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Douglas S. Kenney and Robert Wilkinson, Editors, the Water-Energy Nexus in the American West

If reconsidered correctly, the CRT can reconcile competing interests and be a model for transboundary water agreements. One can only hope, given the nature of political treaties and the variety of social values attached to the Columbia River, that any renegotiation of the treaty leaves no stakeholder high and dry.

*Garrett Davey*

**Douglas S. Kenney and Robert Wilkinson, Editors, *The Water-Energy Nexus in the American West*, Edward Elgar, Northampton, MA (2011); 274 pp; \$42.75; ISBN 978-0-85793-769-8; softcover.**

Robert Wilkinson is an Associate Professor at the University of California Santa Barbara and also an advisor to businesses, non-profits, and governments on energy and water policy. Douglas Kenney directs the Western Water Policy Program at the University of Colorado Law School's Natural Resources Law Center. Mr. Kenney also writes about and advises governmental organizations on water related issues.

Mr. Wilkinson and Mr. Kenney teamed up to put together *The Water-Energy Nexus in the American West*, a collection of essays that seeks to inform the general public and to give decision-makers a solid footing in the law, economics, and science that connects water and energy use in the western United States. The book is organized into four parts: Introduction and Overview; Water for Energy; Energy for Water; and Solutions: Examples of Ways Forward.

Part One, "Introduction and Overview," consists of Chapters One and Two. Chapter One explores the links between energy and water. For example, energy systems and primarily electricity generation account for the largest water use in the United States. Furthermore, the transportation of water consumes nearly twenty percent of all the electricity used in California. Chapter One posits that integrating water and energy management can vastly increase the economic efficiency of both systems by reducing capital and operating costs. These efficiencies would lead to lower tax burdens and improve a community's quality of life through increased environmental stewardship and integrated management style requirements. Chapter Two analyzes how petrochemical, electrical, and biofuel production degrades natural riparian environments. The Chapter concludes that conserving both water and energy will increase efficiency and foster healthier river systems.

Part Two, "Water for Energy," covers Chapters Three through Seven. Chapter Three addresses coal. Generally, a coal mine uses water to suppress dust generated during mining operations. That water can damage ecosystems by increasing the acidity in the streams that capture coal-mining runoff. Once mined, coal-fired power plants create electricity by boiling pure water in a closed loop system to produce steam and pressure, which spin turbines to produce electricity. Electricity generation accounts for ninety percent of all domestically mined coal. The generation plant uses a local water source to condense the steam back into water via a heat exchanger. This cooling process seriously impacts local water resources by increasing water temperatures downstream from the power plant. In order to avoid raising a stream's temperature, the power plant must permanently consume larger quantities of water in order to condense

the steam back to water. Fly ash, a coal-combustion byproduct containing arsenic, lead, and mercury, has also contaminated groundwater in the instances where it was improperly contained.

Chapter Four moves on to shale oil and discusses how the large quantities of water needed to access shale oil via the process of hydraulic fracturing would impact other water uses and the environment. The process also raises potential legal issues such as current water rights and interstate water agreements. Although the authors wrote this chapter before the shale oil boom was fully underway in the United States, it remains relevant because shale oil's actual impacts are still not fully understood.

Up to this point, discussion concerning fossil fuels deals only with fossil fuels' water needs and how using those fossil fuels negatively impacts water quality and water supply. Chapter Five reverses that theme by addressing the water generated from coal bed methane (CBM) production, which could potentially augment local water supplies. Due to coal's geology, most coal deposits are saturated with methane, a type of natural gas, and water. Water production is an unintended consequence of accessing a coal bed's methane supply, and the produced water's quality varies greatly between coal deposits and even within the same deposit. Chapter Five addresses the legal questions surrounding the production, use, disposal, and management of CBM water and gives examples of how several western states incorporate CBM water into their prior appropriation regulatory systems. Finally, the chapter laments that this potentially useful water source typically either languishes in evaporation ponds or is injected deep underground. The authors attribute this phenomenon to western states' laws that typically treat CBM water as a waste byproduct and do not require the water be put to a beneficial use. Further, there is rarely an economic incentive for companies to put CBM water to beneficial use of their own accord.

The next two chapters discuss renewable energy sources that use water to generate energy. Chapter Six focuses on concentrated solar power (CSP). CSP uses essentially the same method to produce electricity as the coal-fired power plant described above, with the major difference of using solar energy instead of burning coal to produce the heat required to generate steam. Large mirror arrays concentrate the sun's energy on a specific point to create enough heat to generate steam. Although electricity generation via coal and CSP both have the same impact on local water supplies, CSP does not raise the environmental concerns caused by mining and burning coal. This chapter touches on the state and federal policies affecting solar power, different CSP technologies, the cooling technologies available to concentrated solar power installations, and how western states value the water required to generate concentrated solar electricity.

Chapter Seven discusses biofuels, with an emphasis on policies that created demand for biofuels over the past few decades. Such policies are a means to attenuate the United States' reliance on imported petroleum and include laws to open agriculture to new markets, job growth measures, and the federal Renewable Fuels Standard. Chapter Seven also describes the current technological trends in biofuel production and the water requirements for both growing feedstock and processing that feedstock into biofuel.

