

The Significance of Structure: Analysis of Multi-Level Administrative Participation  
on Renewable Energy Policy in Los Angeles

Morris Mills  
Senior Comprehensive Project

Department of Urban & Environmental Policy, Occidental College  
April 4<sup>th</sup>, 2018

## Abstract

In the United States, limited Federal action regarding climate change has led states and cities to implement their own renewable energy policies. California and Los Angeles have renewable energy policies that often intersect with one another, along with the decisions made by electric utilities. This paper performs a qualitative analysis on the administrations implementing renewable energy policy in Los Angeles, observing how administrative structure can influence policy outcomes. Using document analysis and interviews, this paper found that state government has increased its control in Los Angeles' local energy policy, with a dissonance between large energy goals and resource feasibility. Research also found that compensation for dated energy infrastructure was still an emerging issue, along with electrical grid reliability concerns with high renewable energy usage. Increased ratepayer participation, streamlined state level programs, and a stranded asset task force were all discussed as possible courses of action to address the paper's findings.

# Table of Contents

<b>Abstract</b> .....	<b>2</b>
<b>Glossary</b> .....	<b>5</b>
<b>Introduction</b> .....	<b>6</b>
<b>Background</b> .....	<b>6</b>
AB 1890 and the 2000-2001 California Electricity Crisis.....	8
Utility Structure in Los Angeles .....	10
<i>IOUs: Southern California Edison</i> .....	11
<i>CCAs: Clean Power Alliance of Southern California</i> .....	12
<i>POUs: LADWP</i> .....	13
<i>Appeal by Los Angeles Department of Water &amp; Power Regarding Renewables Portfolio Standard Certification Eligibility</i> .....	14
<b>Literature Review</b> .....	<b>15</b>
Command and Control: Renewables Portfolio Standard .....	16
Market-based Incentives.....	17
<i>Renewable Energy Credits</i> .....	17
<i>Evolving Utilities: Community Choice Aggregators</i> .....	18
Emerging Tactics.....	19
<i>The Duck Curve</i> .....	20
<i>Developing Policies</i> .....	21
Administrative Levels of Renewable Energy Policy.....	22
<i>Federal Level</i> .....	22
Department of Energy .....	22
Federal Energy Regulatory Commission .....	22
Characterizing Federal Energy Administrations .....	23
<i>State Level</i> .....	24
<i>Local Level</i> .....	25
<i>Policy Assessment v. Administrative Assessment</i> .....	26
<b>Method</b> .....	<b>28</b>
Participants.....	29
Materials .....	29
Design and Procedure .....	30
<b>Findings &amp; Analysis</b> .....	<b>31</b>
Finding 1: Increased State Involvement in Administrative Jurisdiction.....	33
<i>Increased State Control in LA Energy Policy</i> .....	34
<i>State Involvement Can Be Beneficial</i> .....	34
<i>Community Choice Aggregation Can Increase Overall Decentralization</i> .....	35
Finding 2: Dissonance Between Renewable Goals with Actual Feasibility.....	35
<i>Vertical v. Horizontal Coordination</i> .....	36
<i>Gaps Between Energy Policies &amp; Energy Resources</i> .....	36
<i>State Involvement and Coordination Issues: LADWP’s Legal Appeal</i> .....	37
<i>Appeal Decision Creates Stranded Assets</i> .....	38
Finding 3: Emerging Issues of Transitioning Infrastructure and Stranded Asset Compensation .....	39
<i>Financing Differences Between POUs and IOUs</i> .....	39
<i>Minimal Compensation Issues with Community Aggregation</i> .....	40

Finding 4: Reliability Concerns with Increased Renewable Energy Use .....	41
<i>Uncertainties Surrounding CCA's</i> .....	41
<i>Market Impact of CCAs</i> .....	42
<i>POUs and IOUS: Public Accountability v. Mandated Compliance</i> .....	42
<i>Unknown Consequences of High Renewable Energy Penetration</i> .....	43
<b>Recommendations</b> .....	<b>44</b>
Increase Ratepayer Participation in the Decision-Making Process.....	44
Streamline State Level Programs .....	44
Form Stranded Asset Task Force .....	45
<b>Conclusion</b> .....	<b>45</b>
Limitations .....	46
Further Research.....	47
<b>Works Cited</b> .....	<b>48</b>
<b>Appendix</b> .....	<b>53</b>
Appendix I – Interview Participant List .....	53
Appendix II – Interview Questions .....	53
Appendix III – Code List .....	55
Appendix IV –Documents Analyzed .....	56

## Glossary

<b>CAA</b>	Clean Air Act
<b>CAC</b>	Command-and-Control
<b>CAISO</b>	California Independent System Operator
<b>CCA</b>	Community Choice Aggregator
<b>CEC</b>	California Energy Commission
<b>CPA</b>	Clean Power Alliance of Southern California
<b>CPUC</b>	California Public Utilities Commission
<b>DOE</b>	US Department of Energy
<b>EIA</b>	US Energy Information Administration
<b>FERC</b>	Federal Energy Regulatory Commission
<b>IOU</b>	Investor Owned Utility
<b>LADWP</b>	Los Angeles Department of Water & Power
<b>MOU</b>	Municipally Owned Utility
<b>PG&amp;E</b>	Pacific Gas & Electric
<b>POU</b>	Publically Owned Utility
<b>PPA</b>	Power Purchase Agreement
<b>REC</b>	Renewable Energy Credit
<b>RPS</b>	Renewables Portfolio Standard
<b>SCE</b>	Southern California Edison
<b>TREC</b>	Tradable Renewable Energy Credit
<b>VRE</b>	Variable Renewable Energy (i.e. wind, solar)
<b>WECC</b>	Western Electricity Coordinating Council

## Introduction

Anthropogenic climate change has prompted a global transformation from fossil fuels to renewable energy sources, yet in the United States the federal government has been reluctant to enact cohesive policy related to clean power. In response to ineffective federal action, local and state governing bodies have passed policies promoting the generation of Variable Renewable Energy (VRE) (wind and solar power). Municipal governments, regional groups, state agencies, and electric utilities all enact and enforce renewable policy initiatives.

Although extensive research exists assessing renewable energy policies, there is more limited inquiry investigating the structure of administrations that create and comply with such renewable energy initiatives. This research paper uses metropolitan Los Angeles as a case study in order to analyze multi-level administrative interaction in VRE policy -- how does state and local organizational structure impact renewable energy initiatives? Document analysis and expert interviews sought to answer the question of how administrative structure contributes to renewable energy policy outcomes and the decision-making process, including Los Angeles' recent switch towards the direct purchase of renewable energy through Community Choice Aggregation. Results of the research characterized Los Angeles and California as laboratories in the organization and enforcement of a rapid, large-scale shift to renewable energy. There was found to be increased state involvement in LA's energy policy, dissonance between renewable policy goals and feasibility, and issues surrounding grid reliability and dated infrastructure.

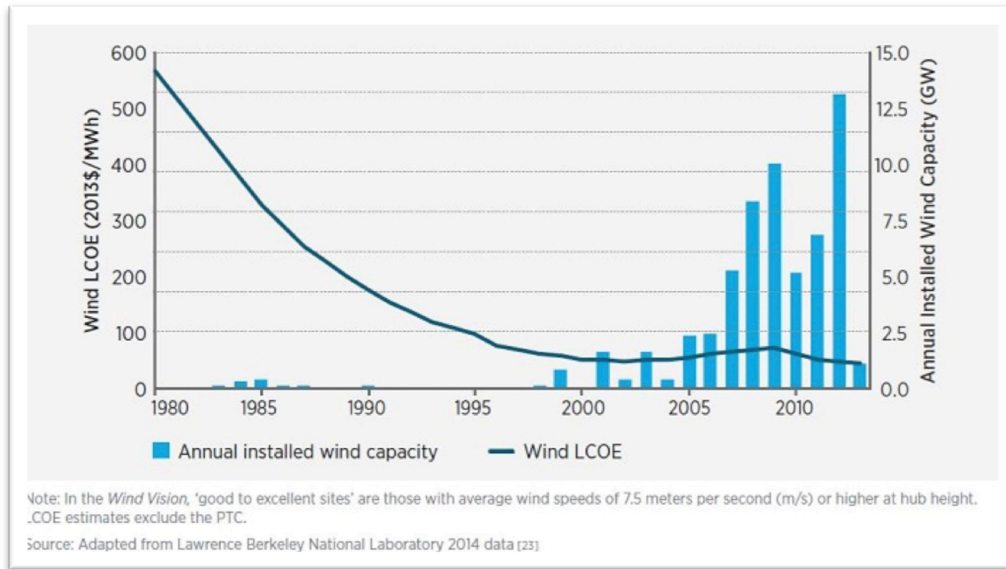
## Background

State and federal oversight of energy policy and energy resources is relatively new; traditionally, local electric utilities and their governing bodies (i.e. city council, board of

commissioners) were in charge of any decisions regarding energy resources (Glaeser and Goldin 2006). It wasn't until the 1970s that centralized renewable energy policies in the United States began to emerge, partly due to the 1973 oil crisis the country underwent in earlier years. In addition, the environmental movement in the United States was beginning to gain more traction around this time (the EPA was created in 1970), prompting increased energy regulations.

Historically, the high cost of renewable energy when compared to fossil fuels was one of the main barriers to widespread use, but rapid advances in technology, as well as increased funding for R&D, has caused the price of VRE to drop significantly (*see* Fig.1). These conditions have made it easier for state and local administrations to implement policies and mandate changes towards sustainability. The increased penetration of renewables has also raised concerns about methods to preserve the financial and environmental value of such technologies, such as a tradable credit system (Database of State Incentives for Renewables & Efficiency 2017).

One of the first federal policies addressing the use of renewable energy was the Public Utilities Regulatory Policy Act (PURPA), which passed as a statute under the 1978 National Energy Act. PURPA sought to promote domestic energy generation, increase energy conservation, and increase the supply of renewable energy available through market incentives for producers (Evans 1978). However, implementation of the Act was left to states, resulting in mixed success: some states did nothing to implement PURPA (Robinson 2017). Since 1978, numerous federal energy policies have featured incentives for renewable energy production (ex. 2005 Energy Policy Act, 2009 American Recovery and Reinvestment Act), but previously mentioned disparities in enforcement have diminished the impact of such initiatives.



*Fig.1 Levelized Cost of Wind Energy (\$/MWh) 1980-2013 (US Department of Energy 2014)*

Federal energy policies like PURPA and the 2005 Energy Policy act had incongruous compliance on behalf of state governments; the political, socioeconomic, and geographic differences between states can result in disparate responses to federal decisions.

In California, lawmakers decided to deregulate state-level energy markets in response to federal energy policies governing natural gas (California Municipal Utilities Association 2003). This action led to a statewide energy crisis, in addition to laying the groundwork for revised market deregulation in California (ex. community choice aggregation).

### **AB 1890 and the 2000-2001 California Electricity Crisis**

In 1993, the Federal Energy Regulatory Commission (FERC) released Order 636, which unbundled (i.e. separated) natural gas generation from transmission (Federal Energy Regulatory Commission 1992). Hoping to reap the benefits (ex. competitive prices) of the newly deregulated natural gas market, the California State Assembly enacted AB 1890 in 1996, which restructured the electric utility industry in the state (US Energy Information Administration 1998).



Previously, California electric utilities were vertically integrated: one company was in control of energy generation, transmission, distribution, and metering/billing. AB 1890 restructured the value chain to allow Californians to choose an energy producer who was separate from the energy distributor, turning energy generation into a competitive free-market. The bill also established the California Independent System Operator (CAISO) to oversee transmission of energy from generators to utility distributors, who are still responsible for distributing and metering electricity.

In 2000-01, these deregulation measures contributed to a state energy shortage. Wholesale energy prices surged as energy companies (most notably Enron) manipulated markets to create an artificial shortage in energy supply (Sweeny 2002). Utilities such as Pacific Gas & Electric and Southern California Edison were forced to borrow money and raise rates in order to supply power to customers. Energy reserves fell below critical levels, and rolling blackouts occurred statewide (California Municipal Utilities Association 2003). In 2001, PG&E filed for bankruptcy, the state's credit rating was downgraded, and the market for wholesale electricity was suspended and eventually regulated with price controls (Congressional Budget Office 2001).

The motivation behind AB 1890 was beneficial; increasing choice in procurement would spur increased market competition and result in lower energy prices. However, the aftermath of the bill delayed any possibility for direct purchase of renewables and lowered the market penetration of clean energy in the state (California Local Government Commission 2006).

Utility deregulation and restructuring would resume in 2002 with Assembly Bill 117, which established updated policies regarding the independent procurement of energy resources separate from the regional investor owned utility (*see literature review*). The legacy of such restructuring policies can be seen in Los Angeles through the organization of its electric utilities.

