of county residents.⁶³ They acted weird; some developed a gambler’s philosophy that was evident to many outsiders.⁶⁴ The “watchword” among tillers was “next year.”⁶⁵ “[M]any thought that growing food was a matter of “fate or luck”⁶⁶ or a matter of “hit[ting] it right.”⁶⁷ Some residents resented the government coming in to tell them what to do.⁶⁸ Far too many were willing to shoulder heavier debt loads to get another crack at producing something.⁶⁹ The collective result was a countywide disaster.⁷⁰

C. Government Programs

In the 1930s, the Federal government came to Haskell County to help distressed farmers.⁷¹ There were a multitude of Federal programs.⁷²

⁶¹ Williams & Bloomquist, Haskell County, *supra* note 53, at 9.

⁶² *Id.* at 8.

⁶³ *Id.* at 9 (“The wide variance between the years of bounty and the years of absolute crop failure had a strong psychological effect upon those living in Haskell County.”).

⁶⁴ *Id.* (noting that the residents “develop[ed] the gambler’s psychology, so noticeable to outsiders. . . .” (quoting EARL H. BELL, CULTURE OF A CONTEMPORARY RURAL COMMUNITY: SUBLETTE, KANSAS 42-43 (1942))).

⁶⁵ Williams & Bloomquist, Haskell County, *supra* note 53, at 9 (citing EARL H. BELL, CULTURE OF A CONTEMPORARY RURAL COMMUNITY: SUBLETTE, KANSAS 2 (1942)).

⁶⁶ *Id.* (quoting EARL H. BELL, CULTURE OF A CONTEMPORARY RURAL COMMUNITY: SUBLETTE, KANSAS 42-43 (1942)).

⁶⁷ Williams & Bloomquist, Haskell County, *supra* note 53, at 9

⁶⁸ *See id.* at 8-9 (stating that “the Haskell County farmers [were] extremely independent prior to 1931 . . .”).

⁶⁹ *Id.* at 10 (It was a “common belief at the time that the climate of the area would improve with increased cultivation.”).

⁷⁰ *See id.* at 12.

⁷¹ *Id.*

⁷² *See id.* at 8-9; *see also* Gary D. Libecap, *The Great Depression and the Regulating State: Federal Government Regulation of Agriculture, 1884-1970*, in THE DEFINING MOMENT: THE GREAT DEPRESSION AND THE AMERICAN ECONOMY IN THE TWENTIETH CENTURY 89-197 (Michael D. Bordo et al. eds., 1998) (providing a general survey of Depression-era relief programs).

Works Progress Administration schemes, with their attractive wage and hour structures, siphoned labor from the local agricultural labor markets.⁷³ Farm subsidy programs made recipients dependent upon government handouts, pliant, sensitive about the government dole, and less inclined to practice conservation.⁷⁴ Sadly, the vitality of these programs depended upon residents who knew about their existence.⁷⁵ Washington officials tried everything to resettle the population and raise the value of farm produce out west.⁷⁶

Over time, the habits and practices of a “self-seeking” generation of Americans⁷⁷ foundered on the rocks of coercion and compulsory-minded government organizations.⁷⁸ There were costs attendant to forcing people into agricultural production programs and plans.⁷⁹ The business community pitched a fit against big government encroachments.⁸⁰ Short run quality of life got worse in rural America.⁸¹ The executive branch (frustrated with a slow moving federal judiciary) mounted an effort to pack, bully, and destabilize the Supreme Court.⁸²

⁷³ Williams & Bloomquist, Haskell County, *supra* note 53, at 8-9; *cf.* Price V. Fishback et al., *The Impact of New Deal Expenditures on Mobility during the Great Depression*, 43 EXPLORATIONS IN ECON. HIST. 179, 208 (2006) (discussing how a higher rate of public works and relief spending in a Depression-era county resulted in a higher rate of in-migration).

⁷⁴ See Williams & Bloomquist, Haskell County, *supra* note 53, at 12.

⁷⁵ See *id.*

⁷⁶ TEACHING AMERICAN HISTORY PROJECT, THE GREAT DEPRESSION AND THE 1930S 4-12, available at <http://www.upa.pdx.edu/lms/currentprojects/TAHv3/Content/Depression/The%20Great%20Depression%20Summary.pdf> (last visited Feb. 15, 2009) [hereinafter THE GREAT DEPRESSION].

⁷⁷ Pres. Franklin D. Roosevelt, First Inaugural Address (Mar. 4, 1933), in 2 GREAT ISSUES IN AMERICAN HISTORY: A DOCUMENTARY RECORD 353 (Richard Hofstadter ed., 1958).

⁷⁸ Pres. Herbert Hoover, The Challenge to Liberty (Sept. 8, 1934), in 2 GREAT ISSUES IN AMERICAN HISTORY: A DOCUMENTARY RECORD 358 (Richard Hofstadter ed., 1958).

⁷⁹ See *infra* notes 94-96 and accompanying text.

⁸⁰ THE GREAT DEPRESSION, *supra* note 76, at 9 (discussing violence and strikes that accompanied the enactment of legislation).

⁸¹ *Id.* at 11 (“The situation was especially bleak . . . on the Great Plains, where drought drove thousands of farmers off the land in the years of the Dust Bowl. There was no effective government response to the Dust Bowl migrations, or to the more general crisis of American agriculture. In the long run, the solution was modernization, meaning the substitution of capital for labor.”).

⁸² *Id.* at 8.

The Agricultural Adjustment Act (AAA) sparked all of this government activity.⁸³ In exchange for agreements, between farmers and the government to cut production, the statute raised and stabilized farm prices.⁸⁴ As incentive for cooperating with the government, farmers received money raised from a tax against the processors of agricultural products.⁸⁵

Farmers had to tow the line under the AAA.⁸⁶ The Resettlement Administration administered a micro-lending program to encourage small farm resettlements. It constructed “regional model settlements” and camps to assist public and private efforts to resettle migrant farmers and farm workers.⁸⁷ The Administration coordinated the re-cultivation of eroded farm land with local help; it spearheaded flood protection schemes and river pollution control mechanism.⁸⁸ Finally, the Resettlement Administration assembled information bureaus in drought stricken areas to advertise available government programs.⁸⁹

D. United States v. Butler

In 1935, a cotton processor challenged the validity of the AAA tax scheme in the Supreme Court.⁹⁰ “The Court held the tax unconstitutional

⁸³ See Joseph L. Rauh, Jr., *An Unabashed Liberal Looks [sic] at a Half-Century of the Supreme Court*, 69 N.C. L. REV. 213, 214-16 (1990) (A discussion of the fact that the AAA, amongst other pieces of federal legislation, was struck down by the Supreme Court “in the hectic years of 1935 and 1936,” and that “[s]omething had to be done [about it] if the New Deal was to be saved and expanded.”).

⁸⁴ See *United States v. Butler*, 297 U.S. 1, 53-55 (1936); *Introduction to United States v. Butler*, in 2 GREAT ISSUES IN AMERICAN HISTORY: A DOCUMENTARY RECORD 360 (Richard Hofstadter ed., 1958).

⁸⁵ *Butler*, 297 U.S. at 57-58.

⁸⁶ *Id.* at 5; see also Bill Ganzel, AAA, Agricultural Adjustment Act & Administration, http://www.livinghistoryfarm.org/farminginthethirties/water_11.html (last visited Feb. 15, 2009).

⁸⁷ MD. COUNCIL ON ECON. EDUC., THE DUST BOWL: HIGH SCHOOL UNITED STATES HISTORY 19 (2006), available at <http://www.econed.org/html/lessons/data/The%20Dust%20Bowl.pdf>.

⁸⁸ *Id.*

⁸⁹ *Id.*

⁹⁰ *Introduction to United States v. Butler*, *supra* note 84.

because it was levied to support an unconstitutional object.”⁹¹ Article I, section 8 of the United States Constitution vested sundry powers in Congress.⁹² The third clause of section 8 endowed Congress with the power to regulate commerce.⁹³ Despite a reference in the AAA to a burden upon the normal currents of commerce, the statute did not expressly regulate commercial transactions.⁹⁴ Rather, the statute (as divined by Congress) controlled agricultural production in various states.⁹⁵

Justice Owen Roberts decided that this was beyond Congress’ cavel and, indeed, not among the enumerated powers listed in the Constitution and allotted to Congress.⁹⁶ Agricultural production was a matter for the states.⁹⁷ The Court said Congress could not use a constitutional subterfuge to grab power that belonged to somebody else.⁹⁸

Justice Harlan Stone wrote the Supreme Court’s dissent.⁹⁹ The Court, he said, should not resort to myths and speculation.¹⁰⁰ “[T]he constitutional power of Congress to levy an excise tax . . . is not questioned. The present levy is held invalid, not for any want of power . . . to lay such a tax . . ., including those for the general welfare, but because the use to which its proceeds are put is disapproved.”¹⁰¹ In the end, the matter was not a mission for the Court.¹⁰² Rather, it was the mission of voters to approve or disapprove of legislation with their votes.¹⁰³ If it is contended, as it is by some, that farmers were coerced to

⁹¹ *Id.*

⁹² U.S. CONST. art. I, § 8.

⁹³ U.S. CONST. art. I, § 8. cl. 3.

⁹⁴ *See Butler*, 297 U.S. at 54-57.

⁹⁵ *See id.* at 54-61.

⁹⁶ *Id.* at 68.

⁹⁷ *Id.*

⁹⁸ *Id.* at 69.

⁹⁹ *Id.* at 78 (Stone, J., dissenting).

¹⁰⁰ *See Butler*, 297 U.S. at 83 (Stone, J., dissenting).

¹⁰¹ *Id.* at 79.

¹⁰² *Id.* at 87 (“Courts are not the only agency of government that must be assumed to have capacity to govern.”).

¹⁰³ *Id.* at 87-88.

act under the statute, there is no evidence.¹⁰⁴ If it is claimed that the legislation infringed upon a prerogative of the states,¹⁰⁵ there is neither a constitutional provision to support the claim, nor an inclination among the states to do anything.¹⁰⁶ Justice Stone stated that there was no disputing the fact that Congress could lay taxes to arm itself with the option to “promote the general welfare.”¹⁰⁷ The Agricultural Adjustment Act was held to do just that.¹⁰⁸

V. A NEW CRISIS

When the climate sours and farm economies clank, people abandon their homesteads and trek elsewhere to find jobs and opportunities to improve their lot in life.¹⁰⁹ Climate change inspires such a social upheaval.¹¹⁰ Although a select few scientists tell us that climate change is a naturally occurring event,¹¹¹ the science supporting the theory of global climate change is widely accepted in the scientific community.¹¹²

¹⁰⁴ *Butler*, 297 U.S. at 81. However, the AAA functioned such that the farmers were required to pay into the “fund,” and then could recover from the fund if they cooperated. Thus, their money was taken away under the act and would be “returned” only if they cooperated. See *Introduction to United States v. Butler*, in 2 GREAT ISSUES IN AMERICAN HISTORY: A DOCUMENTARY RECORD 360 (Richard Hofstadter ed., 1958).

