

A BUNCH OF HOT AIR: THE CHALLENGES OF REGULATING CARBON CAPTURE AND SEQUESTRATION IN ILLINOIS

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I. INTRODUCTION

President Theodore Roosevelt famously said, “[T]o waste, to destroy, our natural resources, to skin and exhaust the land instead of using it so as to increase its usefulness, will result in undermining in the days of our children the very prosperity which we ought by right to hand down to them amplified and developed.”¹ In the age of climate change, America is still grappling with how her natural resources can be used to continue her prosperity while at the same time protecting the environment for future generations. Nowhere is this balancing act greater than the debate over the continued use of fossil fuels to meet our energy needs amid new technology designed to make coal cleaner to use as an energy source.

While coal continues to be the dominant energy resource in America and Illinois, it is also the energy source which emits the most carbon, accounting for almost thirty-four percent of carbon dioxide (CO₂) emissions in the United States.² Because of these air emissions, strict regulations on emissions from coal-fired power plants are being considered by the federal government, which would foreclose the opportunity to build new coal power plants without the use of new CO₂ emission cutting technology.³ One technological option is a process called carbon capture and sequestration (CCS),⁴ which has been proposed for use in central Illinois in the FutureGen

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1. *Archives of the West: The Conservation of Natural Resources*, PBS.ORG, <http://www.pbs.org/weta/thewest/resources/archives/eight/trconserv.htm> (citing Theodore Roosevelt's Seventh Annual Message to Congress Dec. 3, 1907) (last visited July 10, 2014).
 2. Jonas J. Monast, Brooks R. Pearson & Lincoln F. Pratson, *A Cooperative Federalism Framework for CCS Regulation*, 7 ENVTL. & ENERGY L. & POL'Y J. 1, 2 (2012).
 3. See generally Arnold W. Reitze, Jr., *Electric Power in a Carbon Constrained World*, 34 WM. & MARY ENVTL. L. & POL'Y REV. 821 (2010). Increasing efficiency involves increasing the temperature and pressure of the system, forcing companies to spend more in construction and making the building of new coal-fired plants uneconomical. *Id.* at 830.
 4. Avery Fellow, *Meeting Goal for Global Temperature Rise Called Unlikely Without Carbon Sequestration*, 43 ENV'T REP. (BNA) 3113 (Dec. 7, 2012) (“Meeting the [global temperature reduction] 2° Celsius goal will require aggressive measures, such as carbon capture and storage technology.”). CCS has been defined as “a process consisting of the separation of CO₂ from industrial and energy-related sources, transport to a storage location and long-term isolation from

2.0 project in Meredosia, Illinois, and in Tenaska's ill-fated Taylorville Energy Center in Taylorville, Illinois.

In this debate over the usage of coal as an energy source, the stakes for the Illinois economy have never been higher, especially in its southern and central regions. Sixty-eight percent of Illinois contains coal-bearing rocks beneath the soil, with a reserve base of 112 billion tons.⁵ This coal reserve is the second largest in the country and the largest bituminous coal reserve in America.⁶ These reserves hold more energy potential than all of the Saudi Arabian and Kuwaiti oil reserves combined and provide an estimated \$1 billion to Illinois' economy annually.⁷ As an example of coal's impact on the southern Illinois economy, in November of 2012, the Willow Lake coal mine operated by Peabody Energy was permanently closed after safety and compliance issues, displacing over 400 employees.⁸ In a bright spot for the Illinois coal industry, exports of coal to other countries are at all-time highs, doubling from 2010 to 2012, and estimates show that almost 13 megatons of coal were exported in 2012 alone.⁹

However, this export number is of great concern to environmental advocates, as most of these exports have gone to feed China and India's insatiable appetite for coal as their main energy source.¹⁰ Air quality standards in these countries are not nearly as stringent as in the United States, and limited efforts are currently underway to combat greenhouse gas emissions.¹¹ Worse, new studies show that the pollution from China's factories is beginning to have an impact on air quality as far away as the western coast of the United States.¹² While the continued viability of coal

the atmosphere." INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SPECIAL REPORT: CARBON DIOXIDE CAPTURE AND STORAGE 3 (Bert Metz et al. eds., 2005) [hereinafter IPCC SPECIAL REPORT], available at <http://www.ipcc-wg3.de/special-reports/.files-images/SRCCS-WholeReport.pdf>.

5. *Why Study Coal in Illinois?*, ISGS PRAIRIE RESEARCH INST., <http://isgs.illinois.edu/?q=research/coal> (last visited July 10, 2014).
6. *Id.*
7. *Id.*
8. Jeff Williams, *Peabody Closing Southern Illinois Coal Mine*, WSIU (Nov. 27, 2012), <http://news.wsui.org/post/peabody-closing-southern-illinois-coal-mine>.
9. ILL. DEP'T OF COMMERCE & ECON. OPPORTUNITY, REALIZING ILLINOIS COAL EXPORT POTENTIAL 2 (2013), available at <http://www2.illinoisbiz.biz/coal/2013/CoalExportReport2013.pdf>.
10. *See id.* at 3. Over the past five years, China has gone from a net coal exporter to a net coal importer, now importing almost 150 megatons of coal each year. *Id.*
11. *See* Christina Larson, *Who Has Dirtier Air: China or India?*, BLOOMBERG BUSINESSWEEK (Jan. 28, 2014), <http://www.businessweek.com/articles/2014-01-28/smog-in-new-delhi-is-worse-than-in-beijing>. China has had increasingly concerning problems with air pollution and smog over the past year, with schools having to be canceled due to poor air quality. *Id.*
12. William Wan, *Study: Pollution from Chinese Factories is Harming Air Quality on U.S. West Coast*, WASH. POST, Jan. 21, 2014, http://www.washingtonpost.com/world/study-pollution-from-chinese-factories-is-harming-air-quality-on-us-west-coast/2014/01/21/225e9b1e-8281-11e3-bbe5-6a2a3141e3a9_story.html.

will have a large impact on the economic health of southern Illinois and the entire state, it is clear that coal is not going away and must be used in a much cleaner way, with CCS technology being a key component of efforts to combat climate change across the globe.¹³

However, both the Tenaska and FutureGen projects have been mired in bureaucratic red tape, concerns about costs, and uncertainty about regulation from their inception, which have caused significant delays and led to the demise of the Tenaska project. Section II of this Comment will address the history of CCS and the history and challenges which the Tenaska and FutureGen projects have faced in terms of regulation and cost. Section III will analyze the overlap between the two projects along with similar successful projects around the country, and discuss the benefits and detriments of investments in and regulation of CCS technology. Section IV will demonstrate why it is important to invest in and clear the way for this technology, and propose both federal and state legislation providing a framework to allow such projects to move forward within a hybrid model of regulation based on both private and public investment.

II. BACKGROUND

In order to understand the complexities surrounding CCS technology, especially as applied to the FutureGen and Tenaska projects, it is important to explore the history of CCS in the United States, as well as the current regulatory structure put in place by the federal and Illinois governments. This Section will introduce the background information necessary to understand the challenges faced in regulating CCS technology as applied to these large projects proposed in Illinois. First, however, some further background information on CCS is necessary.

A. How CCS Works

Carbon dioxide capture and sequestration (or storage) is a four step process that captures any carbon emissions from coal-fired power plants before emission into the atmosphere.¹⁴ This process allows coal to be used as an energy source without the danger of emitting greenhouse gases into the air, significantly increasing coal's continuing usage as a fuel source in light

13. See U.S. DEP'T OF ENERGY & NAT'L ENERGY TECH. LAB., CARBON DIOXIDE CAPTURE AND STORAGE RD&D ROADMAP 5 (2010) [hereinafter DOE CCS ROADMAP], available at <http://www.netl.doe.gov/File%20Library/Research/Carbon%20Seq/Reference%20Shelf/CCSRoadmap.pdf> ("CCS is considered by many to be a crucial component of any U.S. approach or strategy for addressing the climate change problem, particularly given the United States' current reliance on coal for almost half of its electricity production.").

14. *Id.* at 6.

of future CO₂ air emission limits.¹⁵ There are different technologies allowing for CO₂ to be captured, two of which are pre-combustion and oxy-combustion.¹⁶

Pre-combustion capture is mostly applicable to newly-built gasification plants, where coal fuel stock is heated under pressure with steam and oxygen (O₂).¹⁷ This process, which is also called integrated gasification combined-cycle (IGCC), converts the coal into its gaseous components which are heated to decompose them into syngas, composed of hydrogen (H₂) and carbon monoxide (CO).¹⁸ This syngas is then put into a water-gas-shift reactor, converting the CO into CO₂ and more H₂.¹⁹ Solvents are then used to separate out the CO₂, and the H₂ is used as fuel in a combustion turbine to generate electricity.²⁰ The Tenaska project originally proposed to use this method of capture in its plan to build a new coal gasification power plant in Taylorville.²¹

Oxy-combustion capture can be applied to both old and new coal-fired plants.²² In these plants, air is separated into its component parts, sending enriched O₂ into the boiler with the coal fuel, along with recycled CO₂ from previous combustions.²³ This process produces steam used to turn a turbine and creates byproducts of more CO₂ and water.²⁴ The water is separated out using cooling and condensation, leaving a highly concentrated CO₂ stream.²⁵ Because of the concentrated stream of CO₂, it can be much less costly than post-combustion processes in existing coal-fired plants but still requires a significant capital outlay and energy cost to operate.²⁶ The FutureGen project originally planned to utilize a new pre-combustion coal gasification plant in Mattoon but was later changed to a retrofitted oxy-combustion coal plant in Meredosia due to the high costs of pre-combustion plants.²⁷

Once captured, the CCS process compresses the carbon using a combination of refrigeration and pumping to turn the gas into a supercritical fluid, compressing its volume to allow for cost-effective transport.²⁸ The

15. *Id.*

16. *Id.*

17. *Id.* at 7.