## Utility Structure in Los Angeles

In Los Angeles, deregulations (AB 1890, AB 117) and vertical integration convene to form three separate administrative structures organizing electric utilities; publically owned utilities (POU), investor-owned utilities (IOU), and community choice aggregators (CCA). These cohabitating administrative structures interact differently with the California state legislature and central organizations such as the California Public Utilities Commission and California Energy Commission (CEC).

## Regulatory Differences in Los Angeles Utilities

	<b>IOU (SCE)</b>	<b>POU (LADWP)</b>	<b>CCA (SoCal CPA)</b>
<b>Ownership</b>	Owned by investors not necessarily linked to area	Owned by customers/City of Angeles	Customers in municipal service area (LA county excluding city of LA) "Opt-out" structure
<b>Admin Structure</b>	Investor-elected governing board	Mayor, city council, and board of commissioners	Joint powers authority board of appointed members
<b>Rates/Regulation</b>	Rates and regulation under control of CPUC	Rates approved by city council, regulated by board of commissioners	Rates approved by authority board, regulated by board and exec. Director
<b>Goals</b>	Return on investment by shareholders	Maintain reliability, competitive rates, and environmental stewardship	Competitive rates; reduce GHGs; stimulate renewable energy development; implement distributed energy; energy efficiency and demand reduction; rate stability through local control
<b>Power Generation</b>	Self operated generation facilities, Power Purchase agreements (PPA)	Self operated generation facilities, PPAs	Aggregated purchase of power, local distributed generation
<b>Revenue</b>	Recover costs, return profits	Recover costs, reinvest in infrastructure	Initial revenue goes to capital for start-up and phase in projects
<b>Size</b>	4.88 million customer accounts, approx. 3 million in LA county	The City of Los Angeles, 1.5 million customer accounts as of 2010	Unknown, though roughly 3 million eligible customers
<b>Financing</b>	Investors, selling bonds	Tax free bonds	\$10 million loan from LA County

*Table adapted from a California Energy Commission graphic*

### **IOUs: Southern California Edison**

Southern California Edison (SCE) is the only investor owned utility in Los Angeles County. In addition to serving the LA metro area, SCE services Ventura, San Bernardino, and Orange counties. Behind Pacific Gas & Electric, it is the largest electric utility in California (4.88 million customer accounts as of 2010)(California Energy Commission 2010). Unlike POU's or CCAs, SCE is owned by investors and managed by a shareholder-elected

governing board. Rates and regulations for the company are managed centrally by the CPUC, as opposed to a local board or city council. As previously stated, the main goal of SCE is a return on shareholder investments. Revenue from customer rates is used to return profits (roughly 5% of revenue issued as dividends annually)(California Municipal Utilities Association 2003) and recover loses, not necessarily to re-invest in new infrastructure and customer services.

#### **CCAs: Clean Power Alliance of Southern California**

The Clean Power Alliance of Southern California (SoCal CPA) serves as the only community choice aggregator in Los Angeles and Ventura Counties. Community choice aggregation is an alternative IOUs that allows for communities to choose where they source their energy. Although AB 117 established the use of CCAs in California in 2002, SoCal CPA officially began its operations in January 2018. The CCA is eligible to all customers outside of POU service areas (LADWP, smaller POU's), and, as a result, it is the only market competition to SCE. Similar to a POU like LADWP, SoCal CPA is community-owned by all customers in its service area. Eligible customers in the service area are automatically enrolled in the CCA, and must voluntarily "opt-out" in favor of using SCE's energy procurement services instead. The CCA is administrated by a joint powers authority composed of appointed members representing the communities in the service area. Similar to a POU, energy procurement contracts are approved by the community based authority and is regulated by the board and an executive director. However, SCE still maintains the metering and billing process for SoCal CPA's customers. SoCal CPA and POU's like LADWP share goals of complete rates and maximum local control. However, SoCal CPA's mission is to also maximize renewable energy use and development (as opposed to the renewable

use of its only competitor, SCE). Unlike SCE and LADWP, which both operate their own electric generation facilities; SoCal CPA plans to source its power through the aggregated purchases from various generation facilities. In addition, the CCA will source power from local distributed generation sources such as customer rooftop solar arrays. Since SoCal CPA is a new utility beginning operations, all initial revenue for from customers will go towards starting up projects. This capital is in addition to a \$10 million loan awarded from Los Angeles County, which will also go towards establishing the CCA's operations (Clean Power Alliance of Southern California 2017).

#### **POUs: LADWP**

LADWP is a municipal utility owned and operated by the city of Los Angeles and its customers. LADWP is managed by an appointed board of commissioners, who ultimately report to the mayor's office and city council when approving regulations or changing rates for customers. Unlike investor utilities, whose ultimate goal is return on investment, LADWP's goals are oriented towards customer reliability and competitive rates(LADWP 2016). All revenues generated from financing and electric rates are reinvested in infrastructure and recouping costs. In addition, LADWP has its own environmental goals separate from any state or federal mandates. The utility has an Integrated Resource Plan that stipulates long-term initiatives for environmental stewardship. The plan centers on increasing its renewable portfolio share to 55% by 2030 and 65% by 2036 (LADWP 2016).

In addition to LADWP, there are a number of small cities in LA County that operate publically owned utilities. These cities include Glendale, Burbank, Pasadena, Vernon, Cerritos, Azusa, and the City of Industry. However, LADWP is by far the largest POU in the Los Angeles area (1.5 million customers) and is the largest municipal utility in the United

States (California Municipal Utilities Association 2003). By comparison, the next largest POU in LA (Pasadena Power and Light) serves 141,000 customers (City of Pasadena 2017). To maximize comprehension, the context of this paper will focus on LADWP's structure as a POU rather than analyze the structure of each small city utility in the Los Angeles area.

### **Appeal by Los Angeles Department of Water & Power Regarding Renewables Portfolio Standard**

#### **Certification Eligibility**

In 2016, LADWP, filed a legal appeal to the California Energy Commission concerning the Renewables Portfolio Standard, the state policy governing the amount of renewable energy utilities must use (*see literature review*). LADWP argued that the CEC unlawfully disqualified two of its existing energy resources from being eligible towards their renewable energy compliance, even though the resources were listed as eligible under the RPS legislation (SBX1-2 [2011]). In 2017, the CEC committee ultimately decided to consider only one of the disputed resources as eligible (a Shell biomethane pipeline). The other disputed resource, a series of small hydroelectric plants in British Columbia, would not be counted as compliant with state RPS standards, even though LADWP had already entered into a \$186 million contract with BC Hydro, the hydroelectric plant's operator (California Energy Commission Committee 2017).

Despite ending in compromise, the legal appeal is exemplary of structural issues that can arise from renewable energy policies.

## Literature Review

Lackluster federal oversight, falling renewable energy prices, and utility restructuring all have a role in shaping the tactics policy makers and administrative bodies employ in order to promote variable renewable energy.

As previously stated, humanity has had a disproportionate impact in influencing climate change through the generation of greenhouse gas (GHG) emissions (IPCC 2014). As a top global polluter, the United States has been slow to enact federal policies addressing the issue of climate change (M. McCright & Dunlap 2003; Delmas & Montes-Sancho 2011). As of June 2017, the current administration announced its intentions to withdraw from the Paris Climate Agreement (Wiener 2017) and delay or rescind the Clean Power Plan (Davenport 2017).

With a lack of cohesive federal policy concerning expansion of renewables and reduction of GHG, among other reasons, other levels of administration (municipal, regional, state) have taken it upon themselves to establish benchmarks for adopting alternatives to fossil fuels (Elliott 2013). Strategies on reaching energy goals vary, but each governing body with carbon-reduction benchmarks have implemented one or a combination of the following

- Increasing the amount of variable renewable energy (VRE) generated (energy sources including wind and solar that are not able to be dispatched on demand)
- Decreasing the amount of the fossil fuel consumed/generated
- Increasing the load efficiency of the grid
- Increasing the emissions efficiency of power use

To enact these strategies at the municipal, regional, and state level requires policy tactics. These policy tactics can be organized under two broad categories; command and control (CAC) or market based policies. CAC policies are compulsory mandates enacted by a governing body

(Ciocirlan 2008). These policies are targeted towards the supplier-side (utility companies and grid operators), and include some form of enforcement to ensure that benchmarks are achieved on schedule. Market-based policies are economic incentives that seek to make renewable energy and GHG reduction economically attractive (Ciocirlan 2008).

In addition to specific policy tactics, the multi-level structure of energy administrations and their jurisdictions also contribute to the landscape of renewable energy generation (del Río 2014).

### **Command and Control: Renewables Portfolio Standard**

The flagship CAC policy used by administrations is the Renewable Portfolio Standard (RPS), which ensures that a state generates a scheduled minimum amount of energy from renewable sources. As of 2011, thirty-two states have enacted an RPS policy (Fischlein & Smith 2013). California has enacted amended versions of a RPS since 2002 (Database of State Incentives for Renewables & Efficiency 2017). As of October 2015, the state RPS requires that 50% of energy sold and distributed by retailers and public or privately owned utilities be sourced from renewable energy by 2030 (California Energy Commission 2018). This goal is ambitious, and it is the joint role of the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) to implement and enforce the RPS. The CEC is responsible for certifying renewable facilities (*California Public Utilities Code* § 399.13(a)), while the CPUC regulates compliance to the RPS (*California Public Utilities Code* § 399.16.). A common aspect of RPS enforcement is a financial safety valve or waiver to prevent unjust economic strain on utilities (Fischlein and Smith 2013). In California, for example, the RPS imposes a cost cap for each provider. If a provider has to exceed this cost in order to fulfill RPS requirements in time, then they may be eligible to defer compliance. A financial penalty is also common, such as



alternative compliance payments (ACP) or fines if state-set requirements are not met (interestingly, California has no financial penalty for failure to follow the RPS)(Fischlein and Smith 2013). In most cases, enforcement penalties only defer compliance, not exemption. The RPS is optimized for the best outcome of each state, and as a result the policies enacted are incredibly heterogeneous.

### **Market-based Incentives**

As opposed to command and control mandates, market-based policies are followed via incentives to stimulate the demand for renewables and compensate for market failures. Market-based incentives are applied to energy suppliers as well as consumers. Often, market based incentives are established as a voluntary aspect of a CAC policy.

### **Renewable Energy Credits**

An important market-based incentive states (including California) employ is the renewable energy credit (REC). Each credit corresponds to one megawatt-hour (MWh) of energy generated from a certified renewable source. RECs are either “bundled” directly to the electricity generated, or are “unbundled” and tradable separate from the MWh of renewable energy (referred to as tradable RECs, or TRECs)(Mack et al. 2011). RECs are an important accounting tool for tracking and certifying the California RPS (Gillenwater 2008), and they also serve to monetize the external environmental benefit of renewables (Elder 2007). A credit trading system also allows fossil fuel producers and suppliers to comply with renewable generation mandates by purchasing megawatt-hours of clean energy from other suppliers. Even though fossil fuel generators are not adding any renewable energy capacity, they maintain “on-paper” compliance with renewable energy policies via the trade of RECSs (Gillenwater 2008).

Preserving the value of renewable energy's environmental benefit has an important market impact. Modeled research has demonstrated the relationship between increased VRE market penetration and decreased marginal value: as more renewables go into the energy supply, the economic value of adding additional renewable infrastructure decreases (Mills & Wiser 2012; Mills & Wiser 2015). RECs serve to stabilize the marginal value of increased VRE usage. REC regulations vary widely; a large amount of states permit unlimited trade of unbundled RECs, whereas a small handful caps the amount of TRECs as a percentage of total renewables. In three states (Arizona, Nevada, and Wisconsin), trade of TRECs is not permitted at all (Fischlein & Smith 2013). In 2011 the California Public Utilities Commission introduced price controlled TRECs as a method to achieve up to 25% of a utility's RPS compliance (DSIRE 2017).

#### **Evolving Utilities: Community Choice Aggregators**

Community Choice Aggregators (CCAs) are retail electricity providers administered at the local level. Currently, CCAs are present in 6 states, including California (Durkay 2015). As a local level utility, CCAs are formed on the jurisdictional boundary of a city or county. However, CCA's are not entirely decentralized; they stem from state legislation applied at the local level. In 2002, California AB 117 permitted groups of cities and counties to aggregate the electrical loads of customers. As a consumer group, Community Choice Aggregators can purchase renewable energy directly from suppliers and regulate supply and demand. However, the investor owned utility in the area is still responsible for maintain the local electric grid, as well as billing and metering ratepayers. Importantly, CCAs cannot aggregate loads from customers under the control of publicly-owned utilities (Julien Gattaciececa, J.R. DeShazo, and Kelly Trumbull 2017). This exclusion stipulation has effects in Los Angeles County: the cities of Los Angeles,

Glendale, Burbank, Pasadena, Vernon, Cerritos, Azusa, and Industry all operate their own public utilities, making their populations ineligible for CCA coverage.