¹⁰⁵ *Butler*, 297 U.S. at 83-84.

¹⁰⁶ *Id.*

¹⁰⁷ *Id.* at 86 (Stone, J., dissenting). *But see* Paul Ballonoff, *Limits to Regulation Due to Interaction of the Patent and Commerce Clauses*, 20 CATO J. 401, 406 (2001).

¹⁰⁸ See *Butler*, 297 U.S. at 88 (The AAA promoted the “general welfare” by “reliev[ing] a nationwide economic maladjustment”).

¹⁰⁹ See, e.g., History of the United States, Part Seven: The Great Depression, http://history-world.org/history_of_the_united_states7.htm (last visited Feb. 15, 2009).

¹¹⁰ Michael McCarthy, *Climate Change ‘Will Cause Refugee Crisis’*, THE INDEP. (London), Oct. 20, 2006, available at <http://www.independent.co.uk/environment/climate-change/climate-change-will-cause-refugee-crisis-420845.html> (“Mass movements of people across the world are likely to be one of the most dramatic effects of climate change in the coming century . . .”).

¹¹¹ E.g., Global Climate Change: Temperature Change History, http://www.seed.slb.com/en/scictr/watch/climate_change/change.htm (last visited Feb. 15, 2009).

¹¹² See Richard B. Alley et al., *Summary for Policymakers*, in Intergovernmental Panel on Climate Change, *Climate Change 2007: The Physical Science Basis of Climate Change: Contribution of Working Group I to the Fourth Assessment Report of the IPCC 5* (Susan

Of course, there is a body of opinion about the effects of humankind's antics on the environment.¹¹³ Some think that what we do as a species short circuits nature's cycles, insults the environment,¹¹⁴ and exaggerates whatever bad episode the atmosphere is going through at the moment.¹¹⁵ There is one hypothesis that the earth is sputtering, cooling, and shrinking, and that global climate change is attributable to what is going on beneath the earth's surface.¹¹⁶

Climatologists can depict climate change with graphs.¹¹⁷ There are straight line projections, patterns, cycles, and oscillations.¹¹⁸ Whatever the case the question is: what should government do to protect the population in the face of these projections?

Currently, high levels of carbon dioxide in the atmosphere distort weather patterns,¹¹⁹ raise surface temperatures, and deepen droughts.¹²⁰ In the 1990s, hot spells in the United States gave scientists data and

Solomon et al. eds., Cambridge Univ. Press 2007), available at <http://ipccwg1.ucar.edu/wg1/wg1-report.html>; see, e.g., Naomi Oreskes, *Beyond the Ivory Tower: The Scientific Consensus on Climate Change*, SCIENCE, Dec. 3, 2004, at p.1686, available at <http://www.sciencemag.org/cgi/content/full/306/5702/1686> (identifying the overwhelming amount of scientific consensus on the essential elements supporting the theory of global climate change).

¹¹³ COMMONER, CLOSING CIRCLE, *supra* note 8, at 34-41.

¹¹⁴ *Id.* at 37.

¹¹⁵ See, e.g., Marc Morano, *Gore's (Really) Inconvenient Timing – 'Consensus' on Man-Made Global Warming Collapses in 2008*, US Senate Committee on Environment and Public Works, Inhofe EPW Press Blog, Jul. 18, 2008, http://epw.senate.gov/public/index.cfm?FuseAction=Minority.Blogs&ContentRecord_id=37AE6E96-802A-23AD-4C8AEDF6D8150789.

¹¹⁶ Dr. Qian Weihong, *Climate Change in China*, Lecture at Peking U., Atmosphere Dep't, College of Physics, Beijing, China (Dec. 12, 2007). The observation came from the discussion following the lecture. Cf. Dr. David Chapman, *Facts and Figures Concerning Global Warming*, Lecture at the Resources Development and Climate Change Conference, Rocky Mountain Mineral Law Found., Phoenix, Ariz. (April 10, 2008). (Dr. Chapman said that the cooling and compression of the earth's surface plays a minor role in climate change.)

¹¹⁷ See, e.g., IPCC Slides, http://www.grida.no/climate/ipcc_tar/slides/index.htm (last visited Feb. 15, 2009).

¹¹⁸ See Bette Hileman, *Web of Interaction Makes It Difficult to Untangle Global Warming Data*, CHEM. & ENG'G NEWS, Apr. 27, 1992, at 7.

¹¹⁹ *Id.* at 11.

¹²⁰ LINDA A. JOYCE ET AL., *POTENTIAL CONSEQUENCES OF CLIMATE VARIABILITY AND CHANGE FOR THE GREAT PLAINS* 193 (2000), available at <http://www.usgcrp.gov/usgcrp/Library/nationalassessment/07GP.pdf> [hereinafter CLIMATE CHANGE].

atmospheric models for predicting warmer summers in the future.¹²¹ Some scientists attributed the 2002 droughts in eastern Colorado, Kansas, and Nebraska to global climate change.¹²²

What should we do about this? How should we respond to this? The short answer is that we must prepare for the worst. If the state intervened in the past, to help us during bad times, it will intervene in our lives again. But state intervention must be complemented by a change of attitude in the private sector. Somehow we must make the business community climate conscious, and climate consciousness profitable.

For starters, we should turn our world view upside down.¹²³ In 2008, Americans face a number of crises. There are multiple threats to the environment.¹²⁴ There is a shortage of energy.¹²⁵ There is a decline in the soundness and stability of the world economy.¹²⁶ Some experts regard these upheavals as “separate afflictions, each to be solved on its own terms: environmental degradation with pollution controls; the energy shortages by finding new [oil] and new ways of conserving it; the economic crisis by manipulating prices, taxes, interest rates,” and so on.¹²⁷

¹²¹ *Id.* at 200.

¹²² *Id.* at 201-03. A review of the July 30, 2002 U.S. Drought Monitor reflects this. See U.S. Drought Monitor Archives, www.ndmc.unl.edu/dm/archive.html (last visited Feb. 15, 2009) (allowing the user to choose July 30, 2002 from the drop down menu and observe a visual representation of the drought issues in the plains and west). A written summation is also available; see Drought Monitor Narrative, <http://www.ndmc.unl.edu/dm/archive/20020730/nar20020730.xml> (last visited Feb. 15, 2009). See also Frank Jossi, *Drought Is Hell*, FEDGAZETTE, Fed. Reserve Bank of Minneapolis, Nov. 2002, available at <http://minneapolisfed.org/pubs/fedgaz/02-11/drought.cfm> (last visited Feb. 15, 2009) (discussing the impacts of drought on people in the Great Plains).

¹²³ See BARRY COMMONER, *THE POVERTY OF POWER: ENERGY AND THE ECONOMIC CRISIS* 1-2 (1976) [hereinafter COMMONER, *POVERTY OF POWER*].

¹²⁴ COMMONER, *POVERTY OF POWER*, *supra* note 123, at 1.

¹²⁵ *Id.*

¹²⁶ *Id.*; see also David Leonhardt, *End to the Good Times (Such as They Were)*, N.Y. TIMES, Mar. 8, 2008, at A1.

¹²⁷ COMMONER, *POVERTY OF POWER*, *supra* note 123, at 1.

Sadly, an effort to solve each crisis “seems to clash with the solutions for others – pollution control reduces energy supplies [while] energy conservation costs jobs. Inevitably, proponents of one solution become opponents of the others.”¹²⁸ Public “[p]olicy stagnates . . . remedial action [gets] paralyzed,” adding frustration, confusion, and gloom to people’s lives.¹²⁹

Today’s misery, uncertainty, and inaction are not surprising, given the tangle of problems we so poorly understand.¹³⁰ We are part and parcel of a three tier structure: ecosystem, production system, and economic system.¹³¹ They have established a synergy among themselves and together govern human activity.¹³² Regional ecosystems supply all the resources that support human life.¹³³ The production system converts these resources into wealth: “food, manufactured goods, transportation, and communication.”¹³⁴ The economic system converts this wealth “into earnings, profit, credit, savings, investment, [and] taxes.”¹³⁵ Later on, experts trot out schemes telling us how this wealth should be distributed and what is to be done with it.¹³⁶

Given these dependencies, public officials should concoct brain food for us. They should tell us the following: the economic system must conform to the production system; the production system must conform to the demands of particular ecosystems.¹³⁷ The governing influence

¹²⁸ *Id.*; see Susan L. Geiser, *The 1992 Earth Summit: A Harbinger of the Urgent Need for the Clinton/Gore Administration to Act on Electric Energy Policy*, 17 SUFFOLK TRANSNAT’L L. REV. 408, 428-29 (1994).

¹²⁹ COMMONER, POVERTY OF POWER, *supra* note 123.

¹³⁰ *Id.* at 2.

¹³¹ *Id.*

¹³² *Id.*

¹³³ COMMONER, POVERTY OF POWER, *supra* note 123, at 2; see Daniel Barstow Magraw, *The Worst of Times, or “It Wouldn’t Be Cool,”* 38 ENVTL. L. REP. NEWS & ANALYSIS 10575, 10578 (2008).

¹³⁴ COMMONER, POVERTY OF POWER, *supra* note 123.

¹³⁵ *Id.*

¹³⁶ *Id.*; see William A. Wines, *Does Capitalism Wear a White Hat or Ride a Pale Horse?*, 33 S.U. L. REV. 103, 130 (2005) (proposing wealth distribution schemes on moral guidelines).

¹³⁷ COMMONER, POVERTY OF POWER, *supra* note 123; see John Batt & David C. Short, *The Jurisprudence of the 1992 Rio Declaration on Environment and Development: A Law, Science, and Policy Explication of Certain Aspects of the United Nations Conference on Environment and Development*, 8 J. NAT. RESOURCES & ENV’T L. 229, 241 (1993).

should flow from the bottom up.¹³⁸ This is natural. It's the so-called *upside down view of things*.¹³⁹

Regrettably, the world scene is perceived by many the other way around;¹⁴⁰ there is a flaw in the design. The current crisis with the environment tells us that the ecosystem has been chinked and dinged by a modern production system that came into being with too little regard for its "compatibility with the environment or for the efficient use of energy."¹⁴¹

What confronts Americans is not a series of separate and distinct crises, but a single crisis brought on by an overall design defect.¹⁴² Something is wrong with the modern-day design of our industrial complex, with productivity and capital depletion squeezing the economy at both ends.¹⁴³ We have to do something and act soon.

