A Just Transition: Energy Democracy, Community Choice Aggregation, and the (Im)possibilities of Change

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Abstract:

The ways in which electricity is being generated, distributed, transmitted, and stored are undergoing unprecedented change. Movements for energy democracy, and proponents of a Just Transition —a transformation of the current fossil fuel-based system into place-based, sustainable, equitable, and democratically controlled economies—have attempted to capture the potential of these changes to realize a low-carbon electricity system through new and more equitable electricity generation and procurement models. Community Choice Aggregation (CCA) is one such utility-scale electricity service provision model in California that explicitly aims to reduce greenhouse gas emissions through the provision of locally produced and democratically controlled renewable energy that simultaneously catalyzes localized economic development. Although community choice aggregation is a twenty-year-old electricity procurement and provision model, the growth of CCAs have been slow; they have only been legalized in seven states since its inception in 1997. To date, limited academic research has been conducted to examine the barriers to the growth of community choice aggregation. Furthermore, this research does not connect CCA to larger strategies to enable such a Just Transition, nor does it identify policy levers to bolster community choice aggregators' ability to deliver on their stated goals. This thesis therefore examines the barriers to realizing community choice aggregation. To do so, I conducted semi-structured interviews with individuals essential to the creation of six existing and two emerging community choice aggregators in California. I find that while exit fees, customer opt-outs, and financing remain persistent challenges to CCA formation, new CCA networks, and grassroots coalitions for a Just Transition have allowed CCAs to overcome these barriers. Additionally, I observed that for community choice aggregators, maintaining business functions and ensuring ratepayer-based revenue take precedence over catalyzing economic development. Ultimately, I find that while the CCA market has experienced significant development, allowing them to provide ratepayers cost competitive renewable energy, community choice aggregators have not matured to a point where they are able to meaningfully catalyze local economic development or deepen civic engagement in energy-related decisions at a local level. In order to transform those challenges into opportunities for deepening civic engagement and community wealth for (low-income) communities (of color) and further realize a vision of a just transition, this thesis concludes with proposed state regulatory changes to catalyze mutually beneficial "public-public" relationships between CCAs, electricity co-operatives, and unions to further advance a Just Transition, and help community choice aggregators deliver on their goals.

Thesis Advisor: David Hsu, Assistant Professor, Department of Urban Studies and Planning
Reader: J. Phillip Thompson, Associate Professor, Department of Urban Studies and Planning

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I. Introduction

The energy system is undergoing unprecedented change. The decentralization of energy generation, the proliferation of advanced information and communication technologies, declining costs of renewable energy development, and the adoption of local and state-level greenhouse gas reduction policies are factors radically changing the ways in which electricity is generated, distributed, transmitted, and stored (MIT Energy Initiative: Utility of the Future, 2016). Researchers and community groups have created contested definitions and frameworks to understand the large-scale transformation occurring in energy. In academia, the term "socio-technical transitions"—referring to the deep structural changes in systems that involve long-term and complex reconfigurations of technological, political, infrastructural, socio-cultural, and knowledge-based landscapes— is being widely applied to matters of energy policy (Geels 2005; Verbong & Geels, 2006; Geels & Schot, 2007; Bolton & Foxon, 2015; Adi & Ko, 2016; Markard et. al., 2016). This academic work though, does not address the uneven power dynamics inherent in the politics of transitions (Meadowcroft, 2009), and omits important aspects of social and ecological justice in its definition (Goldthau & Sovacool, 2012; Newell & Mulvaney, 2013).

The concept and praxis of a "just transition" has re-emerged in contemporary social movements to explicitly address issues of equity occluded in these academic frameworks.[i] Over the past decade, national and local movements for climate, energy, and social justice have adopted a vision of a just transition that calls for a fundamental transformation of the current fossil fuel-based system into place-based, sustainable, equitable, and democratically controlled economies that provide meaningful jobs for workers displaced by the deep decarbonization of society. (Labor Network for Sustainability, and Strategic Practice: Grassroots Policy Project, 14).[ii] In recent years, the Just Transition framework has reached an international audience, with the International Labor Organisation and the COP 21 (vis a vis the Paris Agreements) adopting different tenets of the definition as political strategies in 2013 and 2016 respectively.

The extent to which current trends in the energy sector will lead to a just transition is unclear. Past socio-technical transitions have concentrated wealth and power for corporate and financial interests. For example, the advent of the electricity industry in the U.S. began as a decentralized, democratically governed network of citizens and small businesses that generated and supplied electricity to ratepayers locally. However, the electricity sector experienced a wave of consolidation

beginning in 1890 resulting in the concentration of economic and political power into a few monopoly energy service companies (Gomez-Ibanez, 2006; Hughes, 1983). Today, new capital frontiers emerging from multiple socio-technical transitions spurred by a global commitment to address climate change have allowed financial institutions, real estate developers, and cleantech companies to extract monetary value and concentrate economic power from new "green" commodities and strategies. Energy efficiency building retrofits; market-based environmental regulation and resource management strategies (e.g. cap and trade policies, forest carbon offsets); and the financialization of new "green" products (e.g. green bonds, home electricity use data) are contemporary examples of conduits by which non-distributive capital flows towards a small group of actors in socio-technical transitions spurred by climate change (Lohmann, 2005 & 2009; Robertson, 2006; Bumpus et. al., 2008; Gomez-Baggethun et. al, 2009; Knuth, 2014).

Optimistically, advocates for energy democracy-- an equitable system of governance where the users of energy make decisions—have viewed the on-going transformation in the electricity sector as an opportunity to realize a just transition by creating an energy system that deepens civic engagement, bolsters local control over energy-related decisions, and generates community wealth. Community Choice Aggregation (CCA) has emerged from this context as a legislatively enabled electricity provision model that allows local municipalities to pool the energy needs of their constituents and purchase electricity to meet their load demands. Proponents of CCA claim that this new model can provide cheaper, greener, democratically governed, locally produced renewable electricity to ratepayers, while catalyzing municipal-scale economic development better and more equitably than incumbent monopoly utilities (Fenn, 2016). Although community choice aggregation has been successful in providing cost competitive clean electricity to customers, to date they have had uneven success in fully realizing these other goals, most notably falling short to catalyze economic development.