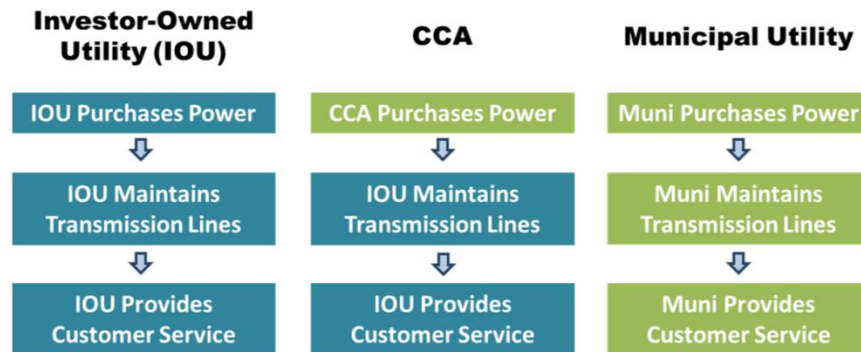


Fig.2 CCA Structure (NREL 2017)

In California, AB 117 (2002) allowed unbundled consumer choice to resume after suspension the 2000-01 electricity crisis (*see* background). AB 117 contains similar language to AB 1890, its predecessor in utility deregulation. However, AB 1890 required customers to “opt-in” to unbundled service, whereas AB 117 assumes all customers within a CCA boundary will become CCA customers (Migden 2002). Consumers instead “opt-out” of CCAs rather than “opting-in”, making it easier for communities to switch to renewable energy use.

By purchasing power directly from suppliers, CCAs are able to offer a larger share of renewables in the energy mix used by customers at a price competitive with larger IOUs. Unlike IOUs, which are private for-profit organizations, CCAs are publicly governed and allow for tailored energy needs from a smaller constituency (Armour et al. 2014). The Clean Power Alliance of Southern California is a new CCA covering Ventura and Los Angeles counties as of January 2018 (Los Angeles Community Choice Energy 2017)(*see* background).

### Emerging Tactics

More recent proposals have been discussed to address the nuanced technical barriers associated with increased renewable energy on the electric grid.

## The Duck Curve

The duck curve is a term used to describe the technical barrier to accommodating more variable renewable energy onto an electrical grid. The “curve” refers to the net load curve, which is a visualization of electrical usage on a grid (net load is the difference between forecasted energy consumption and expected energy production). The goal of energy providers is to best match supply with demand, ideally resulting in a flat load curve. However, VRE peaks generation during the middle of the day, when wind and sun are most prominent (Denholm et al. 2015). The midday energy supply outweighs midday energy demand, resulting in overgeneration and the possible curtailment of production (Fig.3).

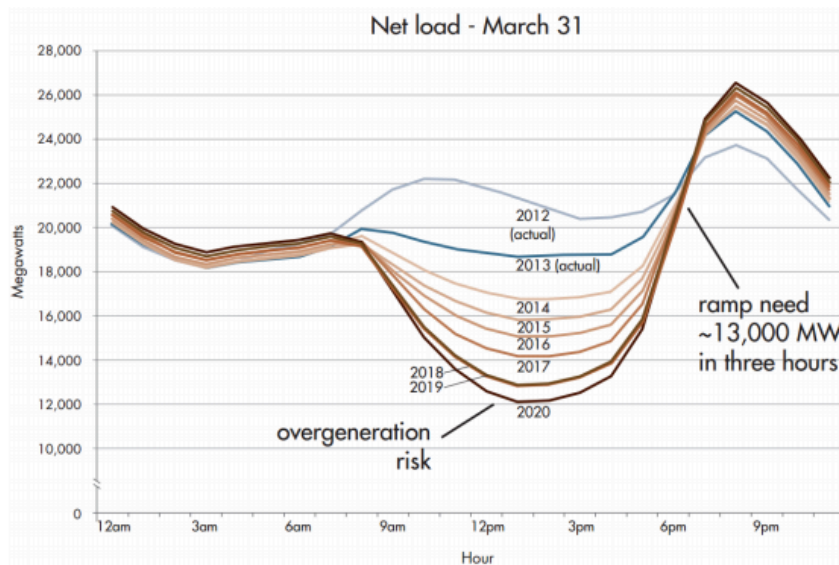


Fig.3 California Net Load for March 31 (California ISO 2016)

Furthermore, energy demand peaks in the evening, when VRE generation is at its lowest. A rapid increase in energy demand calls for a rapid increase in energy supply, as opposed to the steady generation of energy. Herein lies the Duck Curve dilemma; current energy storage technology does not have the capacity to store excess VRE energy generated during the day, so utilities must rapidly fire up traditional energy sources (primarily natural gas) to accommodate

evening demand (California ISO 2016). Rapid fire-up of fossil fuel power stations is a costly process, and generates more pollution than constant use.

Currently, compensating for the variability in renewable energy production forces utilities to rely on the same fossil fuels they intend to phase out.

### **Developing Policies**

Proposed tactics to flatten the duck curve center around increasing the load flexibility of the grid so it can better accommodate supply and demand changes (California ISO 2016; Nelson & Wisland 2015; Denholm et al. 2015). Tactics include increased energy storage capacity, more regional power exchange, and real time pricing to decrease demand during peak loads (Mills and Wiser 2015; Denholm et al. 2015; Lazar 2016). Further recommendations also include demand response to change consumption patterns, increased emissions efficiency through electrification (Dennis et al. 2016; Nelson & Wisland 2015; Lovins 1990), and the distributed generation (DG) of energy from rooftop solar (Lazar 2016; Denholm et al. 2015).

A common thread with emerging policies is the increase of transmission interchange between power generation and the distribution edge (where the power is ultimately used). The traditional “one way street” between energy suppliers and consumers is becoming less defined as consumers gain more power in both producing and consuming energy. Electricity is behaving less like a direct commodity and more like a network of information exchanged between multiple levels of actors and administrative entities (Tomain 2015).

## Administrative Levels of Renewable Energy Policy

### Federal Level

Energy policy is dictated at multiple administrative levels in the United States. The federal government has multiple agencies that are charged with regulating all aspects of energy production, transmission, consumption, and analysis.

#### *Department of Energy*

The US Department of Energy (DOE) was established in 1977. The department's primary responsibility is to oversee domestic energy production and federal energy policies (Department of Energy). The DOE is in charge of a diverse range of areas, from overseeing the US nuclear weapons program to funding energy research at 21 national laboratories. The Office of Energy Efficiency and Renewable Energy is the program primarily responsible for enacting renewable energy policy at the DOE. The office aims to increase VRE generation in the United States, improve energy efficiency of products, and promote sustainable transportation and a smart grid.

The DOE implements federal programs related to renewable energy, but the department does not currently have any command-and-control style policies such as a RPS. Instead, DOE policies are primarily voluntary incentive-based clean energy projects. Policies include third party financing in coordination with service companies (Federal Energy and Water Efficiency Project Financing), and a \$5.4 billion annual budget funding research and development of advanced energy technology (US Department of Energy 2018).

#### *Federal Energy Regulatory Commission*

The Federal Energy Regulatory Commission (FERC) is the governing body responsible for regulating the transmission and sale of electricity in the United States. The Commission was

created as part of the Federal Power Act of 1920, whose purpose was to create a jurisdictional boundary between state and federal agencies. FERC is tasked with supervising wholesale energy utilities, including regulation of electric rates and services offered to consumers. However, it is not within FERC's jurisdiction to regulate "local" electrical energy rates and distribution, or to oversee end use (retail) energy sales (González 2016). Public utilities like LADWP are required to file their rates and terms of use to the FERC, which reviews and determines if service providers are offering competitive rates (FERC).

FERC policies are characterized by regulations that monitor interstate electricity markets, licensing of natural gas pipelines and hydroelectric facilities, and enforcement of mandates via civil penalties (fines paid to the US Treasury). The California Independent System Operator (CAISO), the state organization regulating the in-state transmission of electricity from generators to distributors (i.e. utilities) is under FERC regulations because it balances energy needs with providers in neighboring states like Nevada and Utah (Federal Energy Regulatory Commission 2018). In addition, LADWP falls under FERC guidelines since it generates and transmits energy across state lines, and participates in energy transmission with CAISO (Los Angeles Department of Water & Power 2016). In addition, SCE and LADWP participate in the interstate renewable energy credit (REC) market, which is monitored and investigated by FERC (Southern California Edison 2018; LADWP 2016). In 2016, FERC was involved in legal proceedings involving financial compensation of "negawatts", a theoretical unit of energy saved due to increased conservation and/or efficiency. The Supreme Court sided with the agency, ruling that electric transmission operators were required to create a market price and for negawatts (Federal Energy Regulatory Commission v. Electric Power Supply Association 2015).

*Characterizing Federal Energy Administrations*

Although each department issues its respective regulations, there is still a lack of cohesive federal policy mandating the increased use of renewable energy. Since 2016, federal renewable energy policy has been defined by the repeal and rollback of any previous regulations on energy production and consumption. The administration has, scaled back national fuel economy targets for vehicles, lifted the Obama-era moratorium on offshore drilling, and attempted to repeal the EPA's Clean Power Plan (Ballotpedia). In addition, federal officials have censored language concerning climate change and emissions reductions (Kasprak 2017), further preventing any cohesive policies directed towards clean energy. Thus far, actions by the Trump administration have limited the ability of the federal government to incentivize increased renewable energy generation.

#### State Level

The 10<sup>th</sup> amendment delegates any powers not explicitly stated in the US Constitution to states and their citizens. Delegation of power allows states to create their own constitutions and governing bodies (The Constitution of the United States). The jurisdictional boundary between State and Federal administrations is not clearly defined; laws including the 1920 Federal Power Act, 1978 Public Utilities Regulatory Policies Act, and 2005 Energy Policy Act were enacted to better define division of authority (FERC: Federal Statutes, González 2016). However, the boundary between state and federal authority has broadly been accepted to be interstate v. intrastate. Federal agencies are responsible for any policies that apply across multiple states, whereas State agencies oversee any energy policies that are explicitly found only within one state (González 2016).

State energy departments and public utilities commissions are able to regulate intrastate fossil fuel production and commerce, tax fuel to fund intrastate infrastructure, and supervise



electrical utility rates and service (DSIRE). State agencies are also in charge of any intrastate renewable energy policy. Policies including Renewables Portfolio Standards (RPS), and Renewable Energy Credits (REC) are examples of state initiatives to promote the generation of renewable energy.

At the state level in California, the legislature and executive branches act as the primary rule making bodies concerning renewable energy policy. The state legislature and governor's office create renewable energy mandates like the RPS via bills and executive orders, but they have no control over enforcement. The California Public Utilities Commission (CPUC) is the primary governing body charged with enforcing state RPS policies. IOUs report to the CPUC when requesting rate increases, and the CPUC monitors the renewable energy market in the state, including REC sales (California Public Utilities Commission 2018). The CPUC coordinates much of its responsibilities with the California Energy Commission (CEC), the state's primary energy policy agency. The CEC collects and reports data on renewable energy generation, transmission, and usage from all electricity providers, and also enforces RPS eligibility requirements on utility providers (California Energy Commission 2018). In 2011, extended session legislation (SBX1-2) also allowed the CPUC to enforce RPS policies over POUs, increasing their jurisdictional boundary.

### Local Level

Within state constitutions there are statutes that allow cities and counties to administer their own local laws. In California, Article XI of the state constitution declares that counties and cities can create any local ordinance to govern affairs as long as ordinances do not conflict with existing general laws (California State Constitution).

Los Angeles is a good example of robust local level energy policy. Both the city of Los

Angeles and Los Angeles County have adopted renewable energy policies aimed at increasing the share of renewable energy generated and utilized in the area. Energy policy strategy at the local level in Los Angeles is characterized by amending county ordinances and offering market based incentive programs in order to achieve goals (Los Angeles County 2025 General Plan, Los Angeles Sustainable City pLAn). In addition, the city of Los Angeles has the ability to carry out its own Integrated Resource Plan (IRP) through the Los Angeles Department of Water and Power (LADWP), the largest Publically Owned Utility (POU) in the United States (LA pLAn). The IRP is a 20-year plan laying out LADWP's strategy to procure more renewable energy resources while maintaining electrical grid reliability.

Community Choice Aggregation can also be categorized as a form of local administration. Although CCAs are a market-based utility overseen partly by the CPUC, they are still organized around cities, counties, or municipalities, and are overseen by locally-elected officials (Julien Gattaciececa, J.R. DeShazo, and Kelly Trumbull 2017).

### **Policy Assessment v. Administrative Assessment**

Since the introduction of renewables in the American energy market, there have been numerous debates on the topic of energy policies. The dominant strategy adopted by researchers has been an assessment of policy effectiveness. Research has focused on assessing individual programs like the RPS (such as Yin and Powers 2010, Delmas and Montes-Sancho 2011), as well as studies that seek to track the evolution of government programs (Carley and Browne 2013) or synthesize the general trends of all renewable energy policy (Park 2015).