In today's world, social need should drive energy policy. Agriculture and agriculture-related industries should be cajoled into doing something to utilize farm waste and get rewarded for doing so. Public officials should tell farmers, investors, farm innovators, and entrepreneurs that they can use high-end and low-end technologies for this purpose.

¹³⁸ COMMONER, POVERTY OF POWER, *supra* note 123; see Cinnamon Carlarne, *Notes from a Climate Change Pressure-Cooker: Sub-Federal Attempts at Transformation Meet National Resistance in the USA*, 40 CONN. L. REV. 1351, 1352 (2008).

¹³⁹ COMMONER, POVERTY OF POWER, *supra* note 123, at 3.

¹⁴⁰ *Id.* at 2.

¹⁴¹ *Id.* at 2-3; see Conference on Environment and Development, Rio de Janeiro, Braz., Jun. 14, 1992, *United Nations Framework Convention on Climate Change*, ¶ 16, FCCC/INFORMAL/84, GE.05-62220 (E), available at <http://unfccc.int/resource/docs/convkp/conveng.pdf> [hereinafter UNFCCC].

¹⁴² COMMONER, POVERTY OF POWER, *supra* note 123, at 3.

¹⁴³ *Id.* at 1; see also Carlarne, *supra* note 138, at 1408 (noting the difficulty of creating comprehensive climate change legislation, due to the conflicting views of the business and environmental interests).

Businesses should establish global climate change markets;¹⁴⁴ build schedules for participant involvement (e.g., emission limits);¹⁴⁵ secure promises to perform from them;¹⁴⁶ co-modify achievements over and above proclaimed emissions limits;¹⁴⁷ issue stock to participants keyed to the difference between a participant's promises and results exceeding expectations;¹⁴⁸ assign values to the stocks based upon fellow participants' cravings to use them to meet their performance targets; audit performances;¹⁴⁹ bank a participant's achievements;¹⁵⁰ and allow certificate holders to buy, sell, and barter climate stock to meet overall schedule demands.¹⁵¹

States should enact laws that give oil companies, feedlot businesses, and meat packing factories a tax credit to *incentivize* methane use and carbon sequestration.¹⁵² The federal government should offer grants or make low interest loans to farmers, feedlots, meat packing plants, and railroads, to jump start environmentally beneficial projects.

Social need (*i.e.*, methane containment, carbon dioxide sequestration, capping automobile emissions, keeping homes warm, moving people to and from work, feeding and clothing them) should drive energy decisions and new technology development. The "least cost" to energy, capital, and environmental degradation should be a compulsory part of every

¹⁴⁴ For example, businesses could begin by utilizing clean development mechanisms and farm credits. See About Clean Development Mechanism (CDM), <http://cdm.unfccc.int/about/index.html> (last visited Feb. 15, 2009); North Dakota Farmers Union Carbon Credit, <http://carboncredit.ndfu.org/> (last visited Feb. 15, 2009).

¹⁴⁵ See, e.g., Frequently Asked Questions, <http://www.chicagoclimatex.com/content.jsf?id=74> [hereinafter CCX FAQ] (last visited Feb. 15, 2009) (discussing the processes and specifics of the Chicago Climate Exchange (CCX)).

¹⁴⁶ *Id.*

¹⁴⁷ *Id.* (stating that in the CCX, the second phase of the program involves further reduction of emissions beyond the initial phase).

¹⁴⁸ See *id.* ("A cap-and-trade emission trading system is successful from both environmental and economic viewpoints because . . . [b]anking and sale of allowances provides an incentive to make larger than required reductions in a given time period.")

¹⁴⁹ See Emissions Verification and Compliance, <http://www.chicagoclimatex.com/content.jsf?id=524> [hereinafter Emissions Verification and Compliance] (last visited Feb. 15, 2009) (discussing CCX's verification processes).

¹⁵⁰ KELLE T. JAMES, CHICAGO CLIMATE EXCHANGE, INC. 14, 18-20 (2006), available at http://www.akcf.org/_attachments/climate_change/9CCX.pdf.

¹⁵¹ CCX FAQ, *supra* note 145.

¹⁵² See Carbon Dioxide Reduction Act, H.R. 2419, 2007 Leg., Reg. Sess. (Kan. 2007).

engineering equation.¹⁵³ The production of new machines (e.g., heat pumps and solar collectors for residential dwellings) could provide limited employment in urban areas and full employment in rural labor markets.¹⁵⁴

When a state government is unable to prosecute CO₂ polluters in another state, or use a sneaky procedural tactics to bring about the same result, their elected officials should file legal petitions with the U.S. Environmental Protection Agency¹⁵⁵ (EPA) to accomplish the same ends.¹⁵⁶ If climate change hurts some states, and unregulated fumes from fancy automobiles are partly to blame, EPA should do something to fix the situation.¹⁵⁷ For example, EPA could use their regulatory power to regulate CO₂, as was recently approved by the Supreme Court, to assist those states acutely impacted by global climate change.¹⁵⁸

In the automobile industry, the government could establish CO₂ emissions standards for all manufacturers.¹⁵⁹ In such a system, if a company wanted to exceed its emissions limits, it would have to buy

¹⁵³ COMMONER, CLOSING CIRCLE, *supra* note 8, at 123-24.

¹⁵⁴ *See id.* at 148.

¹⁵⁵ *See, e.g.*, Climate Change State Resource Locator, EPA, <http://www.envcap.org/statetools/climate/index.cfm> (last visited Feb. 15, 2009).

¹⁵⁶ *See The U.S. Supreme Court and Global Warming: National and International Implications*, 10 INT'L REV. 1, 8 (Sydney M. Cone III, ed., 2007), available at <http://old.nyls.edu/pdfs/fa07news.pdf> [hereinafter *Supreme Court and Global Warming*]. *See also* Mass. v. Env'tl. Prot. Agency, 415 F.3d 50 (D.C. Cir. 2005), *rev'd*, 549 U.S. 497 (2007).

¹⁵⁷ *See Supreme Court and Global Warming, supra* note 156, at 11.

¹⁵⁸ *Env'tl. Prot. Agency*, 549 U.S. at 532 ("Because greenhouse gases fit well within the Clean Air Act's capacious definition of "air pollutant," we hold that EPA has the statutory authority to regulate the emission of such gases from new motor vehicles.").

¹⁵⁹ For a look at various international frameworks of mobile source emissions control, along with an in-depth analysis of the technical aspects related to emissions standards for automobile manufacturers, see ASIF FAIZ, CHRISTOPHER S. WEAVER & MICHAEL P. WALSH, AIR POLLUTION FROM MOTOR VEHICLES: STANDARDS AND TECHNOLOGIES FOR CONTROLLING EMISSIONS (1996). The US government could set limits similar to those in use in Australia. *See, e.g.*, AUSTRALIAN AUTOMOBILE ASSOCIATION, ON THE ROAD TO GREENER MOTORING 3-4 (2007), available at http://www.aaa.asn.au/documents/reports/2008/FactA4_EmissionsTrading.pdf [hereinafter AUSTRALIAN AUTO.].

credits (or permits) to do so.¹⁶⁰ Companies exceeding their emissions expectations would have the option to sell their unutilized emissions credits to those automobile companies struggling to remain within their limits.¹⁶¹

VI. POSSIBLE SOLUTIONS

A. *A Model for Solutions*

Experts have reached a general consensus that the atmosphere is a closed system.¹⁶² Within its boundaries there are spaces to disperse greenhouse gases and open spaces to cope with new emissions.¹⁶³ Currently, the available number of open spaces is shrinking and becoming scarce.¹⁶⁴ Because everybody owns the common open spaces, and people can do dreadful things to them, somebody should come up with a scheme to contain the bad things we are doing to ourselves.¹⁶⁵ We should cap emissions, and identify other chemicals that could be added to any greenhouse gas containment scheme. Hydrofluorocarbons are mighty contributors to global climate change.¹⁶⁶ If these substances were added

¹⁶⁰ AUSTRALIAN AUTO., *supra* note 159, at 3-4.

¹⁶¹ *Id.* at 1.

¹⁶² See I.D. WHITE, D.N. MOTTESHEAD & S.J. HARRISON, ENVIRONMENTAL SYSTEMS: AN INTRODUCTORY TEXT 48 (1992); COMMONER, CLOSING CIRCLE, *supra* note 8, at 12-13.

¹⁶³ See Professor Jerald L. Schnoor, Speech for the University of Iowa Presidential Lectures, Eco-Logic: An Environmental Perspective for the 21st Century 3 (1996), available at <http://sdr.lib.uiowa.edu/preslectures/schnoor96/index.html>. See also William E. Rees, *Conserving Natural Capital: The Key to Sustainable Landscapes*, 4 INT'L J. CANADIAN STUD. 7, 12 (1991).

¹⁶⁴ See WORLD HEALTH ORG., NAT'L ENV'T & HEALTH ACTION PLAN, SRI LANKA 1998-2001, § 2b, available at http://www.searo.who.int/LinkFiles/National_Environment_&_Health_Action_Plan_sec2b.pdf.

¹⁶⁵ See generally Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243, 1244-46 (1968) (As human utility does not encourage coordinated decision making, the support structures upon which human advancement are founded become overburdened and subsequently collapse.). Schnoor, *supra* note 163, at 4 ("The world is still a big place and much accommodation is possible, but only with education and good government can we make progress towards providing for humans while not despoiling the environment.").

¹⁶⁶ Stephen J. DeCanio & Catherine S. Norman, *An Economic Framework for Coordinating Climate Policy with the Montreal Protocol*, 7 SUSTAINABLE DEV. L. & POL'Y 41 (2007). According to DeCanio and Norman, ozone-depleting hydrofluorocarbons substantially impact global climate change. Nitric oxide (found in humus, oceans, animal waste, high flying jets, and rockets) and chlorine compounds (industrial refrigerants, fire retardants, and chemical feed stocks) specifically insult the environment. WILLIAM C. CLARK ET AL., ACID RAIN, OZONE

to a greenhouse gas containment scheme, we could slow the pace of global climate change, and make containment profitable for private firms.¹⁶⁷

One can plot private projects on greenhouse gas/ozone depleting substance (GHG-ODS) axes.¹⁶⁸ Economists would have to compile the statistics and graphs. Nonetheless, we could draw a regulatory curve (the first project having a cost that eats into business profits, which firms are willing to accept a sensible thing to do, and/or a regulator forces them to do so)¹⁶⁹ and an exchange curve representing projects that earn credits for gas containment above the mean or median projects on the GHG-ODS axes.¹⁷⁰ The first curve is called A'B'. The second one is entitled AB. Projects to the right of AB on higher slopes are preferable to ordinary AB projects assuming, of course, the tasks are worthwhile and earn climate exchange credits.