CCAs were first formed and continue to evolve through collaborative relationships that are context specific and adaptive to dynamic local social, political, and economic contexts. This thesis therefore examines *the barriers to realizing community choice aggregation.* To do this, I interviewed individuals essential to the creation of six existing and two emerging community choice aggregators in California to identify barriers to formation through a just transition framework. Specifically, I ask them about the social, political, economic, and technical barriers to realizing community choice aggregation; what messaging frameworks garnered public support for community choice energy;

how their respective CCA was financed; what has changed in the landscape of community choice aggregation formation; and the efficacy of their community choice aggregator in catalyzing local economic development. I have chosen to focus on community choice energy in California for several reasons. First, although CCA's were first enabled by legislation passed in Massachusetts in 1997, community choice energy has been legalized in only six other states since. Examining the barriers to community choice aggregation in one state may help to elucidate factors that help explain the slow spread of CCA-enabling legislation across the nation. Second, California is widely considered to be a bellwether state, and is looked to as a laboratory of positive social impact innovation. CCA's in the state have already broken with normative justifications for community choice energy that uphold the primacy of cost-savings in electricity procurement, towards an approach that not only aims to provide affordable renewable energy but also centers greenhouse gas reduction and localized economic development as explicit goals of the entity. Lastly, CCA green power sales increased by 27 percent in California in 2015, but fell or remained steady in other states (Shaughnessy, et. al., 2015). The on-going expansion of CCAs and the acquisition of more non-residential customers in CCA territories are unique to California (Shaughnessy, et. al., 2015). This fact presents a research opportunity to elucidate what barriers exist in realizing the goals of community choice aggregation as economics of scale are being achieved. Identifying specific barriers to CCA formation in this context may provide other states with data to plan sustainable and transformative pathways for the development of community choice energy programs that help to realize a Just Transition. Furthermore, this information can make a small contribution to national movements for energy democracy by identifying potential policy and/or regulatory levers to bolster the capacity of CCAs to create green jobs and generate community wealth for communities of color who have been left out of recent green transitions (Agyeman, et. al., 2006).

This thesis presents and discusses the current barriers to CCA formation in California, and potential partnerships CCAs may engage with to further their mission to catalyze local economic development. This initial section will give a brief overview of the ongoing energy transition and history of community choice aggregation in California. In the second section, I provide an overview of my methodologies and the just transition framework I use throughout this thesis. In Section 3 I present the findings from my interviews, and in Section 4 I propose potential solutions CCA staff may enact to further realize localized economic developments. I provide my concluding thoughts on how can we transform those challenges into opportunities for deepening civic engagement and

community wealth for communities, especially low-income communities of color, to further realize a vision of a just transition in Section 5.

BACKGROUND

Community Choice Aggregation

Community Choice Aggregation (CCA) is a now 20-year-old energy procurement model that is increasingly providing rate payers with alternatives to non-renewable fossil-fuel sourced electricity. First enabled by legislation in Massachusetts in 1997 as part of the state's Electric Industry Restructuring Act, community choice aggregation has since been legalized in six other states enabling the growth of CCAs across the nation.[1] Despite hostile incumbent utilities, power plant fuel price volatility, uneven regulatory environments, and distortions in the electricity marketplace based on hybrids of cost-based and competitive market structures, community choice energy continues to provide a growing ratepayer base with electricity from renewable energy sources (Fenn, et. al., 2009). Currently, CCAs serve nearly 5% of Americans in over 1300 municipalities with over 650,000 enrolled customers in California alone.

The Evolution of CCA Policy: Early Adoption in Massachusetts and Ohio

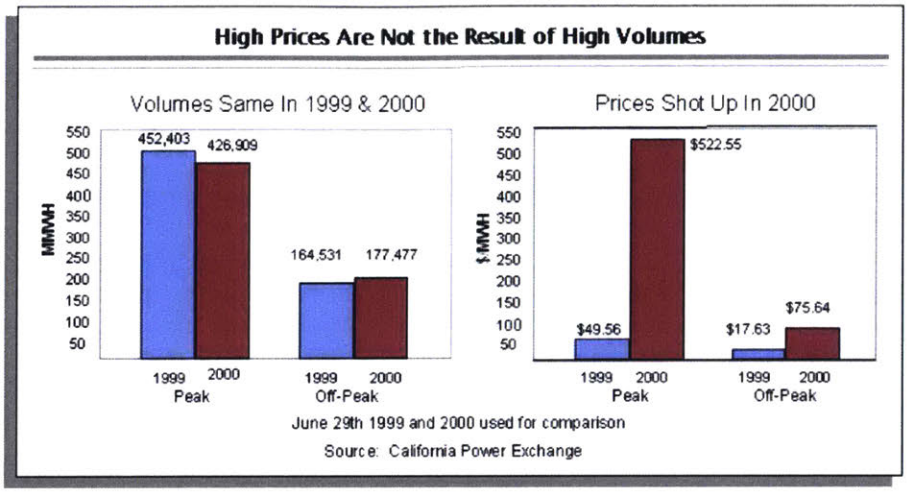
Community choice aggregation policy has evolved with each successive state that has legalized community choice energy. The first CCA enabling legislation was sponsored by then Senator and chair of the Senate Energy Committee, Mark Montigny (D-New Bedford) of Massachusetts, and later incorporated into the state's Electric Industry Restructuring Act as Section 247 of Chapter 164 in 1997. This new law narrowly defined CCAs as entities solely designed to procure electrical energy and capacity from wholesale suppliers or brokers. A legislative and design flaw of this inaugural CCA model arose from a provision in Chapter 164 that required CCAs to offer customers the ability to opt out of the program at any given time. Consequently, a consistent ratepayer base could not be guaranteed, undermining electricity suppliers' confidence that CCA customers would be able to consume pre-purchased procured power in a financially solvent manner. The heightened risks associated with an unstable ratepayer base negatively impacted the ecosystem of renewable energy financing in the state, given the certainty needed to support long-term paybacks required by such investments.

[1] These states include California, Illinois, New Jersey, New York, Ohio, and Rhode Island.