Policy success is often defined narrowly by only one criterion, such as market penetration (i.e. revenue from VRE sales), nominal increases in VRE infrastructure, or as the amount of RECs (bundled and unbundled)(Yin and Powers 2010; Mack et al. 2011). A focus on policy

assessment alone has neglected to investigate the influence of administrative structure and utility organization on the effectiveness of renewable energy policy (del Río 2014).

The impact of administrative structure can be found between state renewable policy and regional transmission operators (RTO). For example, Iowa has mandated a capacity goal for VRE (Fischlein and Smith 2013). In 2015, Iowa ranked second in the entire country for installed wind capacity, and generated 31.3 percent of its energy from wind (US Energy Information Administration 2017). This metric is an achievement for Iowa, as it successfully fulfills the state's goal of increased capacity. However, examining the influence of administrative levels complicates to the state's policy goal. Power generated in Iowa is transmitted and distributed through the Midcontinent Independent System Operator (MISO). MISO is a regional operator under federal administrative jurisdiction that gets its electricity from multiple state sources. Consequently, the resulting energy mix that Iowans use is comprised of a much smaller percentage of renewables than indicated by state administrative goals alone. As of 2017, MISO reports only 10.6% of its energy customers use from VRE sources (Midcontinent Independent System Operator 2017).

A growing number of studies have shifted to focus on policy mixing and administrative interaction in the outcomes of renewable energy policy (De Jonghe et al. 2009; Lecuyer and Bibas 2012; Del Río 2009). These studies examine administrative level interaction predominantly in the Eurozone and the interplay between initiative levels and types, such as energy and climate policy in Spain (Del Río 2009). However, there is still a gap in research examining the administrative structure, particularly of electric utilities, for a prominent urban area in the United States. The purpose of this paper is to investigate this research gap in using the

metropolitan Los Angeles area as a case study, with a focus on how administrative structure relates to renewable energy initiatives.

## Method

As previously stated, the objective of this study was to observe how administrative structures impact renewable energy policies in Los Angeles. The methodology for this study was designed as a qualitative case study focusing on the metropolitan Los Angeles area, supplemented by interviews with various actors in the field of renewable energy policy.

Specifically, the case study aimed to capture the administrative environment related to renewable energy, such as policy mixing between administrative tiers, jurisdictional interplay, and the outcomes of initiatives and projects. The case study relied primarily on coded document analysis in order to assess the climate of administrative interaction in LA. Interviews provided an additional layer of narrative so as to better characterize the complex relationships being surveyed. In addition, interviewees were able to offer expert opinions on the success certain levels of administration and policies had at generating renewable energy policy.

It is difficult to study renewable policy or administrative relationships across the entire United States or through a comparison of two states, two cities, etc. Each city, state, or region has policy and management that is highly contextual on variables such as geographic location, political leanings, and special interests. Comparing and isolating variables is problematic given such high contextuality, so a case study of one area was preferred. A case study research design controlled for geography, affected population, and socioeconomic climate, and made it feasible to assess how different administrative levels of policy produce a particular outcome. A focus on Los Angeles then led to extrapolating a hypothesis to answer the research question.

## Participants

The participants in this study included five professionals who worked in fields related to renewable energy policy and public administration (*see* appendix I). Participants were gathered from a diverse range of topic areas in order generate a balanced opinions and narratives related to the research question. Participants were recruited from the academic policy research field, California State Public Utilities Commission, market consultants, and policy analysts from the LA mayor's sustainability team. All participation in the study was voluntary. The participants were initially recruited via their public email accounts (*Note*: The content of the interviews were personal opinions expressed by participants and were not representative of the organization they work for).

## Materials

Materials included the IRB informed consent forms given to participants (*see* appendix V). This form explained the research purpose, procedure, any risks and/or benefits of participation, as well as information on privacy and publication.

Original interview questions were also included (*see* appendix II). The questions were reviewed before the interview, and were limited to collecting participants' opinions and involvement with administrative roles and energy policy. The questions were open-ended and selective answering was allowed. The questions broadly covered the participants' role as an actor in the administrative landscape, as well as more focused questioning centered on capturing the interviewees' professional opinion on the topics surrounding renewable energy policy and administrative interplay in the LA area.

A majority of the research materials consisted of 13 renewable energy legislation, policy documents, and reports released by state and local level administrative agencies (*see* appendix

IV). These documents were included in the materials in order to gain a definitive understanding of the complex interactions that take place. These documents included enacted RPS legislation, state white papers, technical reports, as well as the Los Angeles city and county general plans. Wherever possible, documents were collected that illustrated the progress/setbacks of enacted policies, such as annual reports.

### **Design and Procedure**

The methodology for this research followed a coded qualitative document analysis approach combined with transcribed participant interviews. Interviews were arranged at the convenience of the participants via email. Phone calls were the primary method for interviewing participants. Participants electronically signed a consent form before speaking with researchers. The interviews consisted of thirteen open-ended questions posed to the participants. The conversation of the interview was loosely moderated, and participants and researchers were allowed to stray off the list of pre-prepared questions. Researchers took loose written notes during the conversations with participants, as well as recording the interview via mobile phone (per consent from the participant). Interviews were then transcribed in order to categorize and analyze the content.

Coded document analysis was used as another tool along with interviews in order to best triangulate and center on the same phenomenon: administrative levels and renewable energy policies in effect in Los Angeles (Bowen 2009). Document analysis consisted first of collecting pertinent documents mainly via online databases, government websites, and community pages. The documents were coded manually and via Dedoose software in order to categorize themes, examine empirical data and interpret meaning. The code list was broadly divided into background and context of policies and administrative levels, tracking changes in the landscape,

and observing relationships (*see* appendix III). Findings from document analysis were then combined with findings from interviews in order to generate an overall observation on the administrative landscape of renewable energy policy in Los Angeles and comment on the impact to the renewable energy field.

## **Findings & Analysis**

California is a large state with robust renewable energy initiatives occurring at multiple governing levels. Rather than focusing on a policy assessment, my research question was geared towards a structural assessment -- how local and state administrative structure influences renewable energy goals and initiatives in Los Angeles.

The policy structures of Los Angeles and California represent a laboratory in the organization and enforcement of a rapid, large-scale shift to variable renewable energy: all key findings are connected to local and state entities' choice to implement robust policies dictating the transition from traditional energy sources to renewable energy.

Administrative structure influenced the coordination of renewable policies, as well as the process of stranded asset compensation and transition to renewable energy infrastructure. In addition, research observed increased state oversight in energy policy, as well as concerns over increased renewable usage and its effect on electric grid reliability.

## Summary of Findings

Category/Theme	Finding
<i>Increased State Involvement in Administrative Jurisdiction</i>	<ul style="list-style-type: none"> <li>- There was an increased presence of central state authority within the structure of decentralized local-level utilities.</li> <li>- State control creates uniform mandates, but does not have control over utility energy procurement</li> </ul>
<i>Coordinating Goals w/ Feasibility</i>	<ul style="list-style-type: none"> <li>- Efforts to synchronize policy signals with feasibility of administrative entities</li> <li>- Coordination was needed in order to prevent policy gaps and redundancies in signals</li> </ul>
<i>Emerging Issues: Transitioning Infrastructure and Stranded Asset Compensation</i>	<ul style="list-style-type: none"> <li>- Not currently a robust discussion concerning the process of compensation for outdated investments in traditional forms of energy, process is different for each utility type</li> </ul>
<i>Reliability Concerns w/ Increased VRE Usage</i>	<ul style="list-style-type: none"> <li>- Ensuring grid reliability underpinned all renewable energy goals by administrations</li> <li>- The full effects of rapid transition to larger shares of renewables on the grid is largely unknown</li> <li>- More reliability concerns surrounding community choice aggregators when compared to IOUs and POUs</li> </ul>

Analysis of these policy documents and interviews found that Los Angeles has a unique administrative landscape regarding renewable energy policy. In particular, research findings focused on the three administrative structures of Los Angeles area electric utilities and their varying relationships complying with California state administrations and renewable energy policies. Separate utility structures in Los Angeles makes it more difficult to equitably enforce state mandates that are intended to generate a uniform playing field. IOUS, POUs, and CCAs have their respective benefits and drawbacks: however, incongruous structure impacts the ease at which customers and stakeholders can understand and interact with changing energy policies.



## Finding 1: Increased State Involvement in Administrative Jurisdiction

*In terms of driving state policy, the governor and state legislature do that. In terms of execution and regulation, it's an arm wrestle between CEC and governing bodies of local utilities.*

(Schweickert, pers. comm., January 12, 2018).

Policy documents and interviews displayed an increased presence of central state authority within the structure of decentralized local-level utilities. Whereas POUs have traditionally had local level authority over their electricity rates and most regulations, IOUs report to a central authority when following mandates or requesting to raise rates. This difference is observed through RPS legislation such as SB 1078 (2002), which is directed towards investor owned utilities and establishes state control through the CPUC. However, later legislation such as SB 107 (2006), SB 350 (2015), SB X1-2 (2011), and EO S-14-08 (2008) include language addressing municipal utilities, demonstrating increased state jurisdiction over publically owned utilities like LADWP. Bryan Schweickert, LADWP's director of economic development, stated that this centralization to the state level through additional RPS legislation and executive orders allows for city customers to be included in requirements for policy goals, "Otherwise, you [California] are missing out on production for 1.5 millions residences not coming from renewable resources"(pers. comm., January 12, 2018).

CCA's structure constitutes a more varied mixture of central and local control. AB 117 (2002) mandates state control over CCAs through implementation oversight from the CPUC and transmission coordination with CAISO, while the choice of where to purchase power is under local control.

### Increased State Control in LA Energy Policy

Research found a movement towards increased centralized state control over renewable energy initiatives. Five of the renewable policy documents analyzed originated from the State Assembly and Executive branch, while the remaining eight documents were sourced from local county and city authorities. However, compliance language with the state RPS was present in each of the local documents. State involvement in local administration was echoed by Schweickert, who commented that “over the recent 10 to 15 years you have the state of California, the legislature, chipping away at that [local] authority... from my perspective it [state authority] continued to chip away at the authority of the local governing body by implanting mandatory policy direction” (pers. comm., January 12, 2018). LADWP and the city of LA have a sustainable city pLAN and an integrated resource plan that parallels the state mandated RPS, but policy documents from the state legislature add an additional layer of authority that wasn’t explicitly designed to compliment the ongoing renewable projects of LA’s local administration.

Policy documents also reveal that the state does not have jurisdiction over energy procurement or the adequacy of resources used by IOUs, CCAs. An interview participant from the CPCU stated that the agency is still discussing this issue -- administering mandates for IOUs and CCAs while also ensuring safe and reliable energy procurement. As a POU, LADWP has its own procurement scheme stated in its integrated resource plan, which makes it separate from state control in that capacity.

### State Involvement Can Be Beneficial

Despite problems from increased state involvement, four of the interviewees mentioned that centralized administrative jurisdiction was still needed in order to create uniform policy. Michael Samulon from the Los Angeles mayor’s office of sustainability mentions that the city,

“sets a goal, but that doesn’t happen in a bubble. It happens with communication between the various stakeholders... we are in communication with our state level colleagues” (pers. comm., February 14, 2018). Climate and energy researcher Kate Konschnick mentioned that centralized policies from the state create uniform signals for administrations to follow, but that there are also instances in areas like energy procurement where it is better to have local agency. As to which administrative level was best at administering each type of renewable policy, “you could ask 100 people and get 100 different answers” (Konschnick, pers. comm., January 29, 2018). Three separate utility structures in Los Angeles County create three different policy signals, but the acknowledgement of state mandates in their local level documents represents the effort to maintain a uniform playing field across administrations.

#### **Community Choice Aggregation Can Increase Overall Decentralization**

On the other hand, the emergence of community choice aggregation utilities in Los Angeles County signals a move towards more decentralized institutions. As the only market competitor to SCE, the Clean Power Alliance of Southern California intends to supply a greater share of reliable renewable energy at competitive prices. Compared to the delocalized structure of IOUs, the CPA is run by a local joint powers authority. When paired with the local municipal structure of LADWP, community choice has the potential to steer Los Angeles renewable energy policy towards a more decentralized structure.

#### **Finding 2: Dissonance Between Renewable Goals with Actual Feasibility**

The effort to synchronize policy signals with the actual capabilities of administrative entities was a common theme appearing in research. Due to the multitude of administrations dealing with renewable policy at the local, regional, and state level (*see* literature review), coordinating activities was a central issue found in documents and participant interviews.

### Vertical v. Horizontal Coordination

Mentions of coordination were present in both local and state-level policy documents, but differed in context. RPS legislation most often mentioned coordination in the context between other state agencies like the CPUC and the CEC. In addition, state documents contained some mentions of coordination with local utilities and regional administrations (ex. California Air Resources Board), but the context surrounded reporting metrics and progress reports to the state.