18. *Id.*

19. *Id.*

20. *Id.*

21. See discussion *infra* Part II.D.

22. DOE CCS ROADMAP, *supra* note 13, at 8.

23. *Id.*

24. *Id.*

25. *Id.*

26. *Id.*

27. See discussion *infra* Part II.C.

28. DOE CCS ROADMAP, *supra* note 13, at 8.

compressed carbon can then be transported via pipelines to the sequestration site.²⁹ There are currently around 3700 miles of CO₂ pipelines across the country.³⁰ Once successfully transported, the compressed carbon is injected underground into geologic formations that are safely able to keep the carbon secured for decades.³¹ Research is continuing on suitable sites, such as abandoned oil and gas fields, saline formations, and unmineable coal seams, which can hold 2.38 trillion metric tons of CO₂ underground.³² At current capture levels, North America alone can store at least 700 years' worth of CO₂ emissions.³³

The geology of Illinois is well-suited for the sequestration of compressed CO₂, as it contains all of the different types of geologic formations being researched for carbon storage.³⁴ In particular, scientists are interested in the saline reservoirs, which are rocks with large porous spaces that contain a watery salt solution.³⁵ It has been estimated that Illinois' saline reservoir storage capacity is between twelve and 161 billion metric tons.³⁶ One such reservoir is the Cambrian Mt. Simon Sandstone formation located across central Illinois, which has been the preferred sequestration site for the FutureGen project.³⁷

B. History, Use, and Regulation of CCS Technology

Much of the technology now used for CCS has been around for a long time and is just now being applied to using coal in an environmentally friendly way. The coal gasification system utilized in pre-combustion capture is a new application of the technology that allowed street "gas-light" lamps to burn in the 1890s.³⁸ Since 1972, CO₂ has been injected into underground geologic formations by the oil and gas industry to increase oil well production in a process called enhanced oil recovery (EOR).³⁹ From this application of CO₂ injection, the idea arose to inject CO₂ into these formations and store it for long periods of time as an alternative to air

29. *Id.*

30. Monast, Pearson & Pratson, *supra* note 2, at 5.

31. DOE CCS ROADMAP, *supra* note 13, at 9.

32. Andrea Vittorio, *North American Carbon Storage Capacity Sufficient for 700 Years*, DOE Report Says, 44 ENV'T REP. (BNA) 15 (Jan. 4, 2013).

33. *Id.*

34. Storage, MIDWEST GEOLOGICAL SEQUESTRATION CONSORTIUM, <http://sequestration.org/science/storage.html> (last visited July 10, 2014).

35. *Deep Saline Reservoirs*, MIDWEST GEOLOGICAL SEQUESTRATION CONSORTIUM, <http://sequestration.org/science/deepsalinereservoirs.html> (last visited July 10, 2014).

36. *Id.*

37. *See id.*

38. Arnold W. Reitze, Jr., *Federal Control of Carbon Capture and Storage*, 42 ENVTL. L. REP. NEWS & ANALYSIS 10796, 10798 (2011).

39. IPCC SPECIAL REPORT, *supra* note 4, at 60.

emissions.⁴⁰ Since EOR has been utilized for four decades and is now prevalent across the United States, it has laid the groundwork for the regulation and legal precedent impacting current CCS practices.⁴¹

As with EOR, CCS presents a myriad of common law issues that must be addressed in any regulatory scheme.⁴² The most likely cause of action arising from CCS is for negligence for harm to the environment, personal injury, or injury to property.⁴³ However, trespass to mineral property rights and nuisance for interference to one's property may also arise.⁴⁴ While beyond the scope of this Comment, many schemes have been devised to address the property rights issues associated with CCS, including ownership of underground pore space and takings issues.⁴⁵ Against this legal backdrop, states began to pass legislation comprehensively regulating CCS in the early 2000s.⁴⁶ By 2005, fourteen states had enacted various types of legislation, ranging from liability provisions to property rights.⁴⁷ By 2010, that number grew to twenty-one states, with the stated purpose of reducing greenhouse gas emissions and improving economic development, especially in those states with significant mining interests and coal reserves.⁴⁸

However, these regulations vary widely, the inconsistency of which may hinder the industry because of high costs and inefficiency.⁴⁹ Illinois recognized the variety of options presented for state regulation of CCS technology and created a Carbon Capture and Sequestration Legislative Commission to study which regulations would be appropriate in Illinois and report back to the legislature and governor.⁵⁰ However, the Commission had yet to meet four months before the deadline, and a member had an apparent conflict of interest.⁵¹ No information on the ultimate results from the

40. *Id.*

41. Monast, Pearson & Pratson, *supra* note 2, at 6.

42. *See id.*

43. Victor B. Flatt, *Paving the Legal Path for Carbon Sequestration from Coal*, 19 DUKE ENVTL. L. & POL'Y J. 211, 222 (2009).

44. *Id.* at 223.

45. *See generally id.* at 229-40; Alexandra B. Klass & Elizabeth J. Wilson, *Climate Change, Carbon Sequestration, and Property Rights*, 2010 U. ILL. L. REV. 363 (2010).

46. Flatt, *supra* note 43, at 214.

47. *Id.*

48. Monast, Pearson & Pratson, *supra* note 2, at 11. This list includes Colorado, Florida, Idaho, Kansas, Kentucky, Louisiana, Minnesota, Mississippi, Montana, North Dakota, New Mexico, Oklahoma, Pennsylvania, South Dakota, Texas, Utah, Washington, Wisconsin, West Virginia, and Wyoming. *Id.*

49. *Id.* at 12.

50. Carbon Capture and Sequestration Legislation Commission Act, Pub. Act 96-754, 20 ILL. COMP. STAT. 5005/15 (repealed 2011).

51. Rachel Wells, *CO₂ Study Group Stalled*, ILL. TIMES, Aug. 26, 2010, <http://www.illinoistimes.com/Springfield/article-7692-co2-study-group-stalled.html>.

Commission is available, and the Act was automatically repealed on January 1, 2011.⁵²

At the same time states began enacting their own regulations for CCS, the federal government became interested in CCS as a component of national energy policy.⁵³ In 2001, President Bush issued the President's National Policy Report for clean coal, and the U.S. Department of Energy (DOE) began preparations to request proposals for the world's first coal-fired power plant with near-zero carbon emissions.⁵⁴ This project was to be later known as FutureGen.⁵⁵ In late 2007, in preparation for the award of the FutureGen project, Congress passed the Energy Independence and Security Act of 2007, which required the Secretary of Energy to "carry out a program to demonstrate technologies for the large-scale capture of CO₂ from industrial sources."⁵⁶ The Act also required the DOE and the U.S. Environmental Protection Agency (EPA) to partner with private companies and foundations to study the effects of CCS technology on the environment and human health.⁵⁷ Most important to the federal regulation of CCS, the Act subjected the injection of CO₂ underground to the requirements of the Safe Drinking Water Act (SDWA) and allowed the EPA to promulgate rules consistent with that program.⁵⁸

The DOE canceled the FutureGen project only six weeks after the award of the project to Mattoon, Illinois, citing the large costs associated with CCS projects.⁵⁹ However, once President Barack Obama took office, the focus on CCS as a carbon emissions mitigation technique once again took center stage.⁶⁰ Much of this renewed interest is owed to the American Recovery and Reinvestment Act of 2009 (stimulus bill), which itself allocated \$3.4 billion in funding to CCS projects.⁶¹ This legislation included \$1 billion for a renewed FutureGen project, \$2.3 billion for other CCS and energy efficiency projects, and \$100 million for additional research into CCS.⁶² While the FutureGen project was the most significant CCS

52. 20 ILL. COMP. STAT. 5005/20 (2012).

53. See Monast, Pearson & Pratson, *supra* note 2, at 14.

54. David A. Hughes, *The FutureGen Project: The Rise and Fall of Mattoon, Illinois*, J. OF MULTISTATE TAXATION & INCENTIVES 19-JUN 30, 30 (2008).

55. *Id.*

56. 42 U.S.C. § 17251 (2012).

57. *Id.* §§ 17253, 17255.