Learning from the challenges of Chapter 164 in Massachusetts legislators in Ohio passed SB 3 (Chaptered as 4928 of the Ohio Revised Code) in 1999, catalyzing the restructuring of the electricity industry and enabling community choice energy or "governmental (municipal) aggregation" as it was named in the code (Ohio Revised Code, 2012). SB 3 specifically extended the opt-out period for CCA customers to every two years, boosting supply side confidence in meeting CCA customer's loads. A combination of factors resulting from the deregulation of the electricity sector-- looming costs associated with the phase in of market based rates via "Electricity Transition Plans", underdevelopment of the competitive electricity market, and inadequate protections for municipal aggregators—spurred the revision of SB3 through landmark legislation passed in 2008 to address the pitfalls of Ohio's electricity deregulation. Pertinent for community choice aggregation, parts of SB 221 preserved the ability of CCAs to compete within the market place by protecting them from increased surcharges resulting from the phase-in of standard service offer plans and market-based electricity rates, extended the customer opt-out period to every three years, and set renewable portfolio standards for the state. These policy amendments safeguarded municipal aggregation, increased electricity supplier confidence in energy provision to CCA customers, and created state-level priorities for meeting greenhouse reduction targets through renewable energy provision. Similar to community choice aggregators in Massachusetts, Ohio's CCA legislation narrowly defined the scope of aggregation

California's Electricity Crisis and Community Choice Energy

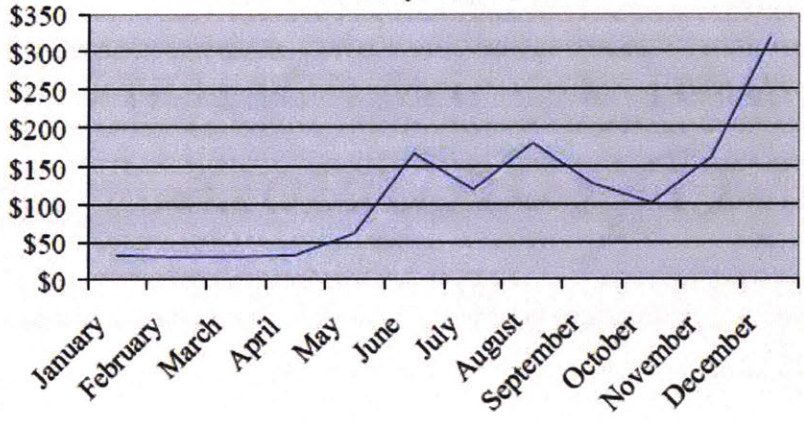
The deregulation of California's electricity industry was a catastrophe that catalyzed the evolution of CCA development. In the summer of 2000, the newly restructured electricity system in California was severely impacted by a series of shocks — shortage of generating capacity, bottlenecks in hydropower imports and transmission capacity, emissions restrictions, unplanned maintenance, faulty market design, and natural gas shortages — created a "perfect storm" that put intense pressure in both the day-ahead and spot markets, dramatically increasing electricity prices (Weare, 2003). From June to July 2000, wholesale electricity prices increased by an average 270 percent compared to the same period in 1999.



Source: http://docs.cpuc.ca.gov/published/report/gov_report.htm

In July 1999, San Diego Gas & Electric's (SDGE&E) retail freeze was eliminated per California's industry deregulation plan which exposed SDGE&E customers to unregulated retail electricity prices.[iii] By July 2000, residential electricity rates had increased 145% to 16 cents per kWh in comparison to the rates in July the previous year (Kahn, 2000).

Exhibit 2: Monthly Average Wholesale Price per MWh, for the year 2000



Source: California Energy Commission

To protect electricity customers, the California legislature passed Assembly Bill 265, establishing a rate cap of 6.5 cents per kWh for residential, small commercial, and lighting customers of SDG&E. The prodigious growth in electricity prices coupled with newly instated price caps (in addition to

existing caps for Pacific Gas & Electric and Southern California Edison) constrained the incumbent utility's ability to pay electricity generators for procured power. The credit ratings of these utilities were decimated while their ability to recover costs was severely impacted, resulting in investors owned utilities (IOUs) accumulating enormous debts, so much so that Pacific Gas and Electric filed for bankruptcy in June 2000. Generators in turn became reluctant to sell power into California. A series of large rolling blackouts affecting upwards of 1.5 million customers plagued the state between June 2000 to May 2001. It was later found that large energy companies – mainly Enron – manipulated the energy market to maximize profit by creating artificial electricity shortages to inflate energy prices during peak demand, exacerbating the ability for utilities to purchase power on behalf of their customers. The Federal Energy Regulatory Commission (FERC) intervened into the state's wholesale markets in December 2000, by eliminating the regulations that required IOUs to sell and buy their power through CalPX, California's spot market at the time to address market design flaws in energy procurement and incentivize the use of energy provision through long-term contracts. Eventually, state intervention allowing the government to purchase electricity through the California Department of Water Resources to meet unmet energy demands, a California Public Utilities Commission (CPUC) approved rate hike, "soft caps" on wholesale prices, voluntary consumer load reduction efforts, and support for new energy generators within the state eventually stabilized the crisis and fundamentally changed the electricity market and regulation.

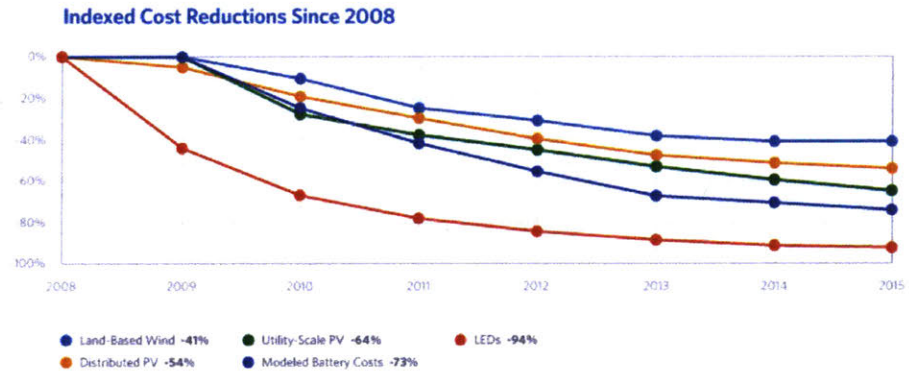
The challenges arising from the deregulation of the electricity sector in California set the conditions of possibility for the emergence of the new model of community choice aggregation. Market manipulation, anti-competitive behavior by incumbent utilities, energy insecurity, and removal of customer retail choice were important factors informing the design and passage of Assembly Bill (AB) 117, California's Community Choice Law in 2001.[iv] Drawing on lessons learned from CCAs in Massachusetts and Ohio, the architects of the law designed a more flexible and robust typology of community choice aggregation for the state. This new model moved away from a narrow cost-savings focus typified by previous CCAs in Ohio and Massachusetts, towards a structure that generated new capacities for CCAs that enable them to develop renewable energy projects and energy efficiency programs in addition to creating new avenues for local control and energy procurement abilities. In short, what emerged from the aftermath of California's energy crisis was a community choice aggregation model that prioritized "[r]ate stabilization, scaled renewable energy

development, energy efficiency program administration, and carbon reduction" in distinction from the discount-oriented, energy procurement CCA's of the past (Fenn, et. al., 2009).