Part Three, "Energy for Water," covers chapters eight through twelve. Chapter Eight explores the energy and water interdependencies of the Central

Arizona Project, which distributes Colorado River water across central and southern Arizona. Chapter Nine details energy intensity, the total amount of energy required to use a given amount of water at a specific location, for many existing and proposed water supply projects throughout the southwestern United States. Chapter Nine then provides less energy intensive alternatives for these projects, such as water conservation, water recycling, and temporary agriculture-to-urban water leases.

Chapter Ten focuses on desalination and describes the various desalination technologies and their respective energy requirements, as well as the advantages and disadvantages to converting brackish groundwater or seawater into usable water supplies. Brackish groundwater is groundwater, usually in an aquifer, which absorbed enough salts while percolating through the soil to necessitate desalination before the water is fit for irrigation or municipal use. Chapter Eleven offers an in-depth case study of Utah's Jordan Valley Water Conservation District, while Chapter Twelve details the important role electricity plays in Arizona's water systems.

Part four, "Solutions: Examples of Ways Forward," covers chapters thirteen through seventeen and provides solutions to issues identified in the book's previous chapters. Chapter Thirteen explores whether adaptive management practices, which account for scientific uncertainty in managing natural systems, can help balance energy development needs with environmental concerns. Chapter Fourteen looks at the decision-making process and offers tools to support water supply decision-makers in better managing issues that arise from the water-energy nexus. Decisions involving the energy-water nexus require such support because certain factors requiring consideration have a larger scope than the issues decision-makers typically consider, such as multiple objectives, long time horizons, the large number and varied interests of stakeholder groups, and the total number of decision makers involved in the process.

Chapter Fifteen addresses integrated planning at the state level for both energy and water, with an emphasis on the Western Governors' Association's Regional Transmission Expansion Project (RTEP). The Western Governors' Association (WGA) is a bipartisan group representing nineteen western states. The WGA encourages regional collaboration to promote vibrant and sustainable communities and economies. Through the RTEP, which began in 2009, the WGA works with other regional and national entities, such as the Department of Energy and the national laboratories, to build a framework that integrates water supply considerations when planning new electrical transmission expansions. The WGA will use the RTEP to promote practical solutions to water-energy nexus challenges.

Chapter Sixteen examines the many benefits and few drawbacks of electricity generating systems that are largely decoupled from the water supply, such as certain solar technologies and wind turbines. Chapter Seventeen, the final chapter, looks at California's burgeoning efforts to both reduce greenhouse gas emissions and prepare for climate change, while simultaneously creating more efficient energy and water systems across the state.

*The Water-Energy Nexus in the American West* is an extremely comprehensive, if dense, survey of many of the energy and water issues facing state and local governments. The book clearly caters to policy makers in the arid and

semi-arid areas of the western states, which helps to make the often-difficult and nuanced issues surrounding the water-energy nexus in a water-scarce area more relatable and accessible to western residents. Furthermore, this book is ideally suited to offer a solid baseline understanding of the water-energy nexus to elected and appointed officials who are unfamiliar with the subject.

*Gabriel Kester*

**Farhana Sultana and Alex Loftus, Editors, *The Right to Water: Politics, Governance and Social Struggles*, Earthscan, New York, NY (2012); 262 pp; \$53.95; ISBN 978-1-84971-360-3; hardcover.**

“*The Right to Water: Politics, Governance and Social Struggles*” surveys how a variety of actors conceive of and implement the right to water across the globe. In its initial chapters, the book, edited by Farhana Sultana and Alex Loftus, expounds on what a right to water means. Each of these chapters puts forth its own analysis and critique of the right. The authors ground their arguments in the theories of inter-related academic disciplines such as geography, political science, and law. The second half of the book shifts focus. In these later chapters, the authors delve into the water justice movements in particular countries or regions. The case studies range widely in structure and location: in Chapter 7, the reader learns about the Maori tribe’s water-based identity, while in Chapter 8, the reader learns about the European Union’s approach to water management.

The preface locates the book in time and space. Some of the chapters originated as papers for an international conference entitled “*The Right to Water*,” held at Syracuse University over March 29 and March 30, 2010. The conference addressed how water activists can equitably advance the global right to water.

In the foreword, activist Maude Barlow discusses the United Nations General Assembly’s passage of two important resolutions concerning the global right to water and sanitation. Barlow’s foreword reads as a call to arms for water activists. It concludes with rhetorical questions about how public and private actors should conceive of the right to water. The chapters that follow explore these questions.

In Chapter 1, “*The right to water: prospects and possibilities*,” the book’s editors introduce the global water justice movement and the topics of the chapters to come. The editors identify two major divisions in rights discourse: commodification versus rights and the public versus private management of water. The thesis of the book is “to bring a geographical sensitivity to calls for a universal right to water: within this, we see the right to water as one necessary but insufficient moment in the struggle to achieve equitable access to water for all.”

In Chapter 2, “*Commons versus commodities: debating the human right to water*,” Karen Bakker develops a framework for analyzing market environmental reforms such as neoliberalism and applies the framework to water. Bakker criticizes the problems endemic to neoliberal reforms. She notes that the privatization of water services is legally compatible with the human right to water. Bakker argues that conceiving of water as a commons allows the reformation