58. *Id.* § 17254. Under the SDWA, the EPA has the authority to regulate the underground injection of any substance which may impact the drinking water supply, in this case compressed CO₂. See 42 U.S.C. § 300h(d) (2012).

59. Hughes, *supra* note 54, at 30; see also discussion *infra* Part II.C.

60. Monast, Pearson & Pratson, *supra* note 2, at 9 ("The current administration has made the largest government investment in CCS research and development than any other nation in history.").

61. *Id.*

62. *FE Implementation of the Recovery Act*, U.S. DEP'T OF ENERGY, <http://energy.gov/fe/implementation-recovery-act> (last visited July 10, 2014).

investment for Illinois in the stimulus bill, another \$109.4 million was allocated to Illinois for CCS projects, including several million dollars for research at universities in the state.⁶³

On February 3, 2010, President Obama issued a presidential memorandum outlining a task force to develop a comprehensive federal strategy to speed development of commercial and industrial CCS projects.⁶⁴ Additionally, Obama outlined a goal to bring between five and ten demonstration projects online by 2016,⁶⁵ which accelerated federal support for CCS technology.

In late 2010, the EPA finalized its rules for implementation of its regulatory authority for CCS under the SDWA, which went into effect on January 10, 2011, as a part of the Underground Injection Control Program (UIC).⁶⁶ These regulations added a new Class VI Well to account for the different characteristics and volumes of CO₂ to be injected and set requirements for well construction, assignment of liability, and monitoring.⁶⁷ However, these rules only regulate injection into the ground to prevent contamination of drinking water, which does not allow for federal regulation of many aspects of CCS, including the capture and transport of CO₂, property rights, transfer of liability, and greenhouse gas reduction accounting.⁶⁸ This gap in federal regulations leaves the regulation of many parts of the CCS process to the states, which creates problems in the coordination of efforts between the EPA and the states on large industrial CCS projects.⁶⁹

Recently, the profile of CCS has been heightened due to its inclusion in President Obama's strategy to cut greenhouse gas emissions and curb global climate change through EPA regulation under the Clean Air Act (CAA). Under CAA Section 111(b), the EPA has the authority to promulgate rules detailing "new source performance standards" (NSPS) for new stationary

63. U.S. DEPARTMENT OF ENERGY, RECOVERY ACT ILLINOIS MEMO 11 (2010), available at http://energy.gov/sites/prod/files/edg/recovery/documents/Recovery_Act_Memo_Illinois.pdf.

64. Administration of Barack Obama, Memorandum on a Comprehensive Federal Strategy on Carbon Capture and Storage, 75 Fed. Reg. 6087 (Feb. 5, 2010).

65. *Id.*

66. *Geologic Sequestration of Carbon Dioxide*, U.S. E.P.A., http://water.epa.gov/type/groundwater/uic/wells_sequestration.cfm (last visited July 10, 2014). The UIC program protects underground sources of drinking water from contamination, with the Class VI Permit specifically tailored to the possibility of contamination from gases such as CO₂. *Id.*

67. See Classification of Injection Wells, 40 C.F.R. § 146.5 (2011); Federal Requirements Under the Underground Injection Control (UIC) Program for Carbon Dioxide Geologic Sequestration Wells, Proposed Rule, 75 Fed. Reg. 77,230 (Dec. 10, 2010) (to be codified at 40 C.F.R. pts. 124, 144, 145, 146, and 147).

68. Monast, Pearson & Pratson, *supra* note 2, at 15.

69. See *id.* at 21.

sources, including new fossil fuel power plants.⁷⁰ The EPA first proposed these regulations in spring 2012 to require the use of CCS technology across all new power plant construction.⁷¹ After extensive comments, the EPA republished the proposed rule in September 2013, which would effectively require all new coal-fired power plants to capture and store between 30-50% of their carbon dioxide emissions through CCS technology.⁷² In a more extensive justification than the previous rule, the EPA argued that CCS is a demonstrated technology due to plants utilizing this technology coming online in Mississippi and Saskatchewan, Canada, in addition to projects in the works such as FutureGen.⁷³

These new proposed rules have lit a firestorm of controversy across the political and industrial spectrum.⁷⁴ Environmental groups welcome the new rules because of the further limitations on emissions of CO₂ into the air, as well as recognizing that the technology is so expensive that it will likely not be deployed and will force utilities to stop building new coal-fired power plants.⁷⁵ It is for this reason that the utility industry firmly opposes the new requirements, because they see it as effectively banning the construction of coal-fired plants since CCS technology is costly and has only been used in a few government-supported demonstration projects, not commercially available technology.⁷⁶ United States House Republicans have jumped on this, arguing that in fact CCS is not a demonstrated technology and that the agency cannot use taxpayer-supported projects as support for this rule under the CAA and the Energy Policy Act of 2005.⁷⁷

This battle is important not only for the building of new coal-fired power plants, but for existing plants as well. This is because under CAA Section 111(d), once an NSPS has been promulgated, the EPA then has the duty to promulgate similar performance standards for all *existing* coal power

70. 42 U.S.C. § 7411 (2012). A stationary source is “any building, structure, facility, or installation which emits or may emit any air pollutant,” and a “new source” is any stationary source that is either constructed or modified after the NSPS rules have been promulgated. *Id.*

71. Standards of Performance for Greenhouse Gas Emissions for Stationary Sources; Electricity Utility Generating Units (Proposal), 72 Fed. Reg. 22,392 (Apr. 13, 2012).

72. Jean Chemnick, *EPA's New Carbon Rule Sparks Battle over CCS, with Legal Challenges Likely*, E&E GREENWIRE (Sept. 20, 2013), <http://www.eenews.net/greenwire/2013/09/20/stories/1059987620>. Technically, the rules only provide more stringent CO₂ emission limits on new power plants that do not use CCS technology; however, the effect is to make it nearly impossible to attain those more stringent limits using coal. *Id.*

73. *Id.*

74. *Id.*

75. *Id.*

76. *Id.*

77. Manuel Quiñones, *Enviro Group Calls House GOP Claim on CCS 'Idiotic'*, E&E DAILY (Nov. 22, 2013), <http://www.eenews.net/eedaily/2013/11/22/stories/1059990903>. Environmental groups say that these claims are “idiotic,” and that the use of projects including tax-payer dollars in no way impacts the rule’s legality. *Id.*

plants, which is a far greater prize for environmental advocates.⁷⁸ In fact, President Obama's action plan to combat climate change pushes the EPA to finalize the NSPS rule in 2014 and to publish final performance standards for existing power plants by June 1, 2015.⁷⁹ However, EPA Administrator Gina McCarthy has stated that CCS technology is not appropriate for existing coal-fired facilities at this time.⁸⁰

It then comes as no surprise that utilities and allies are fighting to derail the NSPS rule, and environmental advocates are fighting just as hard to keep this regulatory framework in place to combat greenhouse gases and climate change for years to come through the use of CCS technology. It remains to be seen if CCS is a viable option, as seen by the challenges that both the FutureGen and Tenaska projects have encountered over their histories.

C. History and Regulation of the FutureGen Project

In mid-2005, the FutureGen Alliance was formed as a consortium of private companies to build the world's first zero-emissions coal-fired power plant.⁸¹ This coalition included many companies with connections to Illinois, such as Ameren Electric Power and Peabody Energy.⁸² By December 2005, the Alliance signed a cooperative agreement with the DOE to develop the project, including siting, technology selection, construction, and operation.⁸³ This cooperative agreement provided for \$1 billion from the federal government, with the corporate partners of the Alliance pledging an investment of more than \$250 million.⁸⁴

In early 2006, twelve proposals from seven states were submitted to the FutureGen Alliance, with criteria used to rank the remaining sites including the shape and size of the proposed site, its topography and geology, coal supply, transportation, and several other factors.⁸⁵ By July 2006, the Alliance

78. 42 U.S.C. § 7411(d) (2012).

79. See Erica Martinson, *Coal in President Obama's Climate Cross Hairs*, POLITICO (Sept. 19, 2013), http://www.politico.com/story/2013/09/coal-barack-obama-epa-greenhouse-gas-emissions-97104.html?hp=t2_3.

80. Jean Chemnick, *CCS not 'Appropriate' for Today's Plants -- EPA Chief*, E&E GREENWIRE (Sept. 23, 2013), <http://www.eenews.net/greenwire/2013/09/23/stories/1059987697>. Administrator McCarthy made clear that CCS is viable when designed with the facility, but it is not as viable when designed as an add-on feature to existing facilities. *Id.*

81. Press Release, FutureGen Alliance, FutureGen Industrial Alliance to Pioneer Development of First Near-Zero Emissions Electricity and Hydrogen Production Facility (Sept. 13, 2005), available at http://futuregenalliance.org/pdf/pr_9-13-05.pdf.

82. *Id.*

83. Press Release, FutureGen Alliance, FutureGen Industrial Alliance and U.S. Department of Energy Enter into Agreement to Develop First Zero-Emissions Coal-Fueled Power Plant (Dec. 6, 2005), available at http://www.futuregenalliance.org/pdf/pr_06-12-05.pdf.