The Drivers of Change in Energy

Three technological, economic, and social drivers are radically changing the status quo in electricity generation, transmission, and distribution. First, developments in technology have dramatically reduced the costs associated with renewable energy provision. As the graph below indicates, the cost of wind and solar photovoltaics (PV), have decreased 30 percent and 60 percent respectively between 2008-2014 (MIT Energy Initiative: Utility of the Future, 2016). This downward trend in costs is expected to continue with industry analysts expecting the installed price of utility-scale solar PV to fall below $1 per watt before 2020 (Wesoff, 2015). Decreasing costs of renewables is not just unique to the United States, but are dropping globally. Policies in Germany, and research and design investments in the United States have prompted manufacturing progress in China that has in turn significantly reduced costs for solar panels, increasing the global demand for solar PV (Graichen et. al. 2015, Cox et al. 2015, CPI 2011).

Figure 1.4: Cost Declines in Key Technologies, 2008-2014



Source: US DOE 2016

Source: MIT Utility of the Future Report, 2016

Second, climate related policies have created favorable market conditions for the continued investment in renewable technology development, and have increased social buy-in for the uptake of renewables. These policies can be manifested in regulatory or market rules, exemplified by feed-in tariffs, utility purchase obligations (e.g. renewable portfolio standards), and omission from certain market-bidding procedures for energy service providers. Lastly, increased consumer choice

continues to have significant impacts on the future of the electricity grid. Distributed generation (DG) is enabling once passive consumers of electricity to become "prosumers"— consumers who also have the capacity to produce their own electricity. DG and the formation of alternative energy service providers, like community choice aggregators, as alternatives to incumbent utilities are increasing the options available for consumers to meet their electricity needs in ways that express and align with their values (e.g. procuring power from an energy service provider that is mission-driven to reduce greenhouse gas emissions).

The Sobering Reality of Climate Change: The Modest Scale of the Current Energy Transition

Between 2015-2016, several prominent public figures and policy experts have declared the near end of the "era of fossil fuels" citing six significant trends.[v] These include: (1) falling coal consumption (2) falling investment in fossil fuels, (3) a sharp rise in renewable energy investment and deployment, (4) improving energy intensity, and (6) the leveling-off of global CO_2 emissions (Sweeney & Treat, 2017).

- Falling Coal Consumption
    - Decreased coal consumption levels are significant for proponents that believe we have reached peak fossil fuel usage particularly because coal-fired power plants are the largest emitters of energy-related CO_2 emissions globally. According to the International Energy Agency (IEA) coal consumption has reduced by 2.8 percent, the largest annual decrease since the IEA began keeping these records (International Energy Agency, 2016). In the United States, coal consumption dropped by 13 percent in 2015 (Olivier et. al., 2016). Dropping demand for coal, and the subsequent decline in coal prices have led to a series of major coal companies declaring bankruptcy and Peabody Energy, the world's largest private-sector coal company to file for bankruptcy protection (Macalister, 2016).
- Declining Investments in the Fossil Fuel Industry
    - Investment levels in the fossil fuel industry have fallen dramatically from 2014 to 2016. According to BP, investment in oil and gas exploration and product development fell by 24 percent from 2014 levels mostly due to an abundance of natural gas in the energy market released by the US shale gas revolution (BP, 2016).
- Rising Investments and Development of Renewable Energy Infrastructure

- According to the Renewable Energy Policy Network for the 21st Century, global "investments in renewable power rose by 5 percent over 2014 to a record $285.9 billion in 2015, exceeding the previous record of $278.5 billion in 2011" (Sweeney & Treat, 2017). Bloomberg New Energy Finance estimated this figure to be higher – $329 billion – for 2015 (Shackleman, 2016). Additionally, according to the IEA global investments for wind and solar in 2015 ($270 billion) was more than double the amount invested in fossil fuel generation capacity ($130 billion) (International Energy Agency, 2016). Development of renewable energy infrastructure from 2006-2015 has been significant as well, during which time solar PV increased from 6.5 GW to 224 GW of installed capacity globally with 50 GW installed in 2015 alone (Solar Market Report and Membership Directory, 2016).

- Improving Energy Intensity
  - In June 2016, in its annual *Statistical Review of World Energy*, BP reported that the global average energy intensity – the average amount of energy need to produce one unit of Gross Domestic Product – declined by 2 percent in 2015 (BP, 2016). Although this 2 percent reduction is similar to the 2 percent annual reduction of energy intensity during the past decade, 2015 was noted as a significant because it was the first time a reduction in energy intensity was coupled with a reduction in energy prices (BP, 2016). Typically, lower energy prices are associated with higher consumption, leading some economists to believe that there has a been a decoupling of economic growth from rising emissions. This decoupling has been noted by prominent economists like Nicholas Stern to state that economic growth could be achieved while reducing greenhouse gas emissions.[vi]

- Slowing Energy Demand
  - The overall demand for energy is slowing. According to BP, global energy demand grew by just 1.0 percent in 2015, just about half of the average growth in demand seen over the past ten years (1.9 percent) (Spencer, 2015). Although part of the slow growth is attributed to lackluster global economic growth initiated by the sub-prime mortgage crisis in 2008, major sources of energy data like the IEA, BP, and EIA project that energy demand will continue to slow as energy efficiency programs proliferate and energy intensity levels decrease.

- Leveling-off of CO_2 Emissions

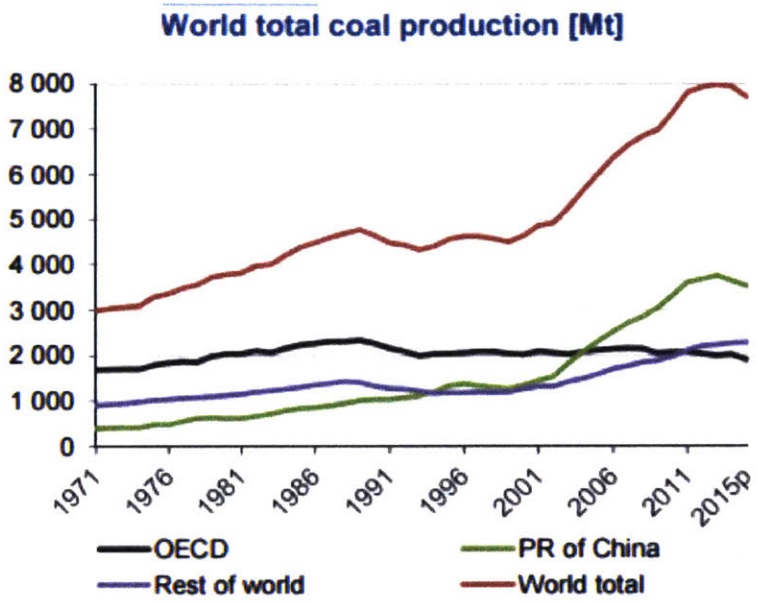
- In 2015, the European Commission's Joint Research Center stated, "After a decade of annual increases of 4%, on average, and two years (2012 and 2013) of slowing down to about 1%, the growth in global CO_2 emissions almost stalled, increasing by only 0.5% in 2014 compared to the record level in 2013" (Olivier et. al., 2015). The 2016 update to the *Trends in Global CO_2 Emissions Report* confirms that "the slowdown in the growth in global CO2 emissions from fossil fuel combustion in the last years was not random, but due to structural changes in the economy, global energy efficiency improvements and in the energy mix of key world players" (Olivier et. al., 2016). Drivers of these changes have been cited as stemming from reduced coal consumption in China and the US, the rise of renewable energy, and improving energy efficiency" (Olivier et. al., 2016).