When mentions of coordination were present in local level documents, the perspective centered on coordinating activities with other local entities. For example, LA's sustainable pLAN mentioned the importance of coordinating its sustainable initiatives across all city departments. Michael Samulon elaborated on this finding, explaining that the role of city administration was goal-setting (ex. increased solar capacity), whereas the role of LADWP and other city departments was carrying out those initiatives, "There are issues that can arise between mayoral goals and departmental capabilities. There's a number of different ways of dealing with them but there's also the realities that you have to deal with" (pers. comm., February 14, 2018). Accordingly, LADWP's resource plan states its intent to integrate renewable energy goals decreed by the mayor and city pLAN. In addition, the LADWP resource plan mentions coordinating its initiatives with state RPS mandates (SB 350) and energy transmission operators like CAISO and the Western Electricity Coordinating Council (WECC).

### Gaps Between Energy Policies & Energy Resources

The participants interviewed did not produce a strong consensus as to which administrative level was most effective for renewable policy: rather that balanced coordination was needed in order to prevent policy gaps and redundancies in signals. According to Michael Samulon, "There's no silver bullet. We need all the tools that are available to us to drive

change.” (pers. comm., February 14, 2018). Similarly, the representative from the CPUC stated that their agency was on the right track in coordinating with other state agencies like the CEC and CARB, but that issue lies in having the resources to follow through with renewable goals. Two interviewees mentioned that administrative can issues arise when there lapses between renewable energy policies and their actual implementation, “You can sometimes end up where a city or company has paid for installation of new renewable energy, but the grid operator isn’t calling on it. So it’s a wasted resource” (Konschnick, pers. comm., January 29, 2018). Similarly, Bryan Schweickert from LADWP mentioned that, “The [state] RPS requires us to go out and build and buy for energy we don’t need” (pers. comm., January 12, 2018). He identified a lapse in coordination between the goals of the state and the on-the-ground capabilities of LADWP, which already has its own renewable goals and procurement progress.

#### **State Involvement and Coordination Issues: LADWP’s Legal Appeal**

Increased state involvement and coordination issues have a more proportionate impact on POUs like LADWP as opposed to IOUs and CCAs, which are both already structured around oversight from the CPUC. Friction occurs when the legislative/executive branch imposes policies on traditionally independent organizations that already have their own policy platform tailored to the needs of its ratepayers. A recently settled (Oct 2017) appeal between LADWP and the California Energy Commission is an example of such friction occurring. The appeal surrounded procurement contracts, which are an agreement between LADWP and a power generator to produce a specified amount of electricity. Contracted power generators are connected through the Western Interconnection power grid, and can be located anywhere in the Western US and Canada.

The appeal centered on whether LADWP was able to grandfather-in existing procurement contracts with a Shell biomethane pipeline and BC Hydro small hydroelectric plants. Both contracts were created prior to SBX1-2 (2011), the legislation that brought POUs under state RPS regulation. The CEC allows for certain existing energy resources to be eligible for RPS compliance if they meet certain conditions, and both biomethane and regional hydroelectric are eligible if they met “the rules in place at the time the contract was executed”. LADWP interpreted “rules in place” referred to their own renewables portfolio program, which qualified the power generators. However, the CEC moved to disqualify the projects, saying that, “the most reasonable interpretation of the phrase ‘rules in place’ is that a generating facility...must meet the requirements of the Energy Commission Guidebook”(California Energy Commission Committee 2017), which initially disqualified both power contracts.

#### **Appeal Decision Creates Stranded Assets**

The final decision by the CEC committee ruled that LADWP’s pipeline biomethane contract would be eligible as a grandfathered resource, but that hydroelectric located out of state would still be ineligible. As a result, LADWP’s \$186 million contract with a BC Hydro in British Columbia became a stranded asset under state RPS requirements, possibly costing LADWP ratepayers an additional \$22 million in penalties.

LADWP’s legal appeal to the CEC is one of the first major examples of obstacles that can occur from robust renewable mandates created by state oversight. The language of SBX1-2 (2011) created a gap in understanding between a local entity (LADWP) and a central authority (CEC). What resulted was a lack of structural coordination – LADWP complied with the RPS according its own interpretation of the policy, while the CEC *enforced* the RPS according to a different interpretation. The appeal ended in compromise, with LADWP being allowed to

grandfather in one of the disputed resources. However, the decision also disqualified one of the procurement contracts, creating a stranded asset that cost Los Angeles ratepayers at least \$186 million. As aggressive policy increases the penetration of renewables, more energy resources may become ineligible for compliance, possibly prompting more legal battles and stranded asset creation.

### **Finding 3: Emerging Issues of Transitioning Infrastructure and Stranded Asset Compensation**

Collected documents had little to say regarding stranded assets, which are energy sources that have since become incompliant with renewable goals and emissions/efficiency standards. Three interviewees paralleled the document findings, stating that there was not currently a robust discussion concerning the process of compensation for outdated investments in traditional forms of energy. According to Kate Konschnick, “I think its still a really emerging area. There have been some attempts, but you don’t see anything comprehensive” (pers. comm., January 29, 2018).

### **Financing Differences Between POU and IOUs**

As a local entity separate from state control, LADWP is unique in having independent renewable policies that have been phasing out coal and to a lesser extent, natural gas. All LADWP revenue goes towards recovering costs and updating infrastructure. The utility integrated resource plan mentions that LADWP has already divested from its coal generation plants (Navajo Generating Station and Intermountain Power Plant, both outside of CA) and acquired more natural gas capabilities, but that coal debt payments and power contracts will not be completed until 2023 and 2027, respectively.

However, as a POU, LADWP has to report to public entities (rate commission, mayor, and city council) in order to raise rates to compensate for transitioning infrastructure. This degree

of public accountability may increase the barriers to financing stranded asset compensation as more renewable sources phase out natural gas plants. This regulatory structure differs from IOUs such as SCE, which are structured as proprietary businesses with limited public participation in the decision making process. Instead, IOUs are mandated through RPS legislation to go the CPUC in order request rate changes. As Schweickert points out, “To the extent to which we have sunk costs, stranded assets, there is no reimbursement for POUs. I think that IOUs can make a case to go to CPUC and ask for a rate increase, they do that all the time” (pers. comm., January 12, 2018).

#### **Minimal Compensation Issues with Community Aggregation**

SoCal CPA is a new utility with an emphasis on a high penetration of renewable energy, and discussions of compensation for dated coal and natural gas facilities was not present in their implementation documents. In addition, SoCal CPA is only an aggregated purchaser of electricity: other than distributed generation from commercial and residential solar systems, the CCA does not operate any of its own production facilities, making the issue of outdated assets obsolete.

The difference in how each type of utility is compensated when transitioning to renewables was observed to be a relatively new issue. The presence of such language was absent in half of the documents analyzed, and interview participants confirmed that it was an emerging issue as renewable targets are increasingly aggressive. According to CPUC senior analyst Rajan Mutialu, “This is something we’ll see going forward and I don’t think we have anything in place right now to address that issue” (pers. comm., January 25, 2018).



#### **Finding 4: Reliability Concerns with Increased Renewable Energy Use**

Ensuring a reliable supply of electricity for customers was the impetus underpinning every document analyzed, and it was an issue discussed by all interview participants. The Los Angeles city sustainable pLAN contains a power reliability program to ensure a safe electrical grid as more solar is installed in the city, and LADWP's integrated resource plan includes a Power System Reliability Program to maintain the grid as infrastructure undergoes transition. Reliability was also present in state RPS documents as a component of renewable policy goals, and most often accompanied transparency and enforcement measures. RPS documents (notably SB 350) mandates electrical providers to regularly report metrics to state agencies such as the CEC and CAISO, and additionally stipulate a publically available tracking system for renewable policy progress.

#### **Uncertainties Surrounding CCA's**

There was found to be more reliability concerns surrounding community choice aggregators when compared to IOUs and POUs. By 2020, roughly 60% of California's population will be eligible CCA customers (Rossi, n.d.). A report by the CEC mentions that such rapid growth raises issues of energy load uncertainty and reliability. CCAs are a new entity in the utility market, and municipalities and electricity generators are unsure of their dependability, both as suppliers of electricity to customers and as purchasers of renewable energy. According to Kate Konschnick, "there's definitely concern by the private sector to try and discern what does it mean to engage in these long term energy contracts with municipalities [CCAs]" (pers. comm., January 29, 2018). Mr. Mutialu from the CPUC reiterated concerns with CCAs as a new electrical entity that plans on using high proportions of variable renewable energy, "The other

issue is reliability. Having the resources to make sure that the lights stay on. CCA's are sort of a black box in terms of reliability." (pers. comm., January 25, 2018).

### **Market Impact of CCAs**

The market of impact CCAs is also uncertain. As CCA's demand a greater proportion of the utility scale renewable energy available, overall market prices could be driven down. On the other hand, CCAs may purchase a majority of the renewable energy supply available at the time, driving prices up.

The market impact of CCAs has an effect on IOUs, and to a lesser extent, POU's. IOUs like SCE is the direct market competitor with a CCA such as SoCal CPA; both utilities are participating in the same renewable energy market. On the other hand, POU's like LADWP have independent renewable energy procurement practices, lessening the market competition from CCAs. As more community choice aggregators go online in California, the economic consequences of their administrative structure will become increasingly apparent.

### **POUs and IOUs: Public Accountability v. Mandated Compliance**

Reliability was also a distinguishing issue between IOU and POU utilities. IOUs are mandated only to report to the CPUC, with limited public accountability. Infrastructure is maintained only as per regulatory compliance, reducing the responsiveness to customer complaints and public pressure. On the other hand, the POU's decision-making process is structured around interaction with local elected bodies (mayor, city council, board of commissioners), emphasizing responsibility to ratepayers.

## Unknown Consequences of High Renewable Energy Penetration

Although RPS legislation and local administrative documents mention feasibility studies, interview participants voiced that the current transition to larger shares of renewables on the grid is largely unknown territory. Governing bodies and utilities alike do not fully know the impact that large amounts of VRE usage will have on grid reliability, customer rates, and overall infrastructure. As said by Mr. Schweickert from LADWP,

Everyone in Sacramento is patting themselves on the back, but we've yet to get a full understanding of things like cost, rate impact, the duck curve, and energy storage. We don't even know yet the unintended consequences of a 25% or 33% RPS are. So utilities are scrambling to figure out what it all means while the state is pushing ahead with this aggressive continuous increase of the standard (pers. comm., January 12, 2018).

Two other interviewees voiced similar sentiments of the disconnect that can occur to between robust renewable energy goals and the feasibility of utilities and energy generators to implement them safely. As a utilities and natural gas trading consultant, Sherry Orton states, "No one is really adjusted to the new normal yet. It's sort of a logistical impossibility to ramp down all other fossil resources far enough to accommodate that" (pers. comm., January 25, 2018). Battery storage was discussed in interviews as well as documents as an avenue to mitigate reliability risks from variable energy sources like wind and solar. As an emerging technology, energy storage requirements were not present in earlier RPS documents (SB 1078, SB 107), but were later addressed by more recent legislation like SB 350 (2015). Increased energy storage capabilities are also mentioned in both the LA sustainable pLAN and LADWP's resource plan as

avenues to ensure reliability. SoCal CPA's implementation documents do not explicitly mention battery storage, but the CCA's plan to use distributed energy resources from commercial and residential facilities entails the use of smaller scale battery storage capabilities.

## **Recommendations**

### **Increase Ratepayer Participation in the Decision-Making Process**

Increasing customer and public participation in the decision-making process is a method to ensure a higher level of accountability and avoid policy initiatives that may be jeopardizing to ratepayers. This recommendation can be applied to rule-making bodies like the State legislature, as well as agencies like the CPUC who enforce said rules. Increased ratepayer participation applies especially to IOU utilities, which operate as private businesses. RPS legislation could be amended to mandate increased stakeholder engagement for IOUs, such as informational "town halls" for customers concerning proposed energy policies, rate increases, or energy procurement contracts. In addition, legislation could be augmented to better communication between the CPUC and CEC and the public. Improved communication on behalf of the CPUC and CEC would lower the barrier to entry for community organizations and interest groups seeking to understand the power structure of energy policy.

### **Streamline State Level Programs**

Having more streamlined programs at the state level (e.g. RPS, CPUC enforcement procedures, CEC reporting rules) would make it easier for power generators, utilities, and stakeholder groups to understand and comply with renewable energy mandates. Importantly, streamlined language with clear directives remedies coordination and compliance issues between administrations, and ultimately allows for the best interpretation of state programs within each

local context. With an improved uniform policy floor, issues similar to LADWP's legal appeal with the CEC may be avoided in the future as utilities increase their renewable energy penetration.

### **Form Stranded Asset Task Force**

In California and Los Angeles, stranded assets and ineligible resources are becoming a more prominent issue, especially in relation to the impact on lower income communities. Both legislation (SB 350) and interviewees mention that currently there is not enough information to fully address stranded assets and the impact on ratepayers. Policy and administrative issues cannot be solved if they cannot be measured – forming a task force to address stranded assets and renewables portfolio standard certification eligibility would provide better metrics and analysis in order to properly address the issue of stranded assets.