84. *Id.*

85. Hughes, *supra* note 54, at 33.

had made two rounds of site cuts, leaving only four sites for consideration, including Mattoon and Tuscola in east-central Illinois, and Jewett and Odessa, Texas.⁸⁶ The evaluation then turned to the economics of the proposed projects, including comprehensive economic packages provided by state and local governments.⁸⁷

The cities of Mattoon and Tuscola created financial incentives to bring FutureGen to their towns.⁸⁸ In July 2007, the Illinois legislature passed the Clean Coal FutureGen for Illinois Act to provide both economic and legal incentives for the FutureGen Alliance to choose either Mattoon or Tuscola as the final site for the project.⁸⁹ This Act assigned the title of the sequestered CO₂ to the State of Illinois, plus all liabilities associated with the sequestered gas.⁹⁰ It also required the State to buy an insurance policy and indemnify the Alliance from any qualified losses in the event the loss was not covered by insurance.⁹¹ If the Alliance was sued for liability in tort, the Illinois Attorney General would represent the Alliance and the State would pay any court costs arising out of litigation.⁹² The Act also required the State to permit the facility and streamline the permitting process.⁹³ Finally, the Act recognized that the State of Illinois had offered various financial incentives to the Alliance.⁹⁴ These incentives were reported to include \$17 million in a cash grant, \$50 million in loans, tax exemptions, and reimbursement for training costs.⁹⁵

Due in part to the financial and legal incentives, the FutureGen Alliance announced on December 18, 2007, that Mattoon had been selected as the site for the project.⁹⁶ Just a month and a half later, DOE Secretary Samuel Bodman announced that the DOE was restructuring the FutureGen project by utilizing the technology at several different sites around the country, instead of the single site at Mattoon.⁹⁷ The DOE's rationale behind this change included a tripling of the construction price since the project was first announced, although that figure was widely criticized as the Alliance had pledged to take on a bigger share of the costs of the project.⁹⁸

86. *Id.*

87. *Id.*

88. *See id.* at 34.

89. Clean Coal FutureGen for Illinois Act, 20 ILL. COMP. STAT. 1107/05 (repealed 2011).

90. *Id.* § 1107/20.

91. *Id.* § 1107/25.

92. *Id.* § 1107/35.

93. *Id.* § 1107/40.

94. *Id.* § 1107/45.

95. Hughes, *supra* note 54, at 34.

96. *Id.*

97. *Id.*

98. *Id.*

During debates on the stimulus bill under the new Obama administration, the DOE specifically requested a \$1 billion earmark for the project, now projected to cost \$2 billion total.⁹⁹ Once the stimulus bill passed, hopes in Mattoon rose dramatically; however, on August 5, 2010, U.S. Senator Dick Durbin announced that the project had again been reconfigured from the initial proposal, now called FutureGen 2.0.¹⁰⁰ Instead of housing a pre-combustion coal gasification facility, Mattoon would only be the sequestration and training facility for the project, with the energy coming from a retrofitted coal power plant in Meredosia, Illinois, utilizing oxy-combustion technology instead.¹⁰¹ The CO₂ would then be piped 175 miles to the Mattoon site, dropping the cost down to \$1.2 billion.¹⁰² In the initial project, there was some trepidation about the risks of a greenhouse gas, such as CO₂, being sequestered in Mattoon; at the time, however, the prospect of a thousand new jobs for the Mattoon area and a huge economic boost won out.¹⁰³ Those prospects changed once FutureGen 2.0 was proposed, and Mattoon soon bowed out of the project, requiring another competition to determine the new sequestration site.¹⁰⁴ Out of several competitors, including Tuscola and Taylorville, the area around Meredosia was chosen as the best sequestration site.¹⁰⁵

The Illinois legislature passed the Clean Coal FutureGen for Illinois Act of 2011 to replace the sunsetted prior legislation by opening up the scope of the law to the plant in Meredosia, in addition to the Carbon Dioxide Transportation and Sequestration Act requiring that the Illinois Commerce Commission (ICC) approve siting of pipelines to transport compressed CO₂ prior to construction.¹⁰⁶ In December 2011, the ICC approved a procurement plan including a sourcing agreement for the FutureGen 2.0 project.¹⁰⁷ This plan required Illinois utility companies to buy the electricity from the FutureGen 2.0 plant, even though it was not expected to come online until 2017.¹⁰⁸ On February 5, 2013, the DOE announced it would begin Phase II of the project to go through permitting, environmental review, and

99. Herb Meeker, *FutureGen Goes West*, JOURNAL GAZETTE & TIMES COURIER, Aug. 5, 2010, http://jg-tc.com/news/article_4ad04eb0-a0c8-11df-b3c1-001cc4c03286.html.

100. *Id.*

101. *Id.*

102. *Id.*

103. *See id.*

104. *See* Press Release, FutureGen Alliance, FutureGen Alliance Selects Morgan County, Ill. as the Site for the FutureGen 2.0 Carbon Storage Facility (Feb. 28, 2011), *available at* http://www.futuregenalliance.org/pdf/pr_02_28_11.pdf.

105. *Id.*

106. 20 ILL. COMP. STAT. 1108/5 (2012); 220 ILL. COMP. STAT. 75/1 (2012).

107. *Electricity Procurement Process for Plan Years Beginning June 2013*, ILL. COMMERCE COMM'N [hereinafter *ICC Procurement Plan*], <http://www.icc.illinois.gov/electricity/procurementprocess2013.aspx> (last visited July 10, 2014).

108. *Id.*

preconstruction activities.¹⁰⁹ Just a few weeks later, Illinois-based utility company Commonwealth Edison filed a notice of appeal with the Illinois Appellate Court First District, challenging the procurement plan's requirement that the company buy the power from the FutureGen 2.0 plant.¹¹⁰ Additionally, the Sierra Club filed a lawsuit to enjoin the EPA from issuing an air emission permit to the FutureGen project, although this lawsuit has since been dismissed.¹¹¹ The organization argued that such a permit would allow for all of FutureGen's CO₂ to be emitted into the air eventually; if the goal of the project is to sequester CO₂ underground, then the air permits should reflect that no air emissions are allowed.¹¹²

On January 15, 2014, the DOE quietly approved the Record of Decision for federal action for the FutureGen project, clearing the way to formally approve the \$1 billion allocation from the stimulus bill.¹¹³ This decision would allow for a demonstration project of oxy-combustion CCS technology at the FutureGen site in Meredosia to run from the completion of construction in 2017, through 2022.¹¹⁴

D. History and Regulation of the Tenaska Taylorville Energy Center Project

As CCS became more prevalent over the mid-2000's, several companies began to specialize in the technology required to build these types of power plants. One such company was Tenaska, Inc., based out of Nebraska, which decided to pursue an IGCC pre-combustion plant utilizing CCS technology in Taylorville, Illinois.¹¹⁵ Named the Taylorville Energy Center (TEC), this first-of-its-kind plant would utilize coal as its feedstock,

109. Ari Natter, *Energy Department Moving Forward with FutureGen Carbon Capture Project*, 44 ENV'T REP. (BNA) 345 (Feb. 8, 2013).

110. Steve Daniels, *ComEd, Power Suppliers Vying to Halt FutureGen Financing Plan*, CRAIN'S CHI. BUS., Feb. 28, 2013, <http://www.chicagobusiness.com/article/20130228/NEWS11/130229763/comed-power-suppliers-vying-to-halt-futuregen-financing-plan>; see also *Petition for Review*, ILL. COMMERCE COMM'N, <http://www.icc.illinois.gov/docket/files.aspx?no=12-0544&docId=196456> (last visited July 10, 2014).

111. See Kurt Erickson, *FutureGen Coal Plant Faces Another Hurdle With Lawsuit*, HERALD & REVIEW, Dec. 14, 2013, http://herald-review.com/news/state-and-regional/futuregen-coal-plant-faces-another-hurdle-with-lawsuit/article_7792dcf0-c4e5-5c44-9e9e-c4c8cf1262c4.html.

112. *Id.*

113. Manuel Quiñones, *DOE Approves \$1B for FutureGen 2.0*, E&E NEWS PM (Jan. 16, 2014), <http://www.eenews.net/eenewspm/2014/01/16/stories/1059993082>.

114. Record of Decision and Floodplain Statement of Findings for the FutureGen 2.0 Project, 79 Fed. Reg. 3577 (Jan. 22, 2014), available at <http://energy.gov/sites/prod/files/2014/01/f6/EIS-0460-ROD-FRversion-2014.pdf>.