Despite these significant developments, and the immense change occurring in the energy sector, the wholesale transition to a low-carbon electricity system, like the just transition, is not inevitable or well underway. Crucially, Sweeney & Treat argue that despite widespread optimism about the decarbonization of the global economy and proliferating discourse claiming that the "era of fossil fuels" is near end, the transition to a low carbon economy is nowhere near the scale or occurring at a rate to warrant such claims (Sweeney & Treat 2017). By noting increased overall energy demand, rising levels of natural gas consumption (and fugitive methane emissions), rises in global oil production and consumption, the immense scale of coal consumption, and the limited penetration of renewable energy into the global electricity power mix, the Trade Unions for Energy Democracy's paper, *Energy Transition: Are We Winning?* (Sweeney & Treat 2017) puts forth a sobering reality to counter widespread optimism that the globe is moving towards a low-carbon future.

- Increased Overall Energy Demand
  - The most important factor undermining the optimism of the "end of fossil fuels" narrative is increasing overall energy demand. Even if demand for energy continues to rise more slowly than GDP, reducing emissions becomes more difficult. According to the IEA's *World Energy Outlook 2015* report, global energy demands will increase by one-third between now and 2040 (International Energy Agency, 2016). Similarly, BP's most recent *Energy Outlook 2017* report projects a 30 percent increase in global energy demand (BP, 2017). Put plainly, the overall global energy demand is not projected to reduce over the next eighteen years.

- Rising Levels of Natural Gas Consumption
    - The increase in global shale oil and gas production has led to the overproduction of fossil fuel-based energy leading to a more than 50 percent collapse in the price of oil from 2014 to 2015, and a similar drop in prices for gas (Husain, et. al., 2015 & Rapier, 2016). According to BP's *Statistical Review of World Energy 2016 Report*, global production of natural gas increased 2.2 percent in 2015, slightly lower than the 2.4 percent average annual growth over the past decade (IEA, 2016). Moreover, the same report notes that the global natural gas consumption in 2015 (3135.2 Mtoe) was considerably larger than consumption of renewable power (364.9 Mtoe) illustrating the disparities between the capacity of natural gas and renewable energy to penetrate the global energy mix. With a sharp reduction in coal consumption globally, Sweeney & Treat note that the "optimistic narrative has tended to attribute the crisis of profitability to the deteriorating economics of fossil fuels vis-à-vis the growing competitiveness of renewable energy, thus giving the impression that the economic position of renewables is strengthening *at the expense of fossil fuels*... it is safe to say that the present crisis of profitability facing fossil fuels is largely the result of global oversupply, which has led to falling prices and finally a slump in investment levels" (Sweeney & Treat, 2017).
- Rising Global Oil Production & Consumption
    - According to recent BP, oil production has risen by 3.2 percent in 2015 with a 1.9 percent increase in global oil consumption in the same year (BP, 2016). An overabundance of oil has led to depressed prices which has increased consumption, particularly within the transportation sector. According to the EIA, transport-related energy use is expected to increase by 1.4 percent each year from 2012 to 2040, with non-OECD transportation energy use increasing by 2.5 percent annually (EIA, 2015). Given that the transportation sector accounts for 23 percent of global CO_2 emissions from fuel-combustion-based transit, increasing production and oil consumption and light penetration of electric vehicles in global markets signify that greenhouse gas emissions from oil will remain a persistent problem into the foreseeable future.
- Placing Reduced Coal Consumption in Context

- Recent reductions in coal consumption are significant, but must be understood in context. Since the 1980s, coal use has doubled with non-OECD countries use of coal for electricity generation increasing 748 percent since 1971 as illustrated in the figure below. Although recent reductions in coal consumption may have signified a peak in coal use, existing coal production and consumption are major barriers to moving towards a truly low-carbon society.



Source: IEA, Key Coal Trends 2016

- Limited Penetration of Renewable Energy
  - According to REN21, wind and solar PV combined account for just 4.9 percent of global electrical power (REN21, 2016). Furthermore, the institution has stated in its most recent *Global Status Report* that 76.3 percent of global electricity production is produced by fossil fuel-based or nuclear power sources (REN21, 2016). The low penetration of renewables in the global energy mix refutes optimist's views that renewable energy is displacing the fossil fuel-based power, despite significant rates of development. Furthermore, investments in renewables are not keeping pace to transition to a low-carbon energy system to stay the worst impacts of climate change. According to Sweeney & Treat, "in 2012, the IEA estimated that in order to be

> consistent with containing warming to two-degrees Celsius, investment in renewables would need to be in excess of $1 trillion each year, from 2012-2050. According to Bloomberg New Energy Finance, total global investment in renewable energy for 2015—a record year, surpassing the previous record in 2011 by three percent—amounted to just under one-third of the required level, at $329 billion" (Sweeney& Treat, 2017).

Despite significant investments in renewables and reductions in fossil fuel the rate of energy use and the pace of carbon emissions continue to rise, albeit more slowly. According to a 2015 Pricewaterhousecoopers (PWC) report, "to prevent warming in excess of 2°C, the global economy needs to cut its carbon intensity by 6.3% a year, every year from now [2017] to 2100" (PWC, 2015). With a 2 percent reduction in 2015 marking a milestone in the decrease in energy reductions of 6.3 percent (a number which is expected to grow in subsequent years) is a daunting task. Given that the electricity and heat generation sector accounts for 42% of global CO_2 emissions, the task to significantly decarbonize the electricity system and deploy renewables at a global scale is a transition that is not yet well underway nor wholly guaranteed (IEA, 2016). Community Choice Aggregation has garnered widespread support in California for its potential to play a role in reducing greenhouse gas emissions at the rate and scale needed to address climate change. Governments believe that by introducing competition into the utility dominated electricity service and provision market, CCAs create economic conditions that incentivizes the provision of local cost-competitive renewable energy, which consequently helps to reduce greenhouse gas emissions, stimulate new energy investments, and diversity power choices. CCAs have also garnered for their capacity to create positive externalities such as meaningful living wage jobs through local economic developments in the renewable energy sector, as a part of the Just Transition.