Figure 1 is an economist's depiction of such a graphical model,¹⁷¹ with life cycle climate projects (LCCP) and ozone depletion projects (ODP) axes. Points on the LCCP line represent GHG projects devoted to emission arrest. The squares represent profitable and unprofitable ozone projects. The A'B' curve represents projects participants are forced to

DEPLETION, AND CLIMATE CHANGE: A HISTORICAL OVERVIEW, 1 LEARNING TO MANAGE GLOBAL ENVIRONMENTAL RISKS 36 (2001). At 25,000 feet, chlorine displaces ozone leaving the earth exposed to dangerous ultraviolet light. At 10,000 feet, chlorine mixes with CO₂ and methane to heat the earth's surface. The mixture changes wind patterns and upsets the chemical processes producing climate. The Montreal Protocol reduces the production, use, and emission of ozone depleting gases. It encourages businesses to find suitable alternatives that are environmentally benign and profitable to use. DANIEL L. ALBRITTON, STRATOSPHERIC OZONE DEPLETION: GLOBAL PROCESSES, OZONE DEPLETION, GREENHOUSE GASES, AND CLIMATE CHANGE 11-16 (Nat'l Academy Press 1989). See U.S. ENVTL PROT. AGENCY, HIGH GLOBAL WARMING POTENTIAL (GWP) GASES, SCIENCE (Oct. 19, 2006), <http://www.epa.gov/highwp/scientific.html> (ozone-depleting substances like hydrofluorocarbons and perfluorocarbons have a strong affect on global climate change, at a rate 4,000 to 10,000 times higher than carbon dioxide).

¹⁶⁷ DeCanio & Norman, *supra* note 166, at 42.

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

¹⁷⁰ *Id.*

¹⁷¹ *Id.*

undertake by government. The AB curve represents profitable undertakings that, on average, curb pollutants.

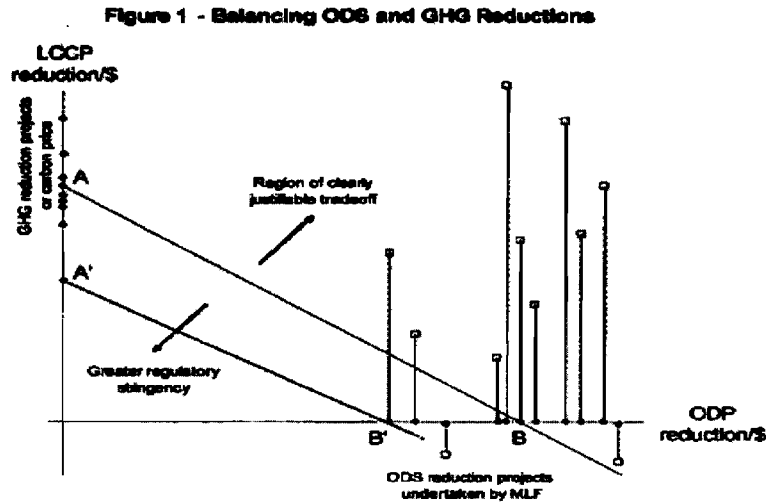
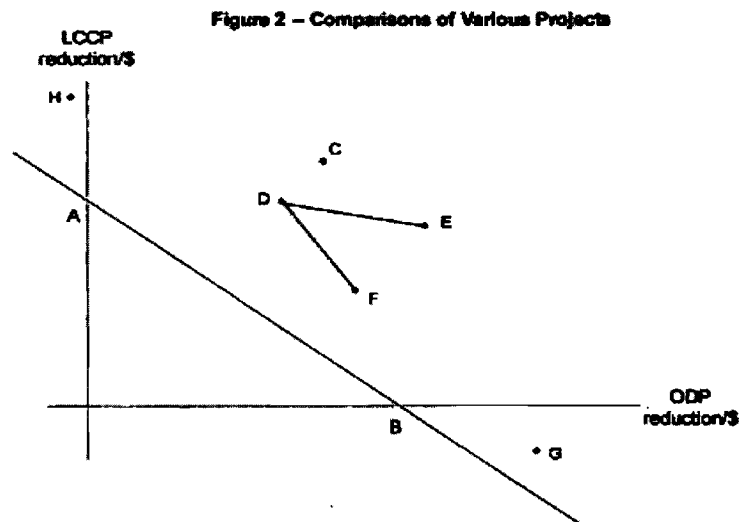


Figure 2 is a less complex depiction of Figure 1.¹⁷² Economists suggest that participants will find projects camped to the right of the AB curve appealing, profitable, uplifting, and emission arresting.¹⁷³

¹⁷² *Id.* at 43.

¹⁷³ DeCanio & Norman, *supra* note 166, at 43.



B. Pollution Tax

We could saddle air polluters with a pollution tax.¹⁷⁴ But a tax raises many questions. What greenhouse gas emissions limits can we sustain in the nation and keep national industries competitive?¹⁷⁵ How do we identify the offenders who must pay a tax?¹⁷⁶ What do we do with the nations coal-fired power plants?¹⁷⁷ Do we demand that they install

¹⁷⁴ This method has been employed in other nations. *See, e.g.*, Katrin Millock & Céline Nauges, *Ex Post Evaluation of an Earmarked Tax on Air Pollution*, 82 *LAND ECON.* 68 (2004) (discussing France's tax on air pollution).

¹⁷⁵ *See* CATHERINE FRANCIS J. CORPUZ, *POLLUTION TAX FOR CONTROLLING EMISSIONS FROM THE MANUFACTURING AND POWER GENERATION SECTORS: METRO MANILA 9* (2003), available at <http://www.idrc.ca/uploads/user-S/10536132100ACF1EB.pdf> ("If [a] regulating body imposes taxes on environmentally detrimental activities equal to the damages they cause, polluters will be forced to account for these damages in their production and consumption decisions.").

¹⁷⁶ *See id.* at 1-8 (discussing how some people have argued that such a system is inadequate if not applied to industry, manufacturing, and electricity generators, among others).

¹⁷⁷ *Id.* at 16 (criticizing a decision to subsidize coal use since coal "is going to exacerbate . . . SO_x problems."). *See also* Co-op America: Stop the Coal Rush!, <http://www.coopamerica.org/takeaction/nocoal/> (last visited Feb. 15, 2009) ("[A] large

sophisticated scrubbers?¹⁷⁸ How long do we want to constrain them? Do we want the limits to run for five years? What are the projections for the out years? What limits should we allot to firms based on their shares of the energy market?¹⁷⁹ What are the projections for these firms in the out years? What are the cost equivalents (in dollars) for these limits?

Perhaps a retributive taxation scheme is the answer. When the emissions from a firm exceed a fixed limit *the difference* (i.e., the cost of the offense minus the cost of the limit) should be taxed at 22.5 percent. The second offense would be taxed at 30 percent. Firms with three or more offenses would be taxed at 40 percent. Under this scheme, the Federal Energy Regulatory Commission (FERC)¹⁸⁰ would write the emissions standards and guidelines for the energy industries. The Internal Revenue Service (IRS)¹⁸¹ would collect the taxes. The revenue from the tax could go into research and development to fund coal gasification projects, fluidized bed reactor combustion, and boiler schemes that accommodate higher temperatures and lower water pressures, with an overall goal of reducing CO₂ emissions.¹⁸²

majority of Americans now support clean energy,” and “[a] growing number of elected officials are opposing coal,” while “bills to tax carbon dioxide emissions are moving through Congress[;]” yet “electric utilities are . . . proposing more . . . coal plants.”)

¹⁷⁸ The modern scrubbers are noted to “yield a by-product that is expected to have use as a fertilizer instead of the gypsum product that comes out of most scrubber systems.” Rod Adams, *Not Quite a “Smoking Gun”—Coal Plant versus Nuclear or Alternatives*, Atomic Insights Blog, Feb. 24, 2008, <http://atomicinsights.blogspot.com/2008/02/not-quite-smoking-gun-coal-plant-versus.html> (last visited Feb. 15, 2009).

¹⁷⁹ Some people have suggested that “infant technologies may be preferred to mature technologies despite greater initial costs.” Yann Bramouellé & Lars J. Olson, *Allocation of Pollution Abatement Under Learning by Doing*, 89 J. PUB. ECON. 1935 (2005).

¹⁸⁰ See 5. C.F.R. § 3401 (2000); Federal Energy Regulatory Commission, <http://www.ferc.gov/> (last visited Feb. 15, 2009).

¹⁸¹ See 26 C.F.R. § 601.101 (2000); Internal Revenue Service, U.S. Dep’t of Treasury, <http://www.irs.gov/> (last visited Feb. 15, 2009).

¹⁸² See Cogeneration Technologies, Fluidized Bed Combustion, http://www.cogeneration.net/fluidized_bed_combustion.htm (last visited Feb. 15, 2009); A.R. Kvrivishvili, *Design Figures of High-Temperature Low-Pressure Combined Steam-Cycle Power Unit*, 14 THERMOPHYSICS & AEROMECHANICS 301 (2007), available at <http://www.springerlink.com/content/10nv771v881261r2/>; Fossil Energy Office of Comm’n, *Gasification Technology R & D*, U.S. DEP’T OF ENERGY, <http://fossil.energy.gov/programs/powersystems/gasification/index.html> (last visited Feb. 15, 2009).

VII. PRAIRIE SCHEMES

The Great Plains blanket eight states.¹⁸³ It is dotted with oil patches, military bases, public utilities, refineries, farms, ranches, feedlots, pig farms, meat packing plants, medium size cities, and molting towns feeding on agricultural activity.¹⁸⁴ The question is, what projects can area residents undertake that are job producers, profitable for businesses, and friendly to the environment?

Regional revenue and employment axes could be erected to establish what full employment means.¹⁸⁵ Thereafter, full employment could be marked on the employment axis (i.e., everybody who can work except those who will not work under any circumstances).¹⁸⁶ Economists would convert that accounting into dollars and ask questions about the amount of money needed to sustain full employment for the region.¹⁸⁷

For example, how much consumer spending can one document for the region? The data would be used to plot a consumer curve on the revenue axis.¹⁸⁸ How much investment income do people use on the

¹⁸³ State and County Quickfacts, <http://quickfacts.census.gov/qfd/> (last visited Feb. 15, 2009) (stating the Great Plains is home to 38.4 million people). Sixty-seven percent of the counties (mostly farm dependent) have lost population. KENNETH M. JOHNSON & RICHARD W. RATHGE, DOES RURAL GREAT PLAINS DEPOPULATION REFLECT A FAILED PUBLIC POLICY?, available at http://www.nercrd.psu.edu/IssueBriefs/Johnson_Rathge%20V3.pdf (last visited Feb. 15, 2009). The bulk of the population lives in forty-one metropolitan counties. *Id.* Twelve percent live in 278 farm counties. *Id.* The region produces two-thirds of the nation's wheat, more than half its beef, a fifth of its corn, a quarter of its cotton, four-fifths of its grain sorghum, and a sixth of its pork. Marvin Duncan, et al., Planning for a Sustainable Future in the Great Plains, <http://www.iisd.org/agri/nebraska/duncan.htm> (last visited Feb. 15, 2009).