115. Mike Riopell, *Taylorville Coal Plant Developers Impatient for Legislative Approval*, HERALD & REVIEW, Nov. 28, 2007, http://herald-review.com/business/local/taylorville-coal-plant-developers-impatient-for-legislative-approval/article_8b122ef6-d5f4-5232-9c20-b57f0ddfc7eb.html.

and capture over fifty percent of its CO₂ emissions.¹¹⁶ At a cost of \$2.5 billion, it would create 630 megawatts of electricity, which would be sold on the open market alongside electricity from other plants.¹¹⁷ However, in order to make the financing attractive to investors and ensure there was a stable market for this electricity, Tenaska decided it needed a change in Illinois law and regulations in order to obtain long-term contracts.¹¹⁸

By late 2007, Tenaska's lobbying effort had stalled in the legislature due to concerns from state leaders about the cost of the plant for electric consumers and its viability as a project.¹¹⁹ After threatening to take the project out of the state, Tenaska entered into negotiations with the Illinois Attorney General and Speaker of the House to allow initial planning for the project to move forward with basic guidelines for the financing of the project delineated in statute.¹²⁰ The result of this effort was the Clean Coal Portfolio Standard Law, passed in late 2008 and signed into law on January 12, 2009.¹²¹

As its premise, the legislature found that Illinois law should "encourage the use of advanced clean coal technologies that capture and sequester carbon dioxide emissions . . . to demonstrate the viability of coal . . . in a carbon constrained economy."¹²² To allow such projects to move forward, the law changed the purchasing requirements within the Illinois Power Agency Act to require Illinois utilities, such as Commonwealth Edison and Ameren, Inc., to purchase up to five percent of their power generated at CCS plants by 2015.¹²³ In order to ensure that electricity rates would not increase dramatically for most residential and small-business consumers, the law established a cap of 2.015% on utility rate increases, but these caps did not apply to larger companies or governmental units.¹²⁴

Most importantly, the law set out the selection process for the "initial clean coal facility" that would be able to take advantage of the utility source agreements in the legislation.¹²⁵ Prior to commencing operations, this facility must have a capacity of at least 500 megawatts and an air emissions permit complying with the law.¹²⁶ However, any sourcing agreement must be

116. *Id.*

117. *Id.*

118. *Id.*

119. *Id.*

120. *See id.*

121. Clean Coal Portfolio Standard Law, Pub. Act No. 95-1027 (codified at 20 ILL. COMP. STAT. 3855/1-5, -10, -75 (2012)).

122. 20 ILL. COMP. STAT. 3855/1-5 (2012).

123. *Id.* § 3855/1-75(d)(1).

124. *See id.* § 3855/1-75(d)(2).

125. *Id.* § 3855/1-75(d)(3).

126. *Id.*

approved by the Illinois General Assembly and the ICC.¹²⁷ The law required Tenaska to submit a facility cost report to the legislature and the ICC for the design, operations, and maintenance costs for the facility, as well as its proposed financing plan for these costs.¹²⁸ It also required the ICC to analyze the report and submit its analysis to the legislature before final approval of the sourcing agreement.¹²⁹ Signed at the same time was an amendment to the coal bond fund authorization statute, including an additional \$18 million in state funds for the TEC facility cost reports.¹³⁰

After the passage of this law, Tenaska sought government financial support in addition to the utility rate hikes in the law.¹³¹ After the passage of the stimulus bill in 2009, Tenaska applied for and was awarded a \$2.6 billion loan guarantee from the DOE for the project, along with an additional \$417 million in government tax credits for the facility.¹³² However, by that time, the cost estimate for the facility had increased to \$3.5 billion.¹³³ Additionally, large electric consumers, led by Commonwealth Edison's parent company, Exelon, began to grow wary of the potential impact of rate increases from the requirement to buy power from the plant with no rate caps.¹³⁴ These companies formed a coalition called Stop Tenaska's Overpriced Power (STOP Coalition) to lobby against the plant before the ICC and Illinois General Assembly.¹³⁵

The ICC held hearings on the TEC in summer 2010 and issued its facility cost report critical of the costs and feasibility of the project on September 1, 2010.¹³⁶ Specifically, it found that the costs associated with the electricity generated by the TEC, estimated to be \$212.73 per megawatt/hour, would be substantially higher than other renewable electric generation.¹³⁷ Additionally, it found that the rate for residential and small business customers would likely meet the full 2.015% rate cap, requiring additional financing from large electric consumers.¹³⁸ Finally, it cast doubt on the ability of the TEC facility to be commercially operable by Tenaska's goal of

127. *Id.*

128. *Id.* § 3855/1-75(d)(4).

129. *Id.*

130. See Act of Jan. 12, 2009, Pub. Act 95-1026 (codified at 30 ILL. COMP. STAT. 330/7 (2012)).

131. *Clean Coal Project Gains Government Support*, REUTERS (July 11, 2009), <http://www.reuters.com/article/2009/07/11/us-coal-illinois-tenaska-idUSTRE56A15820090711>.

132. *Id.*

133. *Id.*

134. STOP COALITION, <http://www.stopcoalition.com> (last visited July 10, 2014).

135. *Id.*

136. See *Tenaska Clean Coal Facility Analysis*, ILL. COMMERCE COMM'N, <http://www.icc.illinois.gov/electricity/tenaska.aspx> (last visited July 10, 2014).

137. ILL. COMMERCE COMM'N, ANALYSIS OF THE TAYLORVILLE ENERGY CENTER FACILITY COST REPORT 2 (2010) [hereinafter ICC TEC REPORT], available at <http://www.icc.illinois.gov/downloads/public/1%20TEC%20Report.pdf>.

138. *Id.*

2016 due to missing details in Tenaska's report and the likelihood of delays in action by the legislature.¹³⁹

Against this backdrop, during the Illinois General Assembly's Fall 2010 Veto Session, Tenaska attempted to push through final legislative approval for the project and sourcing agreement to allow operation by 2016.¹⁴⁰ After initial hesitation, the Illinois House of Representatives approved the legislation after it was linked with another clean electric plant to be built in Chicago.¹⁴¹ However, a last-minute vote in the Illinois Senate failed to garner a majority,¹⁴² and several further attempts to pass the legislation proved unsuccessful.

In the meantime, Tenaska applied to the EPA for two Class VI injection well permits on its Taylorville site to sequester at least fifty percent of CO₂ emissions from the project.¹⁴³ This permit would have allowed injection at least 5000 feet below ground surface into the Mt. Simon sandstone and would inject about sixty-three million metric tons of CO₂ into the ground over a period of thirty years.¹⁴⁴ The permit is still under review for completeness by the EPA,¹⁴⁵ even though development of the project has been halted. In a bid to revive the project and address the objections of the STOP Coalition, Tenaska suddenly reversed course and announced that the project would utilize natural gas instead of Illinois coal, meaning that CCS would no longer be utilized.¹⁴⁶ This reversal was ill-conceived, as many downstate legislators pulled support for the project because it would no longer benefit the southern Illinois coal industry, and the STOP Coalition did not cease its opposition to the project.¹⁴⁷

Prior to this change, the Illinois Environmental Protection Agency (IEPA) issued an air pollution permit to Tenaska for the TEC project, but did not require carbon sequestration as a basis for limiting the plant's

139. *Id.*

140. Tom Kacich, *House Revives Coal-Gas Plant Plans*, CHAMPAIGN NEWS-GAZETTE, Dec. 1, 2010, <http://www.news-gazette.com/news/environment/2010-12-01/house-revives-coal-gas-plant-plans.html>.

141. *Id.*

142. John Lippert, *Illinois Senate Rejects Clean-Coal Plant Support*, BLOOMBERG (Jan. 6, 2011), <http://bloomberg.com/news/2011-01-06/illinois-senate-rejects-clean-coal-plant-support-update1-.html>.

143. *Taylorville Energy Center*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/r5water/uic/tec/> (last visited July 10, 2014).

144. *Id.*

145. *Id.*

146. Kurt Erickson, *Power Plant Project Stripped of Coal*, THE SOUTHERN, May 10, 2012, http://thesouthern.com/news/local/state-and-regional/power-plant-project-stripped-of-coal/article_8be44754-9a53-11e1-a630-001a4bcf887a.html.

147. *Id.*

emissions.¹⁴⁸ In response, the EPA sent an unprecedented letter to the IEPA in July 2012, urging it to consider a different type of permit and encouraging it to work with the federal government to avoid undermining “federal efforts to promote clean coal technology.”¹⁴⁹ Subsequently, the IEPA rescinded the air permit, citing the uncertainty of the project and the need to reconsider the project’s scope with the stakeholders, such as the EPA.¹⁵⁰

Additionally, under the Clean Coal Portfolio Standard Law, the ICC approved the initial electricity sourcing agreements to force Illinois utilities to buy power from the TEC facility, which was tied in with the FutureGen agreements that are now being challenged in court.¹⁵¹ Taylorville legislators continued to support the project, and introduced legislation in the 2013 legislative session to allow for the project to move forward.¹⁵² However, after that legislation failed, Tenaska announced in June 2013 that it was halting project development due to economic difficulties and a lack of support from Illinois public officials.¹⁵³

III. ANALYSIS

As seen with both the FutureGen and Tenaska projects, the major hurdle that CCS projects must overcome is financing. The projects in Illinois present two different ways to pay for CCS technology: government investment and utility rate hikes for consumers. However, regulation of these projects is also an issue, as there is a continuing dichotomy between state and federal regulation, especially when the opinions on these projects vary between the regulatory entities.