The Growth of Community (Choice) Energy

The changes occurring in the electricity field have collided with the imperative to move towards a low carbon electricity system enabling cities and communities across America to generate new and more equitable electricity generation and procurement models. Distributed generation and reduced costs of renewables have catalyzed the uptake of community solar, so much so that the Institute for Local Self Reliance recently reported that shared solar could supply as much as 5 to 10 gigawatts of new power capacity in the next five years in the U.S. (Farrell, 2016). Other renewable technologies such as wind or geothermal have also been increasingly utilized to capture local economic benefits as

well (Vaze & Tindale, 2011). Community choice aggregation emerged in the late 1990s first as an alternative electricity service provider to provide discounted energy to ratepayers in Massachusetts, and has since spread to six other states. In 2010, the nation's first climate-driven CCA, Marin Clean Energy (MCE) was founded in California. To date, MCE has eliminated 122,120 metric tons of greenhouse gas emissions or 2.3% of the US' total energy-related CO_2 emissions in 2015.[vii] Moreover, MCE provides a minimum of 50% renewable power in the electricity mix it provides to their residential and commercial customers at a cost slightly below the incumbent utility rate (MCE, 2016). Similarly, all operational CCAs in California currently provide two-tiered energy provision options that provide ratepayers with electricity sourced from 35 to 100% renewable energy generators at competitive rates, with the explicit goal of driving down greenhouse gas emissions. Currently, seven community choice aggregators are operational with more than twenty other municipalities planning to launch or exploring the process of forming a CCA across the state. As soon as 2020, CCAs are growing and expected to serve 60 percent of eligible ratepayers in California (Kahn, 2016).

Barriers to the (Community-based) Energy Transition

Actors in, and researchers of the neighborhood-scale energy field have written about the barriers to scaling up (community) renewables and accessing energy efficiency programs (Farrell, 2016; Carl, et al., 2012), particularly those that prohibit participation from low-income customers and small businesses in underserved neighborhoods (Scavo, J. et al., 2016).[viii] Advocates for community based electricity generation and distribution models seek to lower the barriers to community renewables because it gives ordinary people control and ownership over energy infrastructure and the electricity that it produces, potentially providing new avenues for wealth generation while helping to reduce society's dependence on fossil fuel—all of which are tenets of a Just Transition. Researchers have found that technical limitations, energy poverty, security of supply, large upfront capital investments, willingness to pay, environmental waste issues, inadequate governance structures, and insufficient regulatory incentives and policy design have hindered the growth of community renewables abroad (Koirola et. al., 2015). Additionally, studies have shown the importance of community renewables in the broader movement for energy democracy as important links between influential actors in the energy transition (i.e. incumbent utilities, regulatory bodies, and large private energy service companies) and ordinary citizens that enable the public to better advocate for and benefit from a transition towards a low carbon energy system (Pahl, 2013; Farrell, 2016). Importantly, critiques of

this research have pointed the tendency to conduct these efforts in isolation from questions of social, racial, economic, and ecological justice (Bickerstaff et. al., 2013).

Obstacles to the modernization of the electricity sector have been well documented domestically at the federal and state level as well. Limitations of tiered government structures, powerful oppositional interests groups, short terminism, political pressure to appease constituencies, and the extraordinary costs of infrastructure investment (Vaze & Tindale, 2011) coupled with the cost-competitiveness of existing fossil fuel based technologies, lack of sufficient transmission capacity to move renewable energy far distances, and lack of sustained and complementary federal and state energy policies (National Research Council, 2010; Cohen, 2015) have been found to be salient obstacles to the modernization of the electricity sector in the United States. On a state level, the policy and regulatory challenges impeding the modernization of the electricity grid have been examined in California. The state's ambitious renewable portfolio standard policy requiring 50 percent of the state's electricity supply come from renewable energy by 2030, coupled with Governor Brown's goals to develop 12,000 MW of distributed generation also by 2020 and 6,500 MW of combined heat and power (CHP) by 2030 are stressing the state's existing regulatory and governance infrastructure. Currently, no single state entity oversees integrating numerous energy and climate related initiatives. Existing decision making processes between various regulatory and legislative bodies are slow, uncoordinated, and subject to different schedules resulting in a "regulatory maze" that creates additional barriers to entry in electricity markets especially for community renewables (Carl et. al., 2013; Grueneich & Carl, 2014). Unprecedented new capital investments needed to upgrade the electricity grid are collectively contributing to rising utility costs and consumer rates. Furthermore, utility rate structures have not been modernized to accommodate the costs and benefits of renewable and distributed power resulting in new inter-consumer cross-subsidies. (Grueneich & Carl, 2014).

While researchers have produced far reaching scholarship regarding high-level challenges associated with the (community-based) transformation of the electricity sector today, the barriers to community choice aggregation remains largely understudied. Additionally, the effectiveness of California-based CCAs to deliver cheaper and greener energy to customers, catalyze local economic development, and give local control over energy-related decisions to ratepayers has not been undertaken by any peer-reviewed study. Lastly, due to the nascent growth of CCA in California little research has been

conducted to examine the potential role of community choice energy in realizing a just transition within larger movements for energy democracy.

What We Know: Barriers to Realizing Community Choice Aggregation

There is little existing literature on community choice aggregation. There are no peer-reviewed studies, but recent reports indicate that CCAs face economic, political, regulatory, and technical challenges to further growth.

The first report written by Local Power Inc., examined community choice energy in Massachusetts and Ohio highlighting the following challenges with CCA development:

- Short term contracts and pricing windows;
- Overexposure to fuel price volatility due to reliance on short-term procurement horizons for natural gas and fossil-fuel based electricity generation sources;
- Lack of competitive electricity service pricing due to reliance on "procurement only" models;
- Overexposure to grid reliability costs from peaking plant operation;
- Narrow value proposition for consumers based entirely on discounts;
- Lack of capacity to effectively compete against incumbent utility price advantages resulting from economies of scale enjoyed by utilities (i.e. rate stabilization);
- Inability to hedge supplier risks exposes CCAs to a recurring crisis of instability and recurring Requests for Proposals for electricity energy service contracts; and
- Opt-out exposure through customer churn rates.