### **Conclusion**

The nature of the electrical grid as a trans-jurisdictional, interconnected system of infrastructure lends itself to multiple providers and governing bodies. As the current federal administration scales back its clean energy initiatives, state and local decision-making bodies have increased their roles in promoting clean energy use. Rather focusing on an assessment of policies alone, this paper assessed the impact of administrative structure on the enforcement and outcome of renewable energy policies, using Los Angeles as a case study.

In California, the transition to renewable energy has occurred in piecemeal: state renewables portfolio standard legislation represents centralized efforts to consolidate control over all utility types and create a more uniform, encompassing policy. California maintains its renewables portfolio standard through the State Legislature, Public Utilities Commission, and Energy

Commissions, while local organizations such as community choice aggregators and municipal utilities have sought to implement their own renewable energy policies. Interviews with renewable energy professionals and coded document analysis revealed that gaps in jurisdictional coordination, compliance (e.g. stranded assets) disputes, and overall grid reliability issues can arise as each administrative entity produces policy signaling the relatively rapid transition to renewable energy. In addition, the incongruous structure of POU, IOU, and CCA, particularly in Los Angeles, further complicates such issues.

Amending regulations to increase ratepayer participation, streamlining state level renewable programs, and forming a stranded asset task force were all discussed as possible avenues to address the findings of this paper. Each recommendation has the ability to better organize the administration of renewable energy policy in Los Angeles and California at large.

### **Limitations**

The field of energy research is complex and highly technical, making it harder to perform an in depth analysis without more formal knowledge of physics, engineering, or energy policy. A stronger background in these subjects would have necessitated a more thorough research methodology.

Another limitation is access to non-public documents like internal memorandums or meeting minutes. These documents would have given more insight into the decision making process of organizations, and any internal/external conflicts which may have had influence on their policy signals or organizational structure.

A drawback of the case study approach was that a detailed focus on Los Angeles was not necessarily representative of every situation relating to renewable energy policy and administrative levels. The findings of the study could not be generalized to apply to every city in

America. However, knowledge gained from the case study was used to develop an informed hypothesis surrounding the research question. Interviews were used to lessen the drawbacks of the case study method and to add greater applicability to the research hypothesis

In addition, there were limitations in the availability of interview participants. Some potential interviewees never responded to inquiries, either because they were too busy or because they ignored any requests to participate. Having a larger panel of interview participants from a larger range of organizations could increase the range of perspectives and opinions on renewable energy and its organization.

### **Further Research**

Suggestions for further research include a more technical approach to key findings of this paper, which would provide a better-rounded approach to the topic. In particular, additional research should focus on the issue of stranded assets and electric grid reliability, both of which are relatively new developing issues in the field of renewable energy policy.

## Works Cited

- “About EIA - Ourwork - U.S. Energy Information Administration (EIA).” n.d. Accessed November 28, 2017. [https://www.eia.gov/about/mission\\_overview.php](https://www.eia.gov/about/mission_overview.php).
- “An Overview of the Federal Energy Regulatory Commission and Federal Regulation of Public Utilities in the United States.” n.d. Accessed November 28, 2017. <https://www.ferc.gov/about/ferc-does/ferc101.pdf>.
- Appeal by Los Angeles Department of Water & Power re Renewables Portfolio Standard Certification Eligibility. 2017. California Energy Commission Committee.
- Armour, Nicholas, Adam Montgomery, David Kong, and Qian Yang. 2014. “Community Choice Aggregation in Torrance, CA A Pre-Feasibility Study Done by USC Price School of Public Policy.” *USC Price School of Public Policy*. [http://file.lacounty.gov/SDSInter/green/242553\\_USCCommunityChoiceAggregationTorrance,CA-02.2014.pdf](http://file.lacounty.gov/SDSInter/green/242553_USCCommunityChoiceAggregationTorrance,CA-02.2014.pdf).
- Bowen, Glenn A. 2009. “Document Analysis as a Qualitative Research Method.” *Qualitative Research Journal* 9 (2): 27–40. <https://doi.org/10.3316/QRJ0902027>.
- B. Wiener, Jonathan. 2017. “Climate Policy in the New US Administration.” *ECONOMICS AND POLICY OF ENERGY AND THE ENVIRONMENT*, no. 3 (August): 45–61. <https://doi.org/10.3280/EFE2016-003004>.
- California Energy Commission. 2010. “California Electric Utility Service Areas.” [http://www.energy.ca.gov/maps/serviceareas/Electric\\_Service\\_Areas\\_Detail.pdf](http://www.energy.ca.gov/maps/serviceareas/Electric_Service_Areas_Detail.pdf).
- . 2018. “Clean Energy & Pollution Reduction Act (SB 350) Overview.” 2018. <http://www.energy.ca.gov/sb350/>.
- California ISO. 2016. “What the Duck Curve Tells Us about Managing a Green Grid.” [https://www.caiso.com/Documents/FlexibleResourcesHelpRenewables\\_FastFacts.pdf](https://www.caiso.com/Documents/FlexibleResourcesHelpRenewables_FastFacts.pdf).
- California Local Government Commission. 2006. “Community Choice Aggregation Fact Sheet.” CEC-500-2006-082. California Energy Commission. <http://www.energy.ca.gov/2006publications/CEC-500-2006-082/CEC-500-2006-082.PDF>.
- California Municipal Utilities Association. 2003. “Publically Owned Utilities: What Makes Us Different?” [http://www.cmua.org/documents/About\\_POUs.pdf](http://www.cmua.org/documents/About_POUs.pdf).
- California Public Utilities Code*. n.d. Accessed October 16, 2017. [https://leginfo.ca.gov/faces/codes\\_displayText.xhtml?lawCode=PUC&division=1.&title=&part=1.&chapter=2.3.&article=16](https://leginfo.ca.gov/faces/codes_displayText.xhtml?lawCode=PUC&division=1.&title=&part=1.&chapter=2.3.&article=16).
- California Public Utilities Commission. 2018. “RPS Homepage.” 2018. [http://www.cpuc.ca.gov/RPS\\_Homepage/](http://www.cpuc.ca.gov/RPS_Homepage/).
- Carley, Sanya, and Tyler R. Browne. 2013. “Innovative US Energy Policy: A Review of States’ Policy Experiences: Innovative US Energy Policy.” *Wiley Interdisciplinary Reviews: Energy and Environment* 2 (5): 488–506. <https://doi.org/10.1002/wene.58>.
- Ciocirlan, Cristina E. 2008. “Analysing Preferences towards Economic Incentives in Combating Climate Change: A Comparative Analysis of US States.” *Climate Policy* 8 (6): 548–68. <https://doi.org/10.3763/cpol.2007.0441>.
- Clean Power Alliance of Southern California. 2017. “CCA Implementation Plan.”



- Congressional Budget Office. 2001. "Causes and Lessons of the California Electricity Crisis." Congressional Budget Office.  
<https://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/30xx/doc3062/californiaenergy.pdf>.
- Database of State Incentives for Renewables & Efficiency. 2017. "California Renewables Portfolio Standard." North Carolina State Clean Energy Technology Center. 2017.  
<http://programs.dsireusa.org/system/program/detail/840>.
- "Database of State Incentives for Renewables & Efficiency®." n.d. DSIRE. Accessed November 28, 2017. <http://www.dsireusa.org/>.
- Davenport, Coral. 2017. "Trump Lays Plans to Reverse Obama's Climate Change Legacy." *The New York Times*, March 21, 2017, sec. Climate.  
<https://www.nytimes.com/2017/03/21/climate/trump-climate-change.html>.
- De Jonghe, Cedric, Erik Delarue, Ronnie Belmans, and William D'haeseleer. 2009. "Interactions between Measures for the Support of Electricity from Renewable Energy Sources and CO2 Mitigation." *Energy Policy* 37 (11): 4743–52.  
<https://doi.org/10.1016/j.enpol.2009.06.033>.
- Delmas, Magali A., and Maria J. Montes-Sancho. 2011. "U.S. State Policies for Renewable Energy: Context and Effectiveness." *Energy Policy* 39 (5): 2273–88.  
<https://doi.org/10.1016/j.enpol.2011.01.034>.
- Del Río, Pablo. 2009. "Interactions between Climate and Energy Policies: The Case of Spain." *Climate Policy; London* 9 (2): 119–38.
- Dennis, Keith, Ken Colburn, and Jim Lazar. 2016. "Environmentally Beneficial Electrification: The Dawn of 'emissions Efficiency.'" *The Electricity Journal* 29 (6): 52–58. <https://doi.org/10.1016/j.tej.2016.07.007>.
- Elliott, E Donald,. 2013. "Why the U.S. Does Not Have a Renewable Energy Policy." *Yale University School of Law Faculty Scholarship Series*.  
[http://digitalcommons.law.yale.edu/cgi/viewcontent.cgi?article=6015&context=fss\\_papers](http://digitalcommons.law.yale.edu/cgi/viewcontent.cgi?article=6015&context=fss_papers).
- Evans, Thomas. 1978. *Public Utilities Regulatory Policy Act. Pub.L. 95-617*.  
<https://www.gpo.gov/fdsys/pkg/STATUTE-92/pdf/STATUTE-92-Pg3117.pdf>.
- "Federal Energy and Water Efficiency Project Financing | Department of Energy." n.d. Accessed November 28, 2017. <https://www.energy.gov/eere/femp/federal-energy-and-water-efficiency-project-financing>.
- Federal Energy Regulatory Commission. 1992. *FERC Order No. 636*.
- . 2018. "FERC: Industries - CAISO." January 18, 2018.  
<https://www.ferc.gov/industries/electric/indus-act/rto/caiso.asp>.
- Federal Energy Regulatory Commission v. Electric Power Supply Association. 2015, 135 S. Ct. 2049. Supreme Court.
- "Federal Policy on Energy, 2017-2020 - Ballotpedia." n.d. Accessed November 28, 2017.  
[https://ballotpedia.org/Federal\\_policy\\_on\\_energy,\\_2017-2020](https://ballotpedia.org/Federal_policy_on_energy,_2017-2020).
- "FERC: Federal Statutes." n.d. Accessed November 28, 2017.  
<https://www.ferc.gov/legal/fed-sta.asp>.
- Fischlein, Miriam, and Timothy M. Smith. 2013. "Revisiting Renewable Portfolio Standard Effectiveness: Policy Design and Outcome Specification Matter." *Policy Sciences; Dordrecht* 46 (3): 277–310. <https://doi.org/http://dx.doi.org/10.1007/s11077-013-9175-0>.

- Gillenwater, Michael. 2008. "Redefining RECs—Part 1: Untangling Attributes and Offsets." *Energy Policy* 36 (6): 2109–19. <https://doi.org/10.1016/j.enpol.2008.02.036>.
- Giovanni S. Saarman González. 2016. "Evolving Jurisdiction Under the Federal Power Act: Promoting Clean Energy Policy." *UCLA Law Review* 63. <https://www.uclalawreview.org/wp-content/uploads/2016/05/Saarman-63-5.pdf>.
- Glaeser, Edward L., and Claudia Dale Goldin, eds. 2006. *Corruption and Reform: Lessons from America's Economic History*. A National Bureau of Economic Research Conference Report. Chicago: University of Chicago Press.
- Intergovernmental Panel on Climate Change. 2014. "Climate Change 2014 Synthesis Report Summary for Policymakers." [http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5\\_SYR\\_FINAL\\_SPM.pdf](http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf).
- James H. Nelson, Ph.D., and Laura M. Wisland. 2015. "Achieving 50 Percent Renewable Electricity in California The Role of Non-Fossil Flexibility in a Cleaner Electricity Grid." August 2015. <http://www.ucsusa.org/sites/default/files/attach/2015/08/Achieving-50-Percent-Renewable-Electricity-In-California.pdf>.
- Jim Lazar. 2016. "Teaching the 'Duck' to Fly, Second Edition." *The Regulatory Assistance Project*, February. <http://www.raponline.org/wp-content/uploads/2016/05/rap-lazar-teachingtheduck2-2016-feb-2.pdf>.
- Jocelyn Durkay. 2015. "Community Choice Aggregation Policies." National Conference of State Legislatures. January 12, 2015. <http://www.ncsl.org/research/energy/community-choice-aggregation.aspx>.
- Julien Gattaciecce, J.R. DeShazo, and Kelly Trumbull. 2017. "The Promises and Challenges of Community Choice Aggregation in California." 2017. <http://innovation.luskin.ucla.edu/sites/default/files/The%20Promises%20and%200Challenges%20of%20Community%20Choice%20Aggregation%20in%20CA.pdf>.
- Kasprak, Alex. 2017. "Did the Department of Energy Ask a Scientist to Remove the Words 'Climate Change' from a Grant Proposal?" Snopes.com. August 25, 2017. <https://www.snopes.com/news/2017/08/25/doe-grants-climate-change/>.
- Lecuyer, Oskar, and Ruben Bibas. 2012. "Combining Climate and Energy Policies: Synergies or Antagonism? Modeling Interactions with Energy Efficiency Instruments." *Centre International de Recherches Sur l'Environnement et Le Développement*, CIRED Working Papers Series, 37 (January). <http://www2.centre-cired.fr/IMG/pdf/CIREDWP-201237.pdf>.
- "Los Angeles Community Choice Energy." 2017. 2017. <http://green.lacounty.gov/wps/portal/green/lacce>.
- "Los Angeles County 2025 General Plan." n.d. Accessed November 14, 2017. [http://planning.lacounty.gov/assets/upl/project/gp\\_final-general-plan.pdf](http://planning.lacounty.gov/assets/upl/project/gp_final-general-plan.pdf).
- Los Angeles Department of Water & Power. 2016. "2016 Final Power Integrated Resource Plan." [https://www.ladwp.com/ladwp/faces/wcnav\\_externalId/a-p-doc?\\_adf.ctrl-state=12qp2h4leg\\_4&\\_afLoop=944833716987006](https://www.ladwp.com/ladwp/faces/wcnav_externalId/a-p-doc?_adf.ctrl-state=12qp2h4leg_4&_afLoop=944833716987006).
- "Los Angeles Sustainable City Plan." n.d. Accessed November 14, 2017. <http://plan.lamayor.org/wp-content/uploads/2017/03/the-plan.pdf>.
- Lovins, Amory. 1990. "The Negawatt Revolution." Rocky Mountain Institute. [https://www.rmi.org/wp-content/uploads/2017/06/RMI\\_Negawatt\\_Revolution\\_1990.pdf](https://www.rmi.org/wp-content/uploads/2017/06/RMI_Negawatt_Revolution_1990.pdf).