A. The Challenge of Financing CCS Projects

Regardless of the financing method, these projects are often prohibitively expensive, costing billions of dollars.¹⁵⁴ As seen in both

148. Patrick Yeagle, *IEPA Withdraws Tenaska Taylorville Permit*, ILL. TIMES, July 19, 2012, <http://www.illinoistimes.com/Springfield/article-10278-iepa-withdraws-tenaska-taylorville-permit.html>.

149. *Id.* Under the Federal Clean Air Act, the states have primary authority for issuing air pollution permits under a State Implementation Plan. See 42 U.S.C. § 7401(a)(3) (2012) (“[A]ir pollution control at its source is the primary responsibility of the States and local governments.”).

150. Yeagle, *supra* note 148.

151. See *ICC Procurement Plan*, *supra* note 107, at 57.

152. *Taylorville Energy Center Not Dead Yet*, TAYLORVILLE DAILY NEWS (Jan. 25, 2013), <http://www.taylorvilledailynews.com/news/details.cfm?clientid=21&id=63021#.UVd1OZNlmuB>.

153. *Tenaska Backs out of Taylorville Energy Plant Project*, HERALD & REVIEW, June 21, 2013, http://herald-review.com/news/local/tenaska-backs-out-of-taylorville-energy-plant-project/article_d296de6c-dad7-11e2-8aaa-001a4bcf887a.html.

154. See discussion *supra* Parts II.C, II.D.

FutureGen and Tenaska, the government has a large role in helping to finance CCS projects, whether through outright financing or regulatory approval for utility-rate financing.¹⁵⁵ This investment is made even more uncertain because it utilizes a new, yet unproven, technology for commercial use. However, for economies dominated by coal mining, such as those in southern Illinois, this investment may become essential to ensuring the future of the industry, while protecting the environment from greenhouse gases.¹⁵⁶ Therefore, the government and sectors of private industry have an incentive to invest in CCS technology.

1. Government Financing of CCS Projects

Here, the government has the larger stake to invest in CCS technology. With \$1 billion in contributions to the state's economy and thousands of jobs in central and southern Illinois, it is in the state's interest to invest in this technology. After all, the southern Illinois region consistently has one of the highest unemployment rates in the state.¹⁵⁷ If coal-fired plants were taken offline and the demand for Illinois coal was thereby reduced, the resulting job losses in coal mining could be devastating to the region. However, CCS technology may be the coal industry's best hope to revolutionize the use of coal in electric generation while reducing the emissions of CO₂ and other greenhouse gases into the atmosphere from its use.¹⁵⁸ Therefore, the promotion of coal for the local economy presents the greatest incentive for state government to invest in CCS technology.

Additionally, with premier research institutions already studying the use of coal and other fossil fuels in a cleaner way, including the partnership between the University of Illinois at Urbana-Champaign and the Illinois State Geological Society¹⁵⁹ and Southern Illinois University's Coal Research Center,¹⁶⁰ Illinois is in a prime position to not only utilize CCS technology in pilot projects such as FutureGen but to be a leader in research on improving its application. After all, the federal government has already funded such educational and research activities in Illinois through the stimulus bill.¹⁶¹ With such new technology, research into its applications and

155. *Id.*

156. See discussion *supra* Part I.

157. See *The History of Southern Illinois*, EGYPTIAN AREA AGENCY ON AGING, <http://www.egyptianaaa.org/SI-History.html> (last visited July 10, 2014); see also ILL. DEP'T. OF EMP'T. SEC., LOCAL AREA UNEMPLOYMENT STATISTICS BY ECONOMIC DEVELOPMENT REGION (2012), available at <http://www.ides.illinois.gov/Custom/Library/Statistic/LAUS/AAD/EDR2012.PDF>.

158. See DOE CCS ROADMAP, *supra* note 13, at 5.

159. *Why Study Coal in Illinois?*, *supra* note 5.

160. *Coal Research Center*, S. ILL. UNIV., <http://www.crc.siu.edu/> (last visited July 10, 2014).

161. See discussion *supra* Part II.B.

improvements to its efficiency are critical to continuing its usage in commercial settings. Investment in this research could provide Illinois with a pipeline of knowledge critical to green technologies in the future.

Another incentive for government financing of these projects is the ability to better regulate and control them, especially with known greenhouse gases being injected into the ground. While the best available science indicates that the injection and storage of large amounts of CO₂ underground is safe, there is no way to know of its long-term effects, as it has never been done before.¹⁶² Therefore, government regulation, such as the EPA's Class VI Injection Well permit program, is key to not only ensuring public health and safety but also encouraging the public to embrace these investments.¹⁶³ Direct funding from government agencies may help to facilitate these regulations by giving the government a larger bargaining chip with the industry to implement safety and monitoring programs for CCS plants and sequestration sites.

However, all of the government investment benefits must be balanced against several negative impacts of leaving financing to the political process. First, and most important, is the increasing need for the Illinois and federal governments to cut investments and budgets for programs that have not shown a direct and important benefit to the population as a whole. This conflict is extremely pronounced in Illinois, as over half of the state's population is located in the metropolitan Chicago area, where there are no usable coal reserves that would directly benefit from the usage of new technologies.¹⁶⁴ As an example, at the same time that Tenaska was being debated in the Illinois General Assembly in 2010, a different clean energy project was proposed in the Chicago area called Leucadia, which would have produced and used synthetic natural gas as its energy source.¹⁶⁵ Some lawmakers and companies saw these projects as direct competitors for state and consumer resources, and regional splits developed, especially in the hiring of minority workers at Tenaska's proposed facility.¹⁶⁶ In fact, the TEC legislation passed the Illinois House of Representatives only because the bill's sponsor tied downstate legislators' support for Leucadia to Chicago area legislators' support for Tenaska.¹⁶⁷

162. Flatt, *supra* note 43, at 220-21.

163. *See id.* at 219-20.

164. *See Illinois*, STATEMASTER, <http://www.statemaster.com/state/IL-illinois> (last visited July 10, 2014).

165. Julie Wernau, *Gasification Projects Light Up Lobbying Efforts*, CHI. TRIB., Jan. 30, 2011, http://articles.chicagotribune.com/2011-01-30/business/ct-biz-0130-lobbying-gasification-20110130_1_heating-bills-gasification-projects-natural-gas.

166. *Id.*

167. *Id.*

This example perfectly illustrates that direct government investment in CCS technology opens it up to the direct political process, which hinders the industry. At a time when companies want to begin these projects as soon as possible to realize their full impacts as first-of-their-kind and state-of-the-art facilities, government process has slowed the projects to a crawl. While these projects are delayed, their costs continue to rise due to inflation and the speed of other technological advances. Tenaska first expressed frustration with the pace of project approval from the Illinois government seven years ago, even without significant direct funding support from the State.¹⁶⁸ During this time, the cost rose by \$1 billion.¹⁶⁹ After fits and starts, FutureGen recently completed the same planning stage that was in progress at the end of 2008, largely due to concerns over the cost to taxpayers. As with Tenaska, the FutureGen project's construction cost over its history has also risen by roughly \$1 billion.¹⁷⁰ These government delays and cost increases create a constant cyclical paradox, significantly hindering the ability to move forward with CCS projects in Illinois.

This paradox is further complicated by the expiration of the stimulus bill funding on December 31, 2015.¹⁷¹ As described *supra*, billions of dollars were invested in CCS technology through the 2009 stimulus bill, representing a significant federal government interest in moving forward with and researching the technology.¹⁷² If projects such as FutureGen have not made significant progress by the funding's expiration, Congress will be reluctant to continue such significant funding for projects that have not come to fruition in those six years. In fact, the Congressional Research Service has recently cast doubt on whether FutureGen will continue to be a viable commercial CCS demonstration project, due to its significant delays and cost increases.¹⁷³

Further, due to its environmental costs and difficulty of extraction, coal is continuing to lose ground to natural gas as the dominant energy source in the United States.¹⁷⁴ Indeed, the country is in the midst of a natural gas revolution in its ability to produce natural gas cheaply and efficiently.¹⁷⁵ Therefore, both government and industry may see coal as an industry that can

168. Riopell, *supra* note 115.

169. *Id.*

170. Meeker, *supra* note 99.

171. See PETER FOLGER, CONG. RESEARCH SERV., CRS 7-5700, FUTUREGEN: A BRIEF HISTORY AND ISSUES FOR CONGRESS 5 (2013), available at <http://www.fas.org/sgp/crs/misc/R43028.pdf>.

172. See *supra* notes 61-63 and accompanying text.

173. FOLGER, *supra* note 171, at 7-8.

174. See Press Release, American Petroleum Institute, Karen Moreau Remarks at Press Briefing Teleconference on America as Global Energy Leader (Feb. 4, 2013), available at <http://www.api.org/news-and-media/testimony-speeches/2013/karen-moreau-remarks-press-briefing-teleconference-america-global-energy-leader>.