It is important to note that Local Power Inc.'s findings are derived from a careful examination of CCA development mostly from Massachusetts and Ohio, for the San Francisco Public Utility Commission as a feasibility study for the city's proposed CCA. California had no operational community choice aggregator in existence at the time the report was written. Given the aforementioned transformation of the CCA model that emerged in California after the energy crisis, the barriers stated in the Local Power Inc. report while useful to understand the past barriers to realization in Massachusetts and Ohio as a means to speculate about potential challenges CCAs in California could face, the report falls short of reporting what actual barriers community choice aggregators face in the state given the particularities of the emergent CCA model and political-economic-regulatory ecosystem. [ix]

A study conducted by then Vice Chair of Marin Energy Authority, Shawn Marshall in 2010, is the most relevant study that encapsulates the barriers to community choice aggregation in California. Out of twenty-three individuals Marshall interviewed, seventeen were involved in the community choice energy field within the state. Specifically, Marshall identifies the following barriers to the formation of CCAs:

- Lack of startup funding for planning and feasibility
    - Since CCAs don't begin generating ratepayer funds to cover overhead costs and capital expenses until power purchase contracts have been approved and customers have been successfully transferred from incumbent utilities, startup capital is needed for planning and feasibility studies to begin the CCA formation process. In 2010, the State and local governments were experiencing massive budget shortfalls due to the 2008 financial crisis, which made obtaining initial investments from governments extremely challenging.
- Under-developed market maturation for CCAs: lack of local understanding of CCA's business structure and localized benefits. (Marshall, 2010).
    - The first operational CCA began providing electricity to ratepayers in 2010. As a new energy service model, early CCA's had no credit history and no proof of concept which created a perception of community choice energy as risky economic investments. The under-developed market for CCAs not only made receiving private or government loans difficult but also limited resource or skill sharing opportunities amongst advocates for CCA who had little experience in their creation. Furthermore, the lack of proof of concept created skepticism regarding the capacity of community choice aggregation to provide local economic benefits or other localized benefits through clean energy provision, providing further challenges to CCA formation.
- Uneven political leadership
    - In the context of fiscal conservatism characterized by the Great Recession, elected officials have been reticent to support community choice aggregation due to the perceived economic risks associated with its limited market maturity. Furthermore, local legislators are not typically energy savvy and can often times be beholden to incumbent utility interests which can make the exploration of and investment in community choice aggregation politically unpalatable.

- Obstructionist utilities
    - Obstructionist utility intervention has been one of the most significant barriers to the realization of community choice aggregators in their short history. In 2010, shortly after MCE was formed Northern California's incumbent utility, Pacific Gas & Electric (PG&E), financially sponsored a statewide ballot measure that would amendment the state constitution to effectively prohibit the formation of community choice aggregators. Specifically, Proposition 16 was a proposed constitutional amendment that would require a two-thirds local majority vote before a local government could establish a CCA program, use public funding to implement a plan to become a CCA provider, and expand electric service to new territory or new customers. PG&E contributed $46.1 million to the campaign while a coalition of community-based organizations, political champions, advocates for community choice energy, and staff of Marin Clean Energy had access to less than $100,000 to combat the initiative (California Proposition 16, 2010). Although voters struck down the ballot measure signifying substantial public support for community choice energy, PGE's obstructionist interventions have continued to challenge the growth of community choice aggregation. In 2011, Senate Bill (SB) 790 was passed to create a utility code of conduct, which among other things outlawed the use of rate payer money to fund negative attack ads in response to anti-competitive smear campaigns PG&E ran against community choice aggregators (Leno, 2011).[x] PG&E later sponsored two other unsuccessful pieces of legislation, AB 976 in 2012 and AB 2145 in 2014, that would have severely hindered the ability of community choice aggregation to exist, going so far as to propose criminalizing consulting work for CCA formation (Landman & Granoff, 2014).[2]
- Inadequately defined or enforced regulations
    - Senate Bill (SB) 790 requires that "the California Public Utilities Commission (PUC) to consider the impact if it finds that an electrical corporation has violated the requirement to cooperate fully with a community choice aggregator" (SB 790 Senate Bill - Bill Analysis, 2011). This "full cooperation" provisions in California's CCA law between IOUs and CCAs were not clearly defined during the writing of Marshall's

[2] AB 976 would have prohibited consultants advising CCAs from bidding on CCA contracts. AB 2145 would have changed default service provision from local energy service providers to incumbent utilities.

report, allowing incumbent utilities to continue to engage in anti-competitive behavior without due recourse, thus impeding the development of CCAs.

A recent report written by the Center for Climate Protection in 2016 has illuminated the following economic and regulatory barriers to entry for community choice aggregation in California.

- Exit Fees
    - Higher exit fees and/or power charge indifference adjustments which can increase a CCA customer's total electricity bill by 14 percent is named as a substantial challenge with the potential to impact the formation of a CCA (Center for Climate Protection, 2016). The PCIA was first introduced in 2006 as a replacement for the Department of Water Resources charge component of the Cost Responsibility Surcharge (CRS) first introduced in 2006 that ensures that utility bundled customers remain "indifferent" to the effects of departing CCA load. To do so, the PCIA charges departing load customers for their share of any unavoidable above-market power procurement costs incurred on their behalf by the investor owned utilities.[xi]
- Interconnection restrictions for distributed generation (DG) and potential rate tariff changes
    - Interconnection restrictions for DG and costs resulting from uncertain rate tariff changes on the horizon have been seen as potentially negatively impacting investments in solar generation projects necessary community choice aggregators to provide cost competitive, local renewable energy to customers (Center for Climate Protection, 2016). Since the CCA business model depends on the value proposition that entails providing cleaner renewable energy at cheaper prices than incumbent utilities, these restrictions and tariff changes could impede the ability for community choice aggregators to fulfill the stated goals of their business model.

What we don't know: Community Choice Aggregation and a Just Transition.

To date, the limited academic research examining the barriers to the growth of community choice aggregation does not connect CCA to larger strategies to enable a Just Transition, nor does it evaluate community choice aggregator's ability to deliver on their stated goals. The socio-economic and political context have substantially changed since the first CCA was formed in California. Seven CCAs have come online since 2010, with more than twenty municipalities now considering forming a community choice aggregator. Increasing market power of CCAs and demonstrated proof of

concept have allowed CCAs like Marin Clean Energy to incentivize developers to build local renewable energy infrastructure projects through power purchase agreements that guarantee an above-market rate for electricity produced from such developments. The growth of CCAs have been coupled with larger macro forces that could impact the formation of community choice aggregators. The renewable portfolio standards mandating 30 percent of California's electricity supply come from renewable energy sources by 2020 has changed to increase this proportion to 50 percent by 2030, underscoring the imperative for utilities and CCAs to increase the production of renewable energy. The cost of solar has also declined by 80 percent since 2010 better enabling CCAs to make good on their goals to catalyze local renewable energy project developments and spur job creation (The Economist, 2016).