¹⁸⁴ See E. Cotton Mather, *The American Great Plains*, in ANNALS OF THE ASS'N OF AM. GEOGRAPHERS 237 (Taylor & Francis, Ltd., 1972), available at <http://www.jstor.org/stable/2569404>.

¹⁸⁵ See GEORGE H. HAND & JOHN H. HAND, ECONOMIC PROBLEMS: ANALYSIS AND SOLUTIONS 44-152 (1974) (analyzing the causes of unemployment and policy solutions affecting aggregate supply and demand of labor, and wage controls); see also ROGER LEROY MILLER, ECONOMICS TODAY 219-30 (14th ed. 1976) (discussing unemployment and changing business conditions).

¹⁸⁶ HAND & HAND, *supra* note 185, at 269.

¹⁸⁷ *Id.*

¹⁸⁸ DeCanio & Norman, *supra* note 166, at 42.

Great Plains to sustain businesses? That data would produce an investment curve.¹⁸⁹ How much does the region receive in farm subsidies? That data would be used to plot a final curve.¹⁹⁰

Assuming more money is needed to achieve full employment than the region commands, the following questions would be asked: how much support is available from the Federal government for bio-fuel projects that convert agricultural waste into heat, energy, and CO₂ containment? How much support can the military provide for projects to produce heat and electricity for military bases? How much would the Federal government credit businesses for CO₂ use in farm fields and CO₂ sequestration in spent oil patches? How much Federal support is available for the construction of trash generator power plants, landfill-gas-generator power plants, and methane digesters?

Ultimately, money would flow into the region.¹⁹¹ Counties, cities, businesses, and farmers could profit from the undertakings described above.¹⁹² The surplus energy produced by different facilities could be sold to public utilities.¹⁹³ If FERC listed the supplemental energy as coming from green sources, utilities could sell the electricity at higher prices to their blue chip clients.¹⁹⁴

VIII. POSSIBLE PROJECTS

A. Artificially Created Wetlands for Wastewater Treatment

Wetlands provide eco-systemic services that help support global ecological diversity by providing essential habitat to millions of endemic

¹⁸⁹ *Id.*

¹⁹⁰ *Id.*

¹⁹¹ See, e.g., LORI BIRD & ELIZABETH BROWN, TRENDS IN UTILITY GREEN PRICING PROGRAMS 1 (2006), available at <http://www.nrel.gov/docs/fy07osti/40777.pdf> [hereinafter BIRD & BROWN, TRENDS] (“In restructured electricity markets, both the number of customers and sales of renewable energy through utility/marketer programs more than doubled during 2005.” In addition, “[c]ollectively, utilities sold nearly 3 billion kilowatt-hours (kWh) of green power to more than 450,000 customers in 2005.”). *Id.*

¹⁹² *Id.*

¹⁹³ See Valerie J. Faden, Note, *Net Metering of Renewable Energy: How Traditional Electricity Suppliers Fight to Keep you in the Dark*, 10 WIDENER J. PUB. L. 109 (2000) (discussing the sale of electricity produced by renewable sources, and the sale of surplus produced energy to public utilities).

¹⁹⁴ See BIRD & BROWN, TRENDS, *supra* note 191.

and migratory species throughout the world.¹⁹⁵ They remove or convert large quantities of pollutants from point and non-point sources, like mining, agriculture and urban runoff.¹⁹⁶ They capture “organic matter, suspended solids, metals and excess nutrients.”¹⁹⁷

Artificial wetlands are useful human-made complexes.¹⁹⁸ Artificial wetlands are basins that are to some degree saturated and contain vegetation, animal life and water that simulate natural wetlands for human use.¹⁹⁹ “Marshes with herbaceous emergent and submergent plants have the most promise [for] wastewater treatment[;]”²⁰⁰ cattails, bulrush, and giant reeds appear to be the best species for such application.²⁰¹ These species adapt well to fluctuating water and nutrient

¹⁹⁵ See Wolfgang J. Junk et al., *The Comparative Biodiversity of Seven Globally Important Wetlands: A Synthesis*, 68 AQUATIC SCIENCES 400 (2006), available at <http://www.environmental-expert.com/resultEachArticlePDF.aspx?cid=6063&codi=9751>; Jennifer L. Bolger, *Creating Economic Incentives to Preserve Unique Ecosystems: Should Wisconsin Adopt a Private Wetlands Mitigation Banking Policy?*, 83 MARQ. L. REV. 625, 631-33 (2000); K.A. Englehardt & M.E. Ritchie, *Effects of Macrophyte Species Richness on Wetland Ecosystem Functioning and Services*, 411 NATURE 687, 689 (2001); Dr. Dale Meryman, Lecture at Northwestern Polytechnic U., Artificially Created Wetlands for Waste Water Treatment, Env'tl. Sci. Dept. in Xi'an, P.R.C. (Dec. 17, 2007) (A typical wetland can accommodate approximately 5000 species of plants, 190 species of amphibians, 270 species of birds, and untold plankton, insects, reptiles, fish, and mammals).

¹⁹⁶ Meryman, *supra* note 195; see Bolger, *supra* note 195, at 632.

¹⁹⁷ Meryman, *supra* note 195; see Stephen R. Rubin, *An Analysis of Nontidal Wetland Regulation in Maryland*, 16 VA. ENVTL. L.J. 459, 461-62 (1997).

¹⁹⁸ Meryman, *supra* note 195. But see Rubin, *supra* note 197, at 501.

¹⁹⁹ Meryman, *supra* note 195. According to 40 C.F.R. § 230.3 (2009),

“[t]he term wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.”

See R.M. Gersberg et al., *Role of Aquatic Plants in Wastewater Treatment by Artificial Wetlands*, 20 WATER RESEARCH 363, 363-8 (1986) (insightful article into the various plant species that provide directed functions in artificial wetlands).

²⁰⁰ Meryman, *supra* note 195.

²⁰¹ Gersberg et al., *supra* note 199.

levels, accommodate high pollutant concentrations, and out-perform most other plant species.²⁰²

“[A]rtificially created wetlands . . . have five main components[:] (1) substrates with various rates of hydraulic conductivity; (2) plants adapted to water saturated anaerobic substrates; (3) a flowing water column; (4) invertebrates and vertebrates, and (5) aerobic and anaerobic microbial populations.”²⁰³ Protozoa, bacteria, fungi, and algae “found in the water and on the stems and leaves of wetland plants, decontaminate pollutants to [gather] nutrients and energy to carry out the life cycles. . . . [W]etland microbes have short generation times, high reproductive rates and genetic plasticity.”²⁰⁴ These features allow for adaptation to new nutrient types and quantities.²⁰⁵

Artificially created wetlands are inexpensive to construct and operate.²⁰⁶ They are easy to maintain, yet still provide effective and reliable water treatment.²⁰⁷ Also, they are tolerant of fluctuating hydraulic and contaminant loads.²⁰⁸ And finally, they provide valuable green space, wildlife habitat, recreational areas, dissolved oxygen production, and ground water recharge.²⁰⁹

B. Coal-Fired Power Plants and CO₂ Sequestration

Coal is both a polluter and an important source of energy.²¹⁰ Humans have chosen to use coal to produce electricity.²¹¹ It is mined and

²⁰² *Id.*

²⁰³ Meryman, *supra* note 195.

²⁰⁴ *Id.*

²⁰⁵ *Id.*; Gersberg et al., *supra* note 199.

²⁰⁶ Joe Gelt, *Constructed Wetlands: Using Human Ingenuity, Natural Processes to Treat Water, Build Habitat*, 9 ARROYO 1 (1997), available at <http://ag.arizona.edu/AZWATER/arroyo/094wet.html>.

²⁰⁷ *Id.*; Gersberg et al., *supra* note 199.

²⁰⁸ Gelt, *supra* note 206.

²⁰⁹ *Id.*

²¹⁰ FAQs About Coal, <http://www.teachcoal.org/aboutcoal/articles/faqs.html> (last visited Feb. 15, 2009) (“Coal is a burnable carbonaceous rock that contains a large amount of carbon. Coal is also a fossil fuel - a substance that contains the remains of plants and animals and that can be burned to release energy.”). Carbon dioxide is a “pollutant” under the Clean Air Act. See *Mass. v. Env'tl. Prot. Agency*, 415 F.3d 50 (D.C. Cir. 2005), *rev'd*, 549 U.S. 497 (2007); see also David B. Spence, *Coal-Fired Power in a Restructured Electricity Market*, 15 DUKE ENVTL. L. & POL'Y F. 187, 187-90 (2005).

extracted from the ground; transported to coal-fired power plants; put in piles and cured; pulverized into powder dust; and blown into boilers to produce heat, steam, and electricity.²¹²

In this process, solid particles sink to the boiler's base.²¹³ When the solid particles are treated with water and lime, the mixture becomes gypsum—a product used in the housing industry.²¹⁴

At some point in the boiler process, harmful gas is piped away.²¹⁵ This gas could be stored by the utilities, pressurized, and pumped to spent oil patches; oil companies could sequester the carbon dioxide, garner tax credits for doing so, and release residual oil from these patches for their clients.²¹⁶

Federal money is available for this project.²¹⁷ There are construction contracts, subcontracts, and labor opportunities available.²¹⁸ There are

²¹¹ Albeit, a “risky” choice, according to some. See Southern Alliance for Clean Energy, <http://www.cleanenergy.org/programs/programs.cfm?id=78> (last visited Feb. 15, 2009).

²¹² Professor David Meredith, Penn. St. U., Environmental Briefing, People to People Citizen Ambassador Program, Global Warming Environmental Science Delegation, Shanghai, P.R.C. (Dec. 18, 2007) (on file with author). For a basic introduction to the process of coal-fired power production, see Coal-Fired Power Plant, Arizona State University, <http://www.eas.asu.edu/~holbert/eee463/coal.htmlb> (last visited Feb. 15, 2009).

²¹³ See Federal Highway Administration, *Recycled Materials in the Highway Environment*, <http://www.tfhr.gov/hnr20/recycle/waste/> (last visited Feb. 15, 2009) (This website provides an overview of the processes within modern coal-fired power plants, while also identifying the commercial uses of the by-products from coal-fired power plants in the marketplace.). Meredith, *supra* note 212.