175. *Id.*

afford to be put on the back burner, while choosing to invest in this new natural gas boom instead. In fact, even Leucadia and similar projects are on hold due to the low cost and high supply of natural gas.¹⁷⁶ However, that approach is short-sighted due to the cyclical nature of the long-term energy market,¹⁷⁷ and does nothing to deal with the environmental costs of using fossil fuels.

2. *Private Investment in CCS Projects*

On the other hand, both Tenaska and FutureGen have garnered a significant amount of private investment as well.¹⁷⁸ With the expense of these projects reaching several billion dollars, it is unlikely that tax money can be the sole investment allowing CCS projects to move forward. The debate over private investment centers on the marketplace and who should invest in these projects.

The benefits of private investment are obvious, in that private enterprises will likely be the ones having the most expertise and capital to invest in research and technology associated with CCS. If left to the marketplace, the industry's job turns to convincing investors that CCS technology is worth the capital outlay in the long-run, which creates a greater incentive for making these projects work financially. Additionally, the coal industry has a vested interest in seeing new technologies that use coal more cleanly become commercially feasible,¹⁷⁹ so there is already natural base for private investment.

There may also be a benefit to the financing model of Tenaska, requiring the purchase of electricity from the plant by electric transmission companies. This model will almost certainly raise utility rates, although that percentage increase is capped pursuant to statute.¹⁸⁰ However, if the electricity from CCS projects would counter any decreases in supply from the shut-down of conventional coal-fired plants in the future, these increases will not be as impactful as initially thought.¹⁸¹ Additionally, the way that

176. Julie Wernau, *Gasification Plants in Illinois Dead or on Life Support*, CHI. TRIB., May 25, 2012, http://articles.chicagotribune.com/2012-05-25/business/ct-biz-0525-coal-plants--20120525_1_million-british-thermal-units-natural-gas-gasification.

177. See Erickson, *supra* note 146 (stating that the price of natural gas will not always be low, so research into other energy sources is better for a long-term energy strategy). Some in the coal industry believed that Tenaska's switch from coal to natural gas was not necessarily a bad thing, as the plant could later be retrofitted to utilize coal once the natural gas boom subsides. *Id.*

178. See discussion *supra* Parts II.C, II.D.

179. See DOE CCS ROADMAP, *supra* note 13, at 5.

180. See *supra* note 124 and accompanying text.

181. Julie Wernau, *Exelon Fights Proposed Coal-to-Gas Plant*, CHI. TRIB., Mar. 16, 2012, http://articles.chicagotribune.com/2012-03-16/business/ct-biz-0315-tenaska-20120316_1_tenaska-proposal-exelon-coal-to-gas-plant.

Tenaska was set up with long-term purchasing contracts allows for added long-term stability.¹⁸² Such mandated contracts ensure a stable market for the electricity produced by these facilities regardless of cost. In turn, this stability provides potential private investors in CCS technology with confidence they may not otherwise have had that the investment will pay off.

This potential stability is illustrated by the progress made by other CCS projects around the country. After regulatory approval for the Texas Clean Energy Project at one of the former potential FutureGen sites, several private companies signed on as investors for the pre-combustion project.¹⁸³ This included a Minnesota company agreeing to a contract for the plant's other byproduct, urea, and a Chinese company agreeing to be the sole financing lender for the project.¹⁸⁴ Additionally, the Kemper County, Mississippi, pre-combustion plant developer received regulatory approval for a fifteen percent utility rate hike after construction for its plant began, and the company recently announced it was eschewing a federal energy loan because it can borrow from private lenders at lower interest rates.¹⁸⁵ While the languishing FutureGen plant has seen private support dwindle,¹⁸⁶ it appears that investors are eager to support projects that are moving forward.

On the other hand, other parts of the energy industry see the possible danger for coal as a viable energy source and would benefit from the decline of coal as a major energy source in the United States.¹⁸⁷ In fact, private companies investing in natural gas, such as Exelon, are seeing large benefits and decreased competition from increased EPA regulations on coal-fired plants.¹⁸⁸ While these companies argue that natural gas is cheaper than coal and significantly less expensive than the power from these CCS pilot projects, that argument only tells half the story.¹⁸⁹ Due to the way Illinois auctions electricity in its procurement process, Exelon could stand to lose more than \$107 million each year from consumers in the form of capacity

182. *Id.*

183. Press Release, Texas Clean Energy Project, Summit Power Group Celebrates Major Milestones in Financing and Construction of the Texas Clean Energy Project—Generating Jobs and Energy (Sept. 12, 2012), <http://www.texascleanenergyproject.com/2012/summit-power-group-celebrates-major-milestones-in-financing-and-construction-of-the-texas-clean-energy-project-generating-jobs-and-energy>.

184. *Id.*

185. Tamar Hallerman, *Regulators Approve Rate Increase for Kemper County Plant*, GHG MONITOR (Mar. 8, 2013), <http://ghgnews.com/index.cfm/regulators-approve-rate-increase-for-kemper-county-plant>.

186. Jim Snyder & Julie Johnsson, *Exelon Falls From Green Favor as Chief Fights Wind Aid*, BLOOMBERG (Apr. 1, 2013), <http://www.bloomberg.com/news/2013-04-01/exelon-falls-from-green-favor-as-chief-fights-wind-aid.html>.

187. Lippert, *supra* note 142.

188. *Id.*

189. Wernau, *supra* note 165.

charges based on the price of electricity.¹⁹⁰ Even if the electricity from Tenaska and FutureGen is more expensive than natural gas sources, it is still less expensive than some other energy forms, such as nuclear energy.¹⁹¹ The competition with these sources could push out these other forms of energy in the auction and drop the overall price of energy, therefore significantly dropping the amount of these capacity charges.¹⁹² This potential drop gives natural gas companies like Exelon a huge incentive to fight to keep CCS projects out of the Illinois market. Exelon was very successful in this regard with its lobbying effort against Tenaska and lawsuit against the ICC requiring the purchase of power from the eventual FutureGen plant.

Exelon's story illustrates a larger problem with private financing for CCS projects. Exelon was once seen by environmentalists as a champion for green energy, when it signed on as a supporter for the original FutureGen project.¹⁹³ However, as the energy market has changed over the past decade to favor natural gas, along with changes in corporate management, company strategy has changed to oppose FutureGen and other clean energy projects.¹⁹⁴ As these projects become more protracted and expensive, corporate support appears to have dwindled, making the task of luring further investment that much harder.

While there is a possibility that utility prices overall may eventually drop due to CCS electricity competing against more expensive energy, this drop will not happen in the short term. In fact, the ICC estimated that residential and small-business utility rates would almost have certainly increased to the full rate allowed by statute had the TEC been built.¹⁹⁵ Utility rate hikes are seen as anathema by the Illinois public and many lawmakers,¹⁹⁶ so legislation which increases short-term utility rates for unproven technologies may be unpopular. Finally, at a time of local government austerity and economic uncertainty for larger corporations, an increase in electric prices for uncapped users may slow hiring and investment in other areas of the Illinois economy.¹⁹⁷

190. *Id.*

191. *Id.*

192. *Id.*

193. See Snyder & Johnsson, *supra* note 186.

194. *Id.*

195. ICC TEC REPORT, *supra* note 137, at 2.

196. See Scott Fitzgerald, *CUB, AARP Oppose Utilities Increase; Says Companies Trying to 'Leapfrog' ICC*, THE SOUTHERN, Mar. 28, 2013, http://thesouthern.com/news/local/cub-aarp-oppose-utilities-increase-says-companies-trying-to-leapfrog/article_81ef9bdc-975e-11e2-b8db-001a4bcf887a.html (stating that utility companies have "unleashed the attack of the utility rate hikes on Illinois consumers").

197. *Take Action*, STOP COALITION, <http://www.stopcoalition.com/take-action> (last visited July 10, 2014).

B. The Challenge of Regulating CCS Projects

The regulatory status of CCS in the United States is at best ill-defined, with a mix of federal and state regulation.¹⁹⁸ While the federal government regulates and permits the injection and storage of CO₂ underground as a Class VI Injection Permit under the SDWA, the rest of the process, such as the carbon capture technology, compression, and transportation, as well as emissions limits from these plants, are controlled largely by the states.¹⁹⁹ This situation has led to confusion for companies attempting to develop CCS projects, conflict between federal and state regulators, and inefficiency and uncertainty as to how these projects are permitted.