- Mack, Joel H., Natasha Gianvecchio, Marc T. Campopiano, and Suzanne M. Logan. 2011. "All RECs Are Local: How In-State Generation Requirements Adversely Affect Development of a Robust REC Market." *The Electricity Journal* 24 (4): 8–25. <https://doi.org/10.1016/j.tej.2011.04.007>.
- Midcontinent Independent System Operator, Inc. 2017. "Fuel Mix." MISO Energy. 2017. <https://www.misoenergy.org/MarketsOperations/RealTimeMarketData/Pages/FuelMix.aspx>.
- Migden. 2002. *Assembly Bill No. 117. CPUC § 331.1, 366.2, 381.1*. [http://www.leginfo.ca.gov/pub/01-02/bill/asm/ab\\_0101-0150/ab\\_117\\_bill\\_20020924\\_chaptered.pdf](http://www.leginfo.ca.gov/pub/01-02/bill/asm/ab_0101-0150/ab_117_bill_20020924_chaptered.pdf).
- Mills, Andrew D., and Ryan H. Wiser. 2015. "Strategies to Mitigate Declines in the Economic Value of Wind and Solar at High Penetration in California." *Applied Energy* 147 (June): 269–78. <https://doi.org/10.1016/j.apenergy.2015.03.014>.
- Mills, Andrew, and Ryan Wiser. 2012. "Changes in the Economic Value of Variable Generation at High Penetration Levels: A Pilot Case Study of California." June 2012. <http://emp.lbl.gov/sites/all/files/lbnl-5445e.pdf>.
- "Mission | Department of Energy." n.d. Accessed November 28, 2017. <https://energy.gov/mission>.
- M. McCright, Aaron, and Riley Dunlap. 2003. *Defeating Kyoto: The Conservative Movement's Impact on U.S. Climate Change Policy*. Vol. 50.
- Park, Sunjoo. 2015. "State Renewable Energy Governance: Policy Instruments, Markets, or Citizens: State Renewable Energy Governance." *Review of Policy Research* 32 (3): 273–96. <https://doi.org/10.1111/ropr.12126>.
- Pasadena, City of. 2017. "Reports & Documents." Pasadena Water and Power. 2017. <https://ww5.cityofpasadena.net/water-and-power/reportsanddocuments/>.
- Paul Denholm, Matthew O'Connell, Gregory Brinkman, and Jennie Jorgenson. 2015. "Overgeneration from Solar Energy in California: A Field Guide to the Duck Chart." *National Renewable Energy Laboratory*, November. <https://www.nrel.gov/docs/fy16osti/65023.pdf>.
- Río, Pablo del. 2014. "On Evaluating Success in Complex Policy Mixes: The Case of Renewable Energy Support Schemes." *Policy Sciences* 47 (3): 267–87. <https://doi.org/10.1007/s11077-013-9189-7>.
- Robinson, Brandi. 2017. "History of Major Energy Policy Landmarks | GEOG (EME) 432: Energy Policy." Penn State College of Earth and Mineral Sciences. 2017. <https://www.e-education.psu.edu/geog432/node/116>.
- Rossi, Jim. n.d. "Community Choice Energy: Promises/Perils/Barriers." Vanderbilt University Law School.
- Southern California Edison. 2018. "Renewable Energy Credits." SCE.com. 2018. <https://www.sce.com/wps/portal/home/regulatory/tariff-books/rates-pricing-choices/renewable-energy-credit>.
- "State Constitution - Table of Contents." n.d. Accessed November 28, 2017. <http://www.leginfo.ca.gov/const-toc.html>.
- Sweeny, James. 2002. "The California Electricity Crisis: Lessons for the Future." *Our Energy Future* 32 (3). <https://nae.edu/Publications/Bridge/OurEnergyFuture/TheCaliforniaElectricityCrisisLessonsfortheFuture.aspx>.

- “The Constitution of the United States: A Transcription.” 2015. National Archives. November 4, 2015. <https://www.archives.gov/founding-docs/constitution-transcript>.
- Tomain, Joseph. 2015. “The Democratization of Energy.” *University of Cincinnati College of Law Scholarship and Publications*.  
[http://scholarship.law.uc.edu/cgi/viewcontent.cgi?article=1309&context=fac\\_pubs](http://scholarship.law.uc.edu/cgi/viewcontent.cgi?article=1309&context=fac_pubs).
- US Department of Energy. 2014. “Wind Vision: A New Era for Windpower in the United States.” U.S. Department of Energy.  
[https://www.energy.gov/sites/prod/files/WindVision\\_Report\\_final.pdf](https://www.energy.gov/sites/prod/files/WindVision_Report_final.pdf).
- . 2018. “Department of Energy FY 2019 Budget Request Fact Sheet.”  
<https://www.energy.gov/sites/prod/files/2018/02/f48/Energy%20Department%20FY%202019%20Budget%20Fact%20Sheet.pdf>.
- US Energy Information Administration. 1998. “California Electric Energy Crisis - Provisions of AB 1890.” 1998.  
<https://www.eia.gov/electricity/policies/legislation/california/assemblybill.html>.
- . 2017. “Electric Power Monthly: With Data for July 2017.”  
<https://www.eia.gov/electricity/monthly/>.
- Yin, Haitao, and Nicholas Powers. 2010. “Do State Renewable Portfolio Standards Promote in-State Renewable Generation?” *Energy Policy* 38 (2): 1140–49.  
<https://doi.org/10.1016/j.enpol.2009.10.067>.

## Appendix

### Appendix I – Interview Participant List

Interview Date	Name	Job Title	Organization
1/12/18	Bryan Schweickert	Director of Economic Development	Los Angeles Department of Water & Power
1/25/18	Sherry Orton	Senior Analyst – Utilities and Natural Gas	Doyle Trading Consultants
1/25/18	Rajan Mutialu	Senior Analyst, Policy and Planning Division	California Public Utilities Commission
1/29/18	Kate Konschnik	Climate & Energy Director	Nicholas Institute for Environmental Policy Solutions, Duke University
2/14/18	Michael Samulon	Policy Analyst	Sustainability Office of Los Angeles Mayor Eric Garcetti

### Appendix II – Interview Questions

- What is your involvement in the area energy policy/what administrative level?
- What is your opinion on the current administrative landscape of your field?
- What are your opinions on the effectiveness of California state level renewable energy policy?
  - Should local or federal administrations increase/decrease their involvement?
- At what administrative level would renewable energy policy be most effective in terms of increasing generation and use?
- Are there widely used policies that you consider ineffective, harmful, or distracting from actually generating renewable energy?
  - Do such policies occur at a particular administrative level?
- What metrics do you think are most effective at accurately measuring the amount of renewable energy generated and used by a state?
  - Conversely, what metrics are the least effective at this goal?

- Can California achieve renewable energy goals by using existing administrative structures, or are there gaps that have not yet been widely addressed?
- Do you consider a portfolio standard as an effective tool at mandating renewable energy generation? What could be changed/improved in state renewable portfolio standard to increase their effectiveness?
- What are your opinions on community choice aggregation and its effect on the administrative landscape of energy policy?
- Are local, state, or federal policies prepared to address the technological barriers to increased renewable energy use (i.e. duck curve overgeneration, distributed generation, storage)?
- What are the power dynamics between local, state, and federal administrations? Who holds the power to sway the decision making process?
- Traditional energy infrastructure (eg. fossil fuels) is often funded and planned decades ahead of anticipated need. How will renewable energy policy be able to fairly compensate utilities and ratepayers who have already invested in such future projects?
- Does jurisdictional/policy intermixing between different administrative bodies significantly effect outcomes and initiatives?

### Appendix III – Code List

Code Name	Description
<b>Administrative Jurisdiction</b>	Mentions that outline the administrative jurisdiction of a policy
<b>Centralization</b>	Centralizing authority from local bodies to the state and/or federal organizations
<b>Decentralization</b>	Transfer of authority from central administrations to the local level
<b>Barriers</b>	Mentions of potential barriers to carrying out policies
<b>CCA</b>	Community Choice Aggregators
<b>Capacity</b>	Mentions of VRE capacity as a policy goal
<b>Compliance</b>	Mentions of compliance with existing regulations and mandates, such as the CAA or RPS
<b>Coordination</b>	Coordinating regulatory activities in accordance with other policies
<b>Distributed Generation</b>	Decentralized small scale VRE found in homes and businesses
<b>Effective/Ineffective Policy</b>	Mentions of policies that are effective or policies that have previously held back progress
<b>Enforcement</b>	Excerpts that mention enforcement of policies
<b>Increasing VRE</b>	Increasing VRE generation and usage as a goal
<b>IOU</b>	Investor Owned Utility
<b>“Pancake Policy”</b>	A policy's interaction/overlap with another policy, either at the same or different admin level
<b>POU/MOU</b>	Publically/Municipally Owned Utility
<b>Ratepayers</b>	Excerpts discussing the role of utility ratepayers
<b>Reducing GHGs</b>	Reducing GHGs as a goal
<b>Reliability</b>	Mentions of reliability relating to generating, transmitting, and distributing energy.
<b>Stranded Assets</b>	Energy sources that have since become ineligible/obsolete under VRE policy
<b>Transition</b>	Similar to stranded assests; mentions of transitioning from traditional energy infrastructure
<b>Transparency</b>	Disclosure of factual information to reduce public risks and reveal the inner workings of a policy
<b>Utility Scale RE</b>	Large scale generation, transmission, and distribution of renewables