²¹⁴ See ALAN A. BLAND ET AL., U.S. DEP'T OF ENERGY, NAT'L ENERGY TECH. LAB., ASH-BASED BUILDING PANELS PRODUCTION AND DEMONSTRATION OF AEROCK DECKING BUILDING PRODUCTS xi (2007), available at <http://www.osti.gov/bridge/servlets/purl/910142-FbCEoD/910142.PDF>; Pavel Tesarek et al., *Flue Gas Desulfurization Gypsum: Study of Basic Mechanical, Hydric and Thermal Properties*, 21 CONSTRUCTION. & BUILDING MATERIALS 1500 (2007), available at <http://www.sciencedirect.com/> (type “Pavel Tesarek” in author field of quick search bar); Federal Highway, *supra* note 213; Meredith, *supra* note 212.

²¹⁵ Meredith, *supra* note 212.

²¹⁶ *Id.*

²¹⁷ See, e.g., Dep't of Energy, Fossil Energy: DOE's Carbon Sequestration Research Program, <http://www.fossil.energy.gov/programs/sequestration/index.html> (last visited Feb. 15, 2009) (listing key research and development programs and initiatives).

supporting financial transactions for parts, credit sales, secured transactions, surety, and letter of credit undertakings.²¹⁹ Public utilities, oil companies and the market at large could profit from these undertakings.²²⁰

C. Feedlots, Meatpacking Plants, and Methane Digesters

The beef industry is booming.²²¹ Feedlots and meatpacking plants are retooling in rural areas to service worldwide demand.²²² These businesses could serve as energy generators, and could engineer their production mechanisms to achieve greenhouse emissions neutrality. If these businesses bought land adjacent to their plants, they could cover their manure pools with a veil to cut the stench; produce methane under specially manufactured covers for plant heat and electricity;²²³ build methane digesters to produce fertilizer, reconstituted soil, heat, and electricity;²²⁴ and plant demonstration farms on adjacent parcels of land (restocked with nutrients) to grow crops for profit.²²⁵

If these businesses worked together and pooled their efforts, they could broker their endeavor on the Chicago Climate Exchange.²²⁶ Everybody would profit from the demand for beef, fertilizer, reconstituted soil, publicly sold electricity, and crops.²²⁷

²¹⁸ See News Release, Alberta Saline Aquifer Project, Alberta Saline Aquifer Project Awards Key Contracts to Launch Carbon Sequestration Pilot in Early 2009 (Sept. 22, 2008), available at <http://www.albertaasap.com/pdf/ASAP-News-Release-Sept17.pdf>. *Id.*

²¹⁹ Dep't of Energy, *supra* note 217.

²²⁰ *Id.*

²²¹ Mark Bittman, *Rethinking the Meat-Guzzler*, N.Y. TIMES, Jan. 27, 2008, at 1, available at <http://www.nytimes.com/2008/01/27/weekinreview/27bittman.html>.

²²² *Id.*

²²³ Anaerobic Digester Floating Covers, MPC Containment, <http://www.mpccontainment.com/anaerobic-digester.shtml> (last visited Feb. 15, 2009).

²²⁴ Bachmeier, *supra* note 4. Sustainable Conservation, Cow-Power, Methane Digesters, <http://www.suscon.org/cowpower/digesters.php> (last visited Feb. 15, 2009).

²²⁵ Terrapass Project Types—Farm Power, <http://www.terrapass.com/projects/categories.html#farm%20power> (last visited Feb. 15, 2009).

²²⁶ Key Features, *supra* note 6.

²²⁷ See *supra* notes 221-225 and accompanying text..

D. Biomass Resources for Heat and Power

Biomass generators produce electricity from renewable resources.²²⁸ They are the single largest source of non-hydroelectric renewable energy in the United States.²²⁹ The Public Utilities Regulatory Policy Act²³⁰ facilitates small producer sales of surplus electricity to public utilities.²³¹ The price is consistent with the cost larger utilities carry to generate a comparable amount of electricity from coal.²³²

Farmers could sell switch grass to wholesalers.²³³ Wholesalers could ship the material to clients or use it in generators to produce electricity.²³⁴ The production cycle has five parts: biomass supply, transportation, handling, conversion, and electricity generation.²³⁵

²²⁸ See Richard L. Bain & Ralph P. Overend, *Biomass for Heat and Power*, 52 FOREST PRODUCTS J. 12 (2002), available at http://www.fpl.fs.fed.us/tmu/resources/documents/fps_feb2002feature_richbain.pdf. But see Daniel Puppan, *Environmental Evaluation of Biofuels*, 10 PERIODICO POLYTECNICA SERVIZIO SOCIAL MAN. SCI. 95, 98 (2001), available at http://www.pp.bme.hu/so/2002_1/pdf/so2002_1_08.pdf (discussing the various positive and negative impacts of biomass fuel usage, including ecosystem stability, biodiversity, climate change impacts, etc.).

²²⁹ See EIA Renewable Energy-Biomass Data and Information, <http://www.eia.doe.gov/cneaf/solar.renewables/page/biomass/biomass.html> (last visited Feb. 15, 2009).

²³⁰ 16 U.S.C. §§ 2601-45 (1978).

²³¹ See Public Utility Regulatory Policies Act of 1978, 16 U.S.C. § 2601 (2000); Energy Vortex, Public Utility Regulatory Policies Act of 1978, [http://www.energyvortex.com/energydictionary/public_utility_regulatory_policies_act_of_1978_\(purpa\).html](http://www.energyvortex.com/energydictionary/public_utility_regulatory_policies_act_of_1978_(purpa).html) (last visited Feb. 15, 2009).

²³² *Id.* The price could be manipulated to improve the incentive for increased use of biomass generators instead of coal-based electricity. *Id.*

²³³ See generally Bain & Overend, *supra* note 228, at 15 (A generalized discussion of the market that exists for biomass fuels, with specific support for the concept of cofiring switchgrass and other biomasses with coal. "Co firing biomass with coal has the potential to produce 7.5 [gigawatts] by 2010 and 26 [gigawatts] by 2020.")

²³⁴ See *id.* See KIM S. SO, ROBERT C. BROWN & DONALD S. SCOTT, ECONOMIC ANALYSIS OF ETHANOL PRODUCTION FROM SWITCHGRASS USING HYBRID THERMAL/BIOLOGICAL PROCESSING 912, BIOENERGY '98: EXPANDING BIOENERGY PARTNERSHIPS, OFFICE OF SCI. & TECH. INFO., U.S. DEP'T OF ENERGY, available at <http://www.osti.gov/bridge/servlets/purl/334228-2KJFGe/webviewable/334228.pdf>.

²³⁵ See Bain & Overend, *supra* note 228, at 12 (graphical representation of distribution chain).

When biomass is added to fluidized reactors it magnifies the heat and the steam needed to produce electricity.²³⁶ Biomass use reduces the amount of fossil fuel dedicated to energy; cuts the cost of fossil fuel; and creates jobs in cattle ranching, farming, harvesting, transporting, storing, curing, and handling the required materials.²³⁷

E. Trash Generators of Electricity

Counties and military bases can work with technological innovators to license and build trash generators for electricity.²³⁸ The plants “shred[] garbage, heat[] it and press[] it into ice-cube-sized bricks.”²³⁹ The bricks are stored on the plant site and used to power boilers to generate heat, gas, steam, and electricity.²⁴⁰ The gas is scrubbed in the machines to remove sulfur, acids, and other pollutants.²⁴¹ Innovators and entrepreneurs can build garbage gasification electrical generation stations on military bases.²⁴² Current iterations of the plants can produce methane, carbon monoxide and hydrogen gases in two stage facilities. These gases can be used to produce heat, steam, and electricity.²⁴³

Similarly, entrepreneurs can build gas wells to extract gas from county landfills.²⁴⁴ The gas is pumped to storage facilities and piped into

²³⁶ *Id.* at 15. See Coal-Fired Power Plant, *supra* note 212.

²³⁷ See Bain & Overend, *supra* note 228, at 12-16.

²³⁸ Adriane J. Dudley & Jamie N. Collins, *Gasification: Could it be an Answer to the Problem of Municipal Solid Waste Disposal?*, 35 URB. LAW. 693, 693-95 (2003); Matthew L. Wald, *Business Technology; Gasifying Garbage to Produce Electricity*, N.Y. TIMES, May 4, 1994, at D7, available at <http://query.nytimes.com/gst/fullpage.html?res=9C07E4DE1E30F937A35756C0A962958260>.

²³⁹ Dudley, *supra* note 238.

²⁴⁰ See Eileen Maura McGurty, *City Renaissance on a Garbage Heap: Newark, New Jersey, and Solid Waste Planning*, 2 J. OF PLAN. HIST. 311-30 (2003).

²⁴¹ Wald, *supra* note 238 (Current technological practices include the use of water vapor and alkaline devices.).

²⁴² Daniela Chen, *Converting Trash into Energy Gold*, CNN, July 17, 2006, <http://www.cnn.com/2006/TECH/05/25/landfill.gas/index.html>. See also Alvin Toffler, *The Third Wave: Selected Excerpts*, http://www.zpower.com/fr/documents/Paper_TheThirdWave.pdf (last visited Feb. 15, 2009) (New York City has contracted with a private firm to burn garbage as fuel.).

²⁴³ Chen, *supra* note 242.

²⁴⁴ Nickolas J. Themelis & Priscilla A. Ulloa, *Methane Generation in Landfills*, 32 RENEWABLE ENERGY 1243, 1247 (Jun. 2007). Chen, *supra* note 242.

machines to generate heat, steam, and electricity.²⁴⁵ The municipality or county shoulders the cost of any land use decisions that must be made, as well as regulating any safety concerns.²⁴⁶ It is projected that innovators and investors could recoup their costs in two years, while local governments could recoup their costs in five years.²⁴⁷

These projects recycle greenhouse gases; create electricity for public use; produce power for military bases; and create construction contracts, subcontracts, business opportunities, and jobs.²⁴⁸ If the affected actors pooled their efforts, co-modified their results, and got a broker, they could sell their undertakings on the Chicago Climate Exchange.²⁴⁹

F. No-Till Farming

Experts tell us that the Great Plains is a great storehouse for CO₂.²⁵⁰ Before farm settlements in the region the atmosphere accommodated less CO₂ than the soil.²⁵¹ In 2008, the air and the soil seem to accommodate

²⁴⁵ Chen, *supra* note 242.

²⁴⁶ *Id.* (An average methane landfill project costs around three million dollars. Further, the municipality would have to shoulder the cost of any eminent domain, zoning, or easement decisions attendant with constructing the trash generator.)