The recent battle between the IEPA and the EPA over the permitting for Tenaska highlights this federal-state conflict.²⁰⁰ The Obama administration has seen CCS technology fit nicely with its “all of the above” energy strategy to reduce carbon emissions throughout the country and has understandably already made several commitments and investments to the original Tenaska project’s utilization of coal and CCS technology.²⁰¹ However, focusing on Tenaska’s single project permit application, the IEPA expressed concerns about the feasibility of successful sequestration of CO₂, especially after Tenaska unilaterally pulled coal from the project.²⁰² In the IEPA’s eyes, the project as submitted would not have required sequestration of CO₂ to comply with Clean Air Act limits, and it therefore did not grant Tenaska a CCS permit.²⁰³ However, after pressure from the EPA, the IEPA withdrew the air permit, and Tenaska would have had to apply for a new one if it had wanted to continue to seek approval for the TEC project.²⁰⁴ This exchange between the federal and state permitting agencies illustrates the problems of the current regulatory approach for CCS technology, pitting the states against federal government priorities.

Another issue in permitting deals with the complex nature of these projects, which requires the expertise and approval of several different agencies. For example, Tenaska required approval for air emissions limits by the IEPA, but also required regulatory approval for its financing mechanism and CO₂ pipeline siting by ICC utility regulators.²⁰⁵ In addition, the Illinois Power Agency also has the authority to get involved if it wishes,

198. See discussion *supra* Part II.B.

199. See discussion *supra* Part II.B.

200. See *supra* notes 148-50 and accompanying text.

201. See Lippert, *supra* note 142.

202. Yeagle, *supra* note 148.

203. *Id.*

204. *Id.*

205. See 20 ILL. COMP. STAT. 3855/1-75(d)(3) (2012).

all of which is a separate requirement from receiving approval for the financing through the full legislative process.²⁰⁶

By structuring the approval process in such a decentralized way, the Illinois General Assembly and the proponents of FutureGen and Tenaska have pushed for permitting approval before other pieces of the project have been given the green-light, and it appears that at least some of these approvals are not contingent on the others. As it stands, Tenaska originally received its air emission permit, but never received regulatory authority to finance the project necessary to build the plant. This scenario presents a burden on agencies because huge amounts of agency resources may be expended to study and issue regulatory approval for a piece of the project, only for the project to get hung up in a different part of the regulatory process. It is entirely possible that after almost a decade of planning, permitting, and approvals at various levels of government, projects like Tenaska and FutureGen will never come close to fruition due to the complexities that these projects present to the current regulatory process.

IV. RECOMMENDATIONS FOR ILLINOIS CCS PROJECTS

CCS technology should be encouraged, and investments in its development should be heightened, while at the same time streamlining its regulation. Direct government funding appears to be key in financing CCS projects, as this technology is so new and commercially impractical at this time. The federal government is in a position to make this direct investment, and it has done so through the 2009 stimulus bill. However, the funding for these projects beyond 2015 is uncertain at best, because the DOE does not have permanent programs in place by law extending beyond FY 2013, which ended on September 30, 2013.²⁰⁷ Therefore, the best way to stabilize investment and application for CCS technology is to extend funding guarantees for CCS projects beyond the expiration of the stimulus bill, although the exact appropriations amounts may change.

Additionally, government should encourage more private investment by continuing to utilize property tax incentives and eliminating taxes on sales of carbon and other byproducts from the facilities. While it may be painful to raise utility rates in an already slow economy, it is likely inevitable that utility rates will rise to accommodate for the electricity from CCS plants.²⁰⁸ However, putting hard caps on all consumers, rather than just residential users, may limit the impact and reduce the likelihood of unplanned utility

206. *See id.*

207. 42 U.S.C. § 17251 (2012) (“There is authorized to be appropriated to the Secretary to carry out this section \$200,000,000 per year for fiscal years 2009 through 2013.”).

208. *See supra* note 124 and accompanying text.

increases. This result could be accomplished by raising the residential rate cap in the Clean Coal Portfolio Standard Law by a small percentage.²⁰⁹ If these capped utility rate increases combined with government funding, other incentives, and likely private investment do not cover the cost of the project, the project should be reconfigured to manage its costs.

Additional private financing has followed regulatory approval for several projects,²¹⁰ so streamlining the regulatory process is key to the financial success of Illinois CCS projects. In regulating CCS technology, there must be more cooperation between the federal and state governments on the policy objectives of the project being implemented. After all, each government entity involved in the regulatory process may ultimately derail a project within its own sphere of influence.²¹¹ However, although there is precedent for federal pre-emption of siting and regulation for similar types of energy regulatory schemes in the Energy Policy Act of 2005,²¹² complete federal pre-emption of CCS regulation may rest on unstable federalism grounds and is likely not a good policy choice due to the local nature of the concerns associated with the technology.

Instead, Congress should pass legislation setting up a legal framework for CCS project approvals, clearly delineating the boundaries between federal and state jurisdiction. In order to ensure that inter-agency battles, such as the IEPA and EPA disagreement over Tenaska, do not happen, there should be a clearly established process put in place to ensure cooperation between the agencies. This legislation should allow the EPA to take the lead in permitting these sequestration projects and then coordinate with state environmental agencies on issues of more local impact, such as siting and air pollutant permits with specific permits for sequestration.

Additionally, Illinois legislation is needed to streamline the approval process for CCS projects. The Illinois General Assembly easily passed legislation requiring companies to buy electricity from the FutureGen plant and requiring state agencies to speed up the regulatory process.²¹³ This was not the case with Tenaska, in part because there was no guarantee of regulatory or further legislative approval and the funding mechanisms were under much tighter governmental control.²¹⁴ If Illinois is serious about keeping these projects that promote Illinois coal on track, the legislature must pass comprehensive, not piecemeal, CCS legislation like many other states

209. It is unclear where the 2.015% residential rate cap came from in the first place, so slightly raising this arbitrary amount would not have disastrous consequences for small consumers.

210. See *supra* notes 183-85 and accompanying text.

211. See Flatt, *supra* note 43, at 218.

212. *Id.* at 218-19 (citing 15 U.S.C. § 717b(e)(1) (2012); AES Sparrows Point LNG, LLC v. Smith, 470 F. Supp. 2d 586, 589 (D. Md. 2007)).

213. See *supra* notes 189-95 and accompanying text.

214. See *supra* notes 121-24 and accompanying text.

have. This comprehensive approach is preferable to the current practice of holding certain projects, like FutureGen, to one standard and other projects to different standards. While the Illinois General Assembly attempted to do this with the Carbon Capture and Sequestration Legislative Commission Act, this attempt apparently ended in failure.²¹⁵ If the issues surrounding CCS are still complicated, another Commission may need to be called with tighter controls to ensure a final report is detailed and accurate, which can guide Illinois policy for CCS projects in the future.

It is also advisable to help coordinate the process between state agencies to better ensure that agency resources are not wasted for projects that depend on other parts of the regulatory process, such as between the IEPA and ICC. This step may include the formation of working groups of inter-agency teams when large CCS or energy projects begin the regulatory process. As an added benefit, this level of coordination between agencies could help iron out issues between agencies before they become a problem. This coordination would also help present a unified front on projects and establish lasting connections between agencies to foster cooperation on these large-scale regulatory schemes, resulting in faster and more efficient processes that ultimately promote the responsible uses of our natural resources.

All of these choices are hard and may seem impracticable in the current energy climate with an abundance of cheap natural gas. However, a comprehensive energy strategy will not let energy reserves equal to that of Saudi Arabia and Kuwait go untapped, especially because prices for natural gas will not always remain low. In the meantime, the coal industry is finding increasing markets in China and India for Illinois coal exports, contributing to problems of air quality in the western United States as well as global climate change, both at alarming rates.²¹⁶ Despite what environmental advocates may hope, coal is not going away on a global scale anytime soon.

It may be that the value of CCS technology will not come into focus for legislators, regulators, or the industries until new CO₂ regulations for power plants go into effect or a carbon tax/trading scheme is put in place and current coal power plants are taken offline.²¹⁷ However, by then it may be too late to add base capacity to the electric system through CCS, especially with how long construction of these projects has taken. Therefore, the larger policy question becomes whether to invest in CCS technology now to use coal more cleanly in the future, or wait for coal as an energy source to become expensive and obsolete and continue to export our coal resources to countries like China who have much less stringent environmental standards than the United States. As a pragmatic solution, the former has the most

215. See *supra* note 50 and accompanying text.

216. See *supra* notes 10-12 and accompanying text.

217. See FOLGER, *supra* note 171, at 7-8.

environmental and economic benefits, and is the best option for southern and central Illinois.

V. CONCLUSION

In a carbon constrained world, CCS technology can provide a way to use coal as an energy source without emitting greenhouse gases into the atmosphere. Two such projects, FutureGen 2.0 and Tenaska's Taylorville Energy Center, have been proposed to pilot this technology in Illinois to continue the use of Illinois coal in electric generation. However, the high cost and delays in government regulation of these projects have significantly hindered their ability to move forward, and led to the demise of the TEC. Ultimately, the fates of projects like Tenaska and FutureGen lie in the hands of legislators and regulators. Without steps taken to ensure responsible financing and more efficient regulation of CCS projects, Illinois may soon lose its ability to demonstrate the commercial feasibility of the technology and therefore significantly hinder the development of technologies to burn coal more cleanly and efficiently.