## Appendix IV – Documents Analyzed

Document	Links
<b>AB 117 (2002)</b>	<a href="http://www.leginfo.ca.gov/pub/01-02/bill/asm/ab_0101-0150/ab_117_bill_20020924_chaptered.pdf">http://www.leginfo.ca.gov/pub/01-02/bill/asm/ab_0101-0150/ab_117_bill_20020924_chaptered.pdf</a>
<b>CEC December 2017 RPS Progress Report</b>	<a href="http://www.energy.ca.gov/renewables/tracking_progress/documents/renewable.pdf">http://www.energy.ca.gov/renewables/tracking_progress/documents/renewable.pdf</a>
<b>City of Los Angeles Sustainable pLAN</b>	<a href="http://plan.lamayor.org/wp-content/uploads/2017/03/the-plan.pdf">http://plan.lamayor.org/wp-content/uploads/2017/03/the-plan.pdf</a>
<b>EO S-14-08 (2008)</b>	<a href="http://www.drecp.org/documents/docs/2008-11-17_Exec_Order_S-14-08.pdf">http://www.drecp.org/documents/docs/2008-11-17_Exec_Order_S-14-08.pdf</a>
<b>LA Community Choice Energy Implementation Packet</b>	<a href="https://www.lacounty.gov/files/sustainability/LACCE%20Implementation%20Plan%20Packet.pdf">https://www.lacounty.gov/files/sustainability/LACCE%20Implementation%20Plan%20Packet.pdf</a>
<b>LA County Renewable Energy Ordinance</b>	<a href="http://file.lacounty.gov/SDSInter/bos/supdocs/109934.pdf">http://file.lacounty.gov/SDSInter/bos/supdocs/109934.pdf</a>
<b>LA Sustainable pLAN 2<sup>nd</sup> Annual Report (2016-17)</b>	<a href="http://plan.lamayor.org/wp-content/uploads/2017/03/sustainability_pLAN_year_two.pdf">http://plan.lamayor.org/wp-content/uploads/2017/03/sustainability_pLAN_year_two.pdf</a>
<b>LA Sustainable pLAN Progress Report Summary</b>	<a href="http://plan.lamayor.org/wp-content/uploads/2017/03/sustainable-city-plan-progress.pdf">http://plan.lamayor.org/wp-content/uploads/2017/03/sustainable-city-plan-progress.pdf</a>
<b>LADWP 2016 Power Integrated Resource Plan</b>	<a href="https://www.ladwp.com/ladwp/faces/wcnav_externalId/a-p-doc?_adf.ctrl-state=8x1ulemty_4&amp;_afLoop=865127465769245">https://www.ladwp.com/ladwp/faces/wcnav_externalId/a-p-doc?_adf.ctrl-state=8x1ulemty_4&amp;_afLoop=865127465769245</a>
<b>SB 107 (2006)</b>	<a href="http://www.energy.ca.gov/portfolio/documents/documents/sb_107_bill_20060926_chaptered.pdf">http://www.energy.ca.gov/portfolio/documents/documents/sb_107_bill_20060926_chaptered.pdf</a>
<b>SB 1078 (2002)</b>	<a href="http://www.energy.ca.gov/portfolio/documents/documents/SB1078.PDF">http://www.energy.ca.gov/portfolio/documents/documents/SB1078.PDF</a>
<b>SB 350 (2015)</b>	<a href="https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350">https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350</a>
<b>SBX1-2 (2011)</b>	<a href="http://www.leginfo.ca.gov/pub/11-12/bill/sen/sb_0001-0050/sbx1_2_bill_20110412_chaptered.html">http://www.leginfo.ca.gov/pub/11-12/bill/sen/sb_0001-0050/sbx1_2_bill_20110412_chaptered.html</a>





OCCIDENTAL COLLEGE  
Consent for Participation in a Research Study

**Title of Study:** Impact analysis of state-level Command and Control policies and market-based incentives as indicators of renewable energy generation

**Student Investigator:** Morris Mills

**Faculty Supervisor:** Professor Mijin Cha

You are invited to participate in a research study conducted by Morris Mills, a student from the Urban and Environmental Policy Department at Occidental College. You must be at least 18 years of age to participate in this study.

The purpose of this study is to investigate the administrative landscape and policy intermixing of renewable energy policy, using Los Angeles as a case study. A qualitative case study approach will be employed in this study. Interviews with renewable energy policy researchers will be conducted over email or via telephone/video calling in order to obtain a up-to-date, straightforward, narrative concerning a relatively complex research field. Additional methods include a qualitative coded analysis of local, state, and federal renewable energy policy documents pertaining to Los Angeles. The aim of the study is provide an observation of administrative and policy intermixing and how it affects renewable energy outcomes and initiatives. The findings of this research will be presented at Occidental College and may be published publicly online.

If you agree to take part in this study, you will be asked to a series of interview questions related to the study. The interviewer will ask a question and the participant will have the opportunity to respond. The interview will be conducted only once in a private setting. The interview will not last longer than one hour (if interview is conducted through phone/video calling).

Your decision to participate or decline participation in this study is voluntary and you may skip any questions that you do not want to answer. You are free to withdraw from the study at any time without penalty, with no loss of benefits to which you were otherwise entitled.

There are no anticipated risks or discomforts to your participation in this study other than those encountered in daily life. To the best of our ability your answers in this study will remain confidential as stated below.

Although you may not directly benefit from this research, by participating in this study your work may gain additional exposure to a previously un-contacted audience., and help to raise awareness of the issues of renewable energy policy .

Consent forms and data will be stored on a password-protected computer during research. Recordings of interviews will be stored on a password-protected smartphone. After the data analysis period, consent forms and data will be printed (or saved to an external hard drive) and be turned over to the

supervisor for storage, along with the interview recordings or transcript. At such time, all data, consent forms and audio recordings will be deleted from the electronic devices. Hard copies will be stored under lock and key at the UEP facility for a period of no less than three years after project completion. If given consent, the subject's identity will be released as part of the study. This fact will be communicated through the email consent form prior to the start of the interview.

Data collected from this study will be used as part of a senior comprehensive project under the UEP department at Occidental. The data will be presented at Occidental College, through a research paper, and possibly published publicly on the college's website. Data derived from this study may be held for future use, and may be stored and re-analyzed, or otherwise combined with other data at a later date.)


You will not be paid for participating in this study

If you have any questions or concerns about the research, you can contact Mo Mills at (314) 691 1139/millsm@oxy.edu or Professor Mijin Cha at (323) 341 4047/mcha@oxy.edu. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board Office at Occidental College in Los Angeles, CA, 90041 at [hsrrc@oxy.edu](mailto:hsrrc@oxy.edu) or (323) 259-2921.

Please print a copy of this page for your records.

By signing below you are indicating that you are at least eighteen years of age, have read and understood this consent form and voluntarily agree to participate in this research study.

I do \_\_\_ I do not \_\_\_ grant permission for my real name to be used in the final published report.

Signature  Date 3/21/18

OCCIDENTAL COLLEGE  
Consent for Participation in a Research Study

**Title of Study:** Impact analysis of state-level Command and Control policies and market-based incentives as indicators of renewable energy generation

**Student Investigator:** Morris Mills

**Faculty Supervisor:** Professor Mijin Cha

You are invited to participate in a research study conducted by Morris Mills, a student from the Urban and Environmental Policy Department at Occidental College. You must be at least 18 years of age to participate in this study.

The purpose of this study is to investigate the administrative landscape and policy intermixing of renewable energy policy, using Los Angeles as a case study. A qualitative case study approach will be employed in this study. Interviews with renewable energy policy researchers will be conducted over email or via telephone/video calling in order to obtain a up-to-date, straightforward, narrative concerning a relatively complex research field. Additional methods include a qualitative coded analysis of local, state, and federal renewable energy policy documents pertaining to Los Angeles. The aim of the study is provide an observation of administrative and policy intermixing and how it affects renewable energy outcomes and initiatives. The findings of this research will be presented at Occidental College and may be published publicly online.

If you agree to take part in this study, you will be asked to a series of interview questions related to the study. The interviewer will ask a question and the participant will have the opportunity to respond. The interview will be conducted only once in a private setting. The interview will not last longer than one hour (if interview is conducted through phone/video calling).

Your decision to participate or decline participation in this study is voluntary and you may skip any questions that you do not want to answer. You are free to withdraw from the study at any time without penalty, with no loss of benefits to which you were otherwise entitled.

There are no anticipated risks or discomforts to your participation in this study other than those encountered in daily life. To the best of our ability your answers in this study will remain confidential as stated below.

Although you may not directly benefit from this research, by participating in this study your work may gain additional exposure to a previously un-contacted audience., and help to raise awareness of the issues of renewable energy policy .

Consent forms and data will be stored on a password-protected computer during research. Recordings of interviews will be stored on a password-protected smartphone. After the data analysis period, consent forms and data will be printed (or saved to an external hard drive) and be turned over to the

supervisor for storage, along with the interview recordings or transcript. At such time, all data, consent forms and audio recordings will be deleted from the electronic devices. Hard copies will be stored under lock and key at the UEP facility for a period of no less than three years after project completion. If given consent, the subject's identity will be released as part of the study. This fact will be communicated through the email consent form prior to the start of the interview.

Data collected from this study will be used as part of a senior comprehensive project under the UEP department at Occidental. The data will be presented at Occidental College, through a research paper, and possibly published publicly on the college's website. Data derived from this study may be held for future use, and may be stored and re-analyzed, or otherwise combined with other data at a later date.)

You will not be paid for participating in this study

If you have any questions or concerns about the research, you can contact Mo Mills at (314) 691 1139/millsm@oxy.edu or Professor Mijin Cha at (323) 341 4047/mcha@oxy.edu. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board Office at Occidental College in Los Angeles, CA, 90041 at [hsrrc@oxy.edu](mailto:hsrrc@oxy.edu) or (323) 259-2921.

Please print a copy of this page for your records.

By signing below you are indicating that you are at least eighteen years of age, have read and understood this consent form and voluntarily agree to participate in this research study.

I do  I do not  grant permission for my real name to be used in the final published report.

Signature Karen E. Konrad Date 2/1/18



OCCIDENTAL COLLEGE  
Consent for Participation in a Research Study

**Title of Study:** Impact analysis of state-level Command and Control policies and market-based incentives as indicators of renewable energy generation

**Student Investigator:** Morris Mills

**Faculty Supervisor:** Professor Mijin Cha

You are invited to participate in a research study conducted by Morris Mills, a student from the Urban and Environmental Policy Department at Occidental College. You must be at least 18 years of age to participate in this study.

The purpose of this study is to investigate the administrative landscape and policy intermixing of renewable energy policy, using Los Angeles as a case study. A qualitative case study approach will be employed in this study. Interviews with renewable energy policy researchers will be conducted over email or via telephone/video calling in order to obtain a up-to-date, straightforward, narrative concerning a relatively complex research field. Additional methods include a qualitative coded analysis of local, state, and federal renewable energy policy documents pertaining to Los Angeles. The aim of the study is provide an observation of administrative and policy intermixing and how it affects renewable energy outcomes and initiatives. The findings of this research will be presented at Occidental College and may be published publicly online.

If you agree to take part in this study, you will be asked to a series of interview questions related to the study. The interviewer will ask a question and the participant will have the opportunity to respond. The interview will be conducted only once in a private setting. The interview will not last longer than one hour (if interview is conducted through phone/video calling).

Your decision to participate or decline participation in this study is voluntary and you may skip any questions that you do not want to answer. You are free to withdraw from the study at any time without penalty, with no loss of benefits to which you were otherwise entitled.

There are no anticipated risks or discomforts to your participation in this study other than those encountered in daily life. To the best of our ability your answers in this study will remain confidential as stated below.

Although you may not directly benefit from this research, by participating in this study your work may gain additional exposure to a previously un-contacted audience., and help to raise awareness of the issues of renewable energy policy .

Consent forms and data will be stored on a password-protected computer during research. Recordings of interviews will be stored on a password-protected smartphone. After the data analysis period, consent forms and data will be printed (or saved to an external hard drive) and be turned over to the

supervisor for storage, along with the interview recordings or transcript. At such time, all data, consent forms and audio recordings will be deleted from the electronic devices. Hard copies will be stored under lock and key at the UEP facility for a period of no less than three years after project completion. If given consent, the subject's identity will be released as part of the study. This fact will be communicated through the email consent form prior to the start of the interview.

Data collected from this study will be used as part of a senior comprehensive project under the UEP department at Occidental. The data will be presented at Occidental College, through a research paper, and possibly published publicly on the college's website. Data derived from this study may be held for future use, and may be stored and re-analyzed, or otherwise combined with other data at a later date.)

You will not be paid for participating in this study

If you have any questions or concerns about the research, you can contact Mo Mills at (314) 691 1139/millsm@oxy.edu or Professor Mijin Cha at (323) 341 4047/mcha@oxy.edu. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board Office at Occidental College in Los Angeles, CA, 90041 at [hsrrc@oxy.edu](mailto:hsrrc@oxy.edu) or (323) 259-2921.

Please print a copy of this page for your records.

By signing below you are indicating that you are at least eighteen years of age, have read and understood this consent form and voluntarily agree to participate in this research study.

I do  I do not  grant permission for my real name to be used in the final published report.

Signature  Date 1/20/18

supervisor for storage, along with the interview recordings or transcript. At such time, all data, consent forms and audio recordings will be deleted from the electronic devices. Hard copies will be stored under lock and key at the UEP facility for a period of no less than three years after project completion. If given consent, the subject's identity will be released as part of the study. This fact will be communicated through the email consent form prior to the start of the interview.

Data collected from this study will be used as part of a senior comprehensive project under the UEP department at Occidental. The data will be presented at Occidental College, through a research paper, and possibly published publicly on the college's website. Data derived from this study may be held for future use, and may be stored and re-analyzed, or otherwise combined with other data at a later date.)

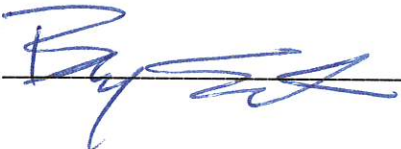
You will not be paid for participating in this study

If you have any questions or concerns about the research, you can contact Mo Mills at (314) 691 1139/millsm@oxy.edu or Professor Mijin Cha at (323) 341 4047/mcha@oxy.edu. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board Office at Occidental College in Los Angeles, CA, 90041 at [hsrrc@oxy.edu](mailto:hsrrc@oxy.edu) or (323) 259-2921.

Please print a copy of this page for your records.

By signing below you are indicating that you are at least eighteen years of age, have read and understood this consent form and voluntarily agree to participate in this research study.

I do  I do not  grant permission for my real name to be used in the final published report.

Signature  Date 1/11/18