²⁴⁷ *Id.* See also Latin American Carbon Finance Deal of the Year 2007, *Ecoayres: Cash for Trash*, (Nov. 2008), <http://www.projectfinancemagazine.com/default.asp?page=7&PubID=4&ISS=24561&SID=702066> (discussing the recent financing by the Roggio Group of methane recapture projects in Argentinian landfills, and the profit margins associated with them).

²⁴⁸ See Julie A. Sealander, *Landfill Methane Gas Recycling: A Source of Fuel and Multiple Environmental Benefits*, 15 TEMP. ENVTL. L. & TECH. J. 229, 237-39 (1996).

²⁴⁹ JAMES, *supra* note 150.

²⁵⁰ See, e.g., Christine Van Lenten, *A Strategy for Slowing Global Warming: Sequestering Carbon in Soil*, <http://www.nyas.org/ebrief/miniEB.asp?ebriefID=285>. See also Margaret Yowell & Jessica Ferrell, *Using Carbon Sequestration Projects to Offset Greenhouse Gas Emissions*, 20 NAT. RESOURCES & ENV'T 20, 23 (2005) [hereinafter Yowell & Ferrell, *Carbon Sequestration*].

²⁵¹ Lenten, *supra* note 250. See also NATIONAL FARMERS UNION CARBON CREDIT PROGRAM: QUESTIONS AND ANSWERS 1, http://www.uwex.edu/CES/cty/pierce/ag/documents/CarbonCreditsQuestionsandAnswers_000.pdf [hereinafter QUESTIONS AND ANSWERS] (last visited Feb. 15, 2009).

roughly equal amounts of CO₂.²⁵² No-tillage farming produces worthwhile crops (e.g., beans, peas, and lentils), store CO₂, and restores the previous CO₂ balance.²⁵³

If farmers could commit themselves to this undertaking, they could sell their carbon sinks to the Chicago Climate Exchange.²⁵⁴ Landholders sign contracts embedded with promises to use no-till methods for five years.²⁵⁵ The contracts are pooled and brokered in Chicago.²⁵⁶ The Exchange audits performance through the principles of supply and demand.²⁵⁷ After the credits are sold, the broker distributes the proceeds in proportion to the participant's acreage under contract.²⁵⁸

Of course, all undertakings are binding,²⁵⁹ with contract practices requiring mandatory performance for a five year period.²⁶⁰ "If a landowner sells land that is covered by a [no-till] contract, the subsequent landowner [must] accept the arrangement and continue the practices."²⁶¹ If the subsequent landowner abandons the existing obligations, "the first landowner faces penalties" for breach.²⁶² Eligible offset management practices include "pulse crop[]" productions and limitations on the use of chemical additives.²⁶³ A variety of farming equipment can be used effectively in no-till farming.²⁶⁴ No offset

²⁵² QUESTIONS AND ANSWERS, *supra* note 251.

²⁵³ MANAGEMENT GUIDELINES, *supra* note 2.

²⁵⁴ QUESTIONS AND ANSWERS, *supra* note 251, at 2.

²⁵⁵ *Id.* at 4. See also Press Release, Senator Ken Salazar, Sen. Salazar, Sen. Lugar, Sen. Stabenow Laud Nat'l Farmers Union Carbon Credit Program: 61,580 Acres in Co. Enrolled (Jul. 29, 2008), available at <http://salazar.senate.gov/news/releases/080729fmrerdjnt.htm>.

²⁵⁶ QUESTIONS AND ANSWERS, *supra* note 251, at 2.

²⁵⁷ *Id.*

²⁵⁸ *Id.*

²⁵⁹ Chicago Climate Exchange, Overview, <http://www.chicagoclimateexchange.com/content.jsf?id=821> (last visited Feb. 15, 2009) ("CCX emitting Members make a voluntary but legally binding commitment to meet annual GHG emission reduction targets.").

²⁶⁰ QUESTIONS AND ANSWERS, *supra* note 251, at 4.

²⁶¹ *Id.*

²⁶² *Id.*

²⁶³ MANAGEMENT GUIDELINES, *supra* note 2 ("Pulse crops (*i.e.*, beans, peas, lentils) may be seeded no more than three of five years.")

²⁶⁴ *Id.* This includes: no-till drills, no-till and strip till planters, rolling harrows, low disturbance liquid manure injectors, anhydrous ammonia applicators, manure knife applicators, and subsoil rippers with twenty-four inch shank spacing. *Id.*

contracts will be issued to farmers committed to burning or residue removal.²⁶⁵

IX. CHICAGO CLIMATE EXCHANGE

The Kyoto Protocol prompted multinational corporations to establish the Chicago Climate Exchange (CCX).²⁶⁶ The entity is “North America’s only, and the world’s first, greenhouse gas (GHG) emissions registry, reduction and trading system”²⁶⁷ It manages “all six industrial greenhouse gases (GHGs)—carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride.”²⁶⁸

CCX is a self-governed commodities exchange that operates under mutually agreed upon rules designed and implemented by members.²⁶⁹ CCX participants make “voluntary but legally binding commitment[s] to reduce” greenhouse gas [GHG] emissions.²⁷⁰ Members who are able to reduce their emissions below contractually agreed upon targets can either hold or sell any surplus emissions allowances that they generate;²⁷¹ members who exceed their contractual allowances must purchase “CCX Carbon Financial Instrument[s] (CFI)” to bring their industrial undertaking in line with their promises.²⁷²

²⁶⁵ *Id.*

²⁶⁶ QUESTIONS AND ANSWERS, *supra* note 251, at 1. See J. Kevin Healy & Jeffrey M. Topick, *Climate Change: It’s Not Just a Policy Issue for Corporate Council—It’s a Legal Problem*, 29 COLUM. J. ENVTL. L. 89, 92-93 (2004) (discussing the United States’ decision not to ratify the Kyoto Protocol and the establishment of voluntary programs for reducing greenhouse gas emissions).

²⁶⁷ QUESTIONS AND ANSWERS, *supra* note 251, at 1.

²⁶⁸ QUESTIONS AND ANSWERS, *supra* note 251, at 1. See T. Rick Irvin et al., *Kyoto Comes to Georgia: How International Environmental Initiatives Foster Sustainable Commerce in Small Town America*, 36 GA. J. INT’L & COMP. L. 559, 590-91 (2008) (discussing the Chicago Climate Exchange as recognized under the Kyoto Protocol).

²⁶⁹ QUESTIONS AND ANSWERS, *supra* note 251, at 1.

²⁷⁰ *Id.*; see Irvin, *supra* note 268.

²⁷¹ Overview, *supra* note 7.

²⁷² *Id.*; see Jonathan Donehower, *Analyzing Carbon Emissions Trading: A Potential Cost Efficient Mechanism to Reduce Carbon Emissions*, 38 ENVTL. L. 177, 179-82 (2008).

The standard unit in a CCX contract “represents 100 metric tons of CO₂.”²⁷³ The instruments come from an exchange allowance system (bankable surpluses) and exchange offsets (qualifying “offset projects”) system.²⁷⁴ Eligible offset projects include, but are not limited to: agricultural methane, land fill methane, coal mine methane, agricultural soil carbon, rangeland soil carbon management, forestry, renewable energy, energy efficiency and fuel switching, and “Clean Development Mechanism” eligible projects.²⁷⁵

In the beginning, Phase I Emission Reduction Targets were one percent per year below the average annual emissions for the years 1998 through 2001.²⁷⁶ In 2007, “Phase II parameters extended the reduction period to 2010,” with an additional two percent reduction commitment.²⁷⁷ The Financial Industry Regulatory Authority (FINRA) “acts as CCX’s regulatory service provider.”²⁷⁸ It audits all “[b]aseline and annual emissions reports for Phase I and Phase II program[s],” “monitor[s] CCX trading activity,” and “review[s] all verifier’s reports for offset projects.”²⁷⁹

A members compliance with their individual CCX Emission Reduction Schedule is “enforced by the CCX Environmental Compliance Committee.”²⁸⁰ Failing members “must [either] use banked allowances from previous years or purchase [CFIs] . . .” to meet membership demands.²⁸¹ Of course, all of the undertakings listed in the previous

²⁷³ Overview, *supra* note 7.

²⁷⁴ *Id.*

²⁷⁵ *Id.* See also UNFCCC, Clean Development Mechanism, <http://cdm.unfccc.int/index.html> (last visited Feb. 15, 2009) (overview of the U.N. program designed for the growth and facilitation of Clean Development Mechanism projects).

²⁷⁶ Key Features, *supra* note 6. Accord Steven Ferrey, *Corporate Responsibility and Carbon-Based Life Forms*, 35 B.C. ENVTL. AFF. L. REV. 419, 433 (2008) (The article discusses the efforts “to halt the release of carbon into the atmosphere and mitigate global warming from state-led initiatives to litigation in lower courts and the United States Supreme Court.”).

²⁷⁷ Key Features, *supra* note 6.

²⁷⁸ Emissions Verification and Compliance, *supra* note 149. See Yesenia Cervantes, “FIN RAH!” . . . *A Welcome Change: Why the Merger was Necessary to Preserve U.S. Market Integrity*, 13 FORDHAM J. CORP. & FIN. L. 829, 830-85 (2008) (discussing the beneficial role of the Financial Industry Regulatory Authority in the United States markets).

²⁷⁹ Emissions Verification and Compliance, *supra* note 149.

²⁸⁰ *Id.*

²⁸¹ *Id.*

section would qualify as suitable offset projects for failing businesses.²⁸² The size and aggregation of these undertakings would determine the CFI's value.²⁸³

The CCX's goals are to limit insults to the environment, reclaim bits of our natural surroundings for the next generation, and make environmentalism profitable.²⁸⁴ "Participants with a surplus" can sell their CO₂ credits, dump the income from the sales into their general fund, fritter it away, spend a percentage on CO₂ technology, or bank an innovator's new machines.²⁸⁵ Alternatively, participants "holding a surplus" can buy new technology with CO₂ credits and cash; invest in CO₂ firms building innovative machinery in developing countries;²⁸⁶ enter into joint ventures with developing nations building innovative machinery;²⁸⁷ or dump the revenue into a CO₂ fund managed by the World Bank and, thereafter, await returns on investments in developing countries.²⁸⁸

X. KYOTO PROTOCOL

The purchasers of CCX carbon credits include "Fortune 500 companies, multinational corporations, [and] utility and power generation companies."²⁸⁹ Of these purchasers, some include conglomerate companies with subsidiaries in a foreign jurisdiction that

²⁸² CCX Offsets Program, <http://www.chicagoclimatex.com/content.jsf?id=23> [hereinafter Offsets Program] (last visited Feb. 15, 2009) (discussing projects to manage greenhouse gas emissions for members of the Chicago Climate Exchange). See *supra* note 275 and accompanying text.

²⁸³ *Id.*

²⁸⁴ Overview, *supra* note 7. See also JAMES, *supra* note 150.

²⁸⁵ Keith Castro & Peter Messrobian, *Cap and Trade—A Creative Source of Finance for Green Technologies*, TRENDS: ABA SEC. OF ENV'T, ENERGY, AND RESOURCE NEWSL., Mar.-Apr., 2008, at 4, 4-5 (2008), available at http://www.sdma.com/files/Publication/0644dcfd-0d0b-42ec-b5a74e8a8e3f4500/Presentation/PublicationAttachment/8e9aed25-675e-4303-9f0b-61c0a0a49360/2008_Casto_reprint_v1.pdf.

²⁸⁶ *Id.* at 5.

²⁸⁷ *Id.*

²⁸⁸ *Id.*

²⁸⁹ QUESTIONS AND ANSWERS, *supra* note 251, at 1.

are subject to the Kyoto Protocol and its emissions reduction requirement.²⁹⁰ Other purchasers view the credit purchase as investment opportunity.²⁹¹ Finally, some purchasers demonstrate concern for GHG emissions, either as part of a “good ‘corporate citizen’ public relations campaign,”²⁹² or out of a genuine concern for GHG emissions.²⁹³

The Kyoto Protocol is premised on contract.²⁹⁴ Under Kyoto, nations promise to cut their greenhouse gas emissions to their year 2000 level, or buy credits from a credit surplus market or an offset project market to meet this level.²⁹⁵ When a nation’s emissions fall below an established level, they can bank their surplus or sell it to others.²⁹⁶ Additionally, they can enter into joint ventures with developing nations to build and manage CO₂ machinery, or finance firms building innovative CO₂ machinery in developing country.²⁹⁷ The following is a summary analysis of the key provisions of the Kyoto Protocol as related to our inquiry:²⁹⁸

Article 2 contains policies and procedures binding developed nations to meet their Quantified Emissions Limitations and Reduction Objectives (QELROs).²⁹⁹ Performance is based upon what the nations can realistically achieve.³⁰⁰

²⁹⁰ See Irvin, *supra* note 268, at 568-71 (asserting that businesses, and state and local governments in the United States have undertaken sustainable commerce initiatives addressing greenhouse gas emissions).

²⁹¹ QUESTIONS AND ANSWERS, *supra* note 251, at 1.

²⁹² *Id.*

²⁹³ *Id.*

²⁹⁴ Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, 37 I.L.M. 22, available at <http://unfccc.int/resource/docs/convkp/kpeng.html>. See Deborah E. Cooper, *The Kyoto Protocol and China: Global Warming's Sleeping Giant*, 11 GEO. INT'L ENVTL. L. REV. 401, 425 (1999). See also Global Warming Online-Kyoto Protocol, <http://www.globalwarmingonline.info/Kyoto-Protocol.html> [hereinafter Global Warming Online] (last visited Feb. 15, 2009).

²⁹⁵ Global Warming Online, *supra* note 294.

²⁹⁶ *Id.*

²⁹⁷ Cooper, *supra* note 294, at 423.

²⁹⁸ Kyoto Protocol, *supra* note 294. Cooper, *supra* note 294, at 425.

²⁹⁹ Kyoto Protocol, *supra* note 294, art. II. A QELRO is a Quantified Emission Limitation and Reduction Objective. See Kyoto Protocol, *supra* note 294.

³⁰⁰ *Id.*

Article 3 binds developed nations, jointly and individually, to meet their QELROs for all six greenhouse gases.³⁰¹ The goal is to lower emissions, on average, to five percent below the 1990 levels by 2012.³⁰² The United States has agreed to a seven percent reduction commitment, the European Union (EU) is bound to an eight percent reduction, and Japan is bound to a six percent reduction of greenhouse gases.³⁰³

Article 4 “allows for joint fulfillment of reduction commitments.”³⁰⁴ It “allows all of Europe to meet its QELROs as a unit, giving leeway to those that exceed their targets, as long as [they are] offset by EU countries [that] are below their emissions limits.”³⁰⁵ If the EU achieves its targets, member countries exceeding their limits are individually accountable for their misconduct.³⁰⁶ The article accommodates an EU country’s use of a joint venture (joint implementation scheme) in a developing country to earn offset credits.³⁰⁷

Article 5 imposes a duty upon developed nations to establish a national monitoring system by 2007.³⁰⁸ The guidelines for estimating greenhouse emissions and greenhouse sinks must be based on the International Panel on Climate Change’s recommendations.³⁰⁹ The guidelines are subject to review and revision by the member nations.³¹⁰

Article 6 accommodates a developed nation’s use of the joint venture (joint implementation scheme) to earn emission reduction units in developing countries.³¹¹

³⁰¹ *Id.* at art. III.

³⁰² *Id.*

³⁰³ Cooper, *supra* note 294, at 425.

³⁰⁴ *Id.* See Kyoto Protocol, *supra* note 294, art. IV.

³⁰⁵ Cooper, *supra* note 294, at 425-26.

³⁰⁶ *Id.* at 426.

³⁰⁷ *Id.*

³⁰⁸ Kyoto Protocol, *supra* note 294, art. V.

³⁰⁹ Cooper, *supra* note 294, at 426.

³¹⁰ *Id.*

³¹¹ Kyoto Protocol, *supra* note 294, art. VI.

Article 12 establishes the Clean Development Mechanism (CDM).³¹² Developed nations can invest in certified emission reduction projects in developing nations and apply some of the reductions generated by these projects to their QELROs.³¹³ The CDM accommodates private companies doing CO₂ business in developing nations.³¹⁴

Article 17 provides for emissions trading among developed nations.³¹⁵ Emissions “reductions through trading must be ‘supplemental to domestic actions’” (*i.e.*, similar to some of the undertakings spotlighted in Section VI & VIII).³¹⁶

Articles 18 - 24, 27, and 28 “deal with typical issues in international agreements, such as dispute resolution, amendment procedures, annexes, voting rights, ratification, reservations, and withdrawal.”³¹⁷

XI. SITUATION ASSESSMENT

There is a lot of confusion about climate change information brought on by its fashionableness and the media’s rush to judgment on the environment.³¹⁸ Some people conflate reporting systems, credit trading, and cap-and-trade systems.³¹⁹ All three are separate and distinct; and the differences (we are told) are critical to a coherent discussion about global climate change and good analysis.³²⁰ The first system puts the public on notice about pollutants in the air.³²¹ California, Georgia, Illinois, Maine, Massachusetts, New Hampshire, New Jersey, Oregon, Texas, Washington, and Wisconsin are parties to an arrangement structured under the first approach.³²² The second system arms utilities with the

³¹² Cooper, *supra* note 294, at 427.

³¹³ See Kyoto Protocol, *supra* note 294, art. XII. Cooper, *supra* note 294, at 427.

³¹⁴ Cooper, *supra* note 294, at 427.

³¹⁵ Kyoto Protocol, *supra* note 294, art. XVII.

³¹⁶ Cooper, *supra* note 294, at 427. See *supra* Section VI & VIII.

³¹⁷ *Id.*

³¹⁸ Jennifer Bowmar & Laurie Wireman, Note, *Hopping on the Green Wagon: How Corporations Can Overcome Potential Political and Legal Pitfalls Associated With Sustainability Initiatives*, 76 U. CIN. L. REV. 1479, 1480 (2008).

³¹⁹ See Yowell & Ferrell, *Carbon Sequestration*, *supra* note 250, at 20.

³²⁰ *Id.*; see James L. Olmsted, *The Global Warming Crisis: An Analytical Framework to Regional Responses*, 23 J. ENVTL. L. & LITIG. 125, 161-67 (2008).

³²¹ Yowell & Ferrell, *Carbon Sequestration*, *supra* note 250, at 20.

³²² See *id.* at 20-21.

option to finance or undertake offset projects to reduce their GHG emissions in a particular state.³²³ Washington is a party to an arrangement structured under the second approach.³²⁴ The third system caps emissions and creates incentives to make those caps permanent.³²⁵ Universities, offset aggregators, and national and multinational corporations are parties to the third approach.³²⁶

On balance, the third undertaking holds the most promise. It reduces pollution absolutely and makes the reduction permanent.³²⁷ When there are multiple participants, homogeneous pollutants like the ones on the CCX hit list, and an institutional willingness to lift everybody up equally, the system works. One needs a reliable monitoring system that works with everybody. The goal is to get participants to ply their skills to innovations, trade, new machines, and reduction schemes that lower the cost of compliance.³²⁸

Sadly, our government's withdrawal from Kyoto taints every undertaking. Nonparticipation precludes European businesses from purchasing American credits or dabbling in our offset market. This decreases the demand for American credits deflates their value.³²⁹ If scientists are right about sink sequestration on the Great Plains (i.e., that current cattle grassing, reseeded the prairie with natural grass, no-till farming, land conversion, and restoration will buy no more than thirty years of CO₂ sequestration),³³⁰ the cost of best management practices on

³²³ See *id.* at 24; see also Bradley C. Karkkainen, *Bottlenecks and Baselines: Tackling Information Deficits in Environmental Regulation*, 86 TEX. L. REV. 1409, 1416 (2008).

³²⁴ *Id.* at 21.

³²⁵ See Yowell & Ferrell, *Carbon Sequestration*, *supra* note 250, at 21; see also Karkkainen, *supra* note 323, at 1416.

³²⁶ Members of CCX, <http://www.chicagoclimatex.com/content.jsf?id=64> (last visited Feb. 15, 2009); see Yowell & Ferrell, *Carbon Sequestration*, *supra* note 250, at 21-22.

³²⁷ See Yowell & Ferrell, *Carbon Sequestration*, *supra* note 250, at 21; see also Karkkainen, *supra* note 323, at 1416.

³²⁸ Byron Swift, *U.S. Emissions Trading: Myths, Realities, and Opportunities*, 20 NAT. RESOURCES & ENV'T 3, 3 (2005).

³²⁹ Yowell & Ferrell, *Carbon Sequestration*, *supra* note 250, at 25.

³³⁰ *Id.* at 23.

the land will dampen the landholder's ardor to do anything, and depress the value of any GHG credits.

XII. CONCLUSION

We are in trouble. Each day brings more evidence that we face a climate crisis. Global climate change is real. It is happening. Our habitat is changing. What we face is dreadful. As Upton Sinclair said, "[i]t is difficult to get a man to understand something when his salary depends upon his not understanding it."³³¹ This Article brews a recipe for folks to get around all that.

³³¹ UPTON SINCLAIR ET AL., I, CANDIDATE FOR GOVERNOR: AND HOW I GOT LICKED 109 (Univ. of Ca. Press 1994) (1935).