What is evident is that CCAs have continued to proliferate in California despite the barriers to formation that they have faced in the past. What is unknown are the extent to which these barriers have changed, or what new challenges have arisen to realizing community choice energy. Furthermore, CCAs have now demonstrated proof of concept, and are reaching a level of market maturation where they should be able to catalyze local economic development and engage ordinary people more deeply in energy-related decisions. What is also unknown is how effectively operational CCAs have been able to fulfill these goals.

II. Methods

This thesis utilizes a qualitative case comparison method to investigate the barriers to realizing community choice aggregation (CCA) programs in California and their relationship to realizing a Just Transition.

My choice of qualitative methods is tied to the nature of my research question, which seeks to examine the barriers to realizing community choice aggregation. I chose to examine six operational and two emerging community choice aggregators in one state. By limiting the sample of CCA's to one state, where the electricity regulatory framework and state energy legislation are constant, elucidating the heterogenous barriers associated with realizing different community choice aggregators can be more easily ascribed to local political-economic contexts, actors, and networks.

The information I utilize for this thesis was collected through sixteen interviews with individuals that either currently work at an existing CCA or were an actor in processes that enabled their creation. To identify interviewees for this research project I first surveyed publicly available documents (particularly location-specific CCA feasibility studies) to determine those who had obvious roles in the formation of the eight CCA's in this research, and conducted preliminary interviews with them. From these sources, I further compiled a list of individuals from not-for-profit, civic, and private sectors that I understood to be involved in the formation of various CCA's throughout the state. I relied on snowball sampling to identify additional individuals to interview. Important perspectives from actors in the CCA process that would have added valuable insight to the barriers of CCA formation—such as grassroots organizing and advocacy groups, ratepayers in the service area of existing CCA's, and elected officials—were not included in my interview sample.

Interviews were conducted between December 2016 to early April 2017, and were thirty to sixty minutes in length. The interviews were semi-structured, and were conducted mostly over the phone. The interviews first began with questions to elucidate the interviewee's background and role within the specific CCA formation process, then about the history of the CCA being researched and the barriers to forming the CCA itself (the most substantial part of the conversations) and finally ended with questions about specific aspects of the CCA that needed clarification (e.g. where did the financing for startup capital costs for these aggregators come from?). Each interview was tailored to

the localized CCA history and context, in addition to the organizational position the interviewee had within the CCA formation.

Eight interviewees were associated with all current operational community choice aggregators, except Apple Valley Choice energy that launched in April 2017 during the time of this writing. Two interviewees were from emerging but not operational CCAs, East Bay Community Energy and Redwood Coast Energy Authority. Four individuals were not associated with a community choice aggregator but were expert practitioners and researchers that were instrumental in realizing different renewable energy projects throughout the Bay Area in California. The names and titles interviewed for this thesis are in Appendix A. In addition to these interviews, data from a thorough review of program evaluation documents, community choice energy studies, program materials, and news articles provided rich information which informed the design of my interview questions.

Conceptual Framework: A Just Transition Framework and Community Choice Aggregation

Given the inherent advantages of community choice aggregation in its capacity and potential to provide ratepayers with cost competitive renewable electricity at scale, bolster democratic local control over energy-related decisions, and catalyze local economic development a just transition requires overcoming the following barriers.

- A just transition is redistributive in nature. The Just Transition framework elaborates upon the basic tenets of environmental justice that states that every person has the basic right to "live, work, go to school, play, and pray in a healthy and clean environment" (Farrell, 2012). A just transition framework entails that the on-going energy transition reckons with historical inequities in the provision of energy and the emission of greenhouse gas emissions to realize energy and climate justice. Furthermore, a just transition seeks to create new jobs -- which is possible even with stringent environmental regulation, (Berman & Bui, 2001; Belova & Morgenstern, 2013) -- and low carbon economies that transfer political and economic power back to local communities (Labor Network for Sustainability and Strategic Practice, 2016) and maintain the Earth's capacity to sustain human and non-human life.
- Large scale socio-technical transitions are inherently political and situated in global and domestic political economies (Meadowcroft, 2009; Kalicki & Goldwyn, 2013). A complex set of actors and institutions with material interests in the energy sector constitute different action arenas at different scales that are never neutral. A Just Transition framework attends

to these differential power relations and the uneven material impacts these dynamics may have on historically marginalized communities.

- Social and racial equity are critical elements to realizing a just transition. Complex geo-political relationships mediated through unequal power relations internationally and domestically have disproportionately negatively impacted poor communities of color and indigenous nations with respect to both energy provision and climate injustice (Pellow & Park, 2002; Newell & Mulvaney, 2013) A Just Transition holds central the need to ensure the energy transition helps to address legacies of dispossession and harm to realize social, racial, and ecological justice (Goldthau & Sovacool, 2012; Newell & Mulvaney, 2013; Farrell, 2016).
- A just transition entails a shift in values. Indigenous practices of energy sovereignty provide alternative ways of approaching the just transition that creates an ethical and responsible relationship to the earth and people (Lameman, 2017). A reorientation of social norms of this kind especially regarding fossil fuel extraction, and the creation of new energy infrastructure will enable a just transition to ensure the earth's ability to sustain life in the future (Simpson, 2014).
- What actors and institutions define what the electricity transition will look like and for whom this transformation will benefit, creates an opening for renewed civic engagement (Newell & Mulvaney, 2013). Energy democracy is one potential pathway towards realizing a just transition, by giving ordinary people ownership and control over localized energy systems that generate local jobs in a low carbon economy.

In this study, I use a just transition framework to draw connections between the barriers to realizing community choice aggregation and strategies put forth by proponents of energy democracy to account for potential pathways to realizing a more socially and ecologically just society.

Advocates for a Just Transition view the national movement for energy democracy as a powerful means to build the capacity of ordinary people to demand the creation of a socially and ecologically just low carbon energy system that centers the needs of the most marginalized communities in our society. Energy democracy is broadly defined as an energy system that is democratically governed by the users of energy. According to the Institute for Local Self Reliance, energy democracy entails the following common principles:

- "Energy democracy means both the sources (e.g. solar panels) and ownership of energy generation are distributed widely.
- Energy democracy means that the management of the energy system be governed by democratic principles (e.g. by a public, transparent, accountable authority) that allows ordinary citizens to have a say. This means that communities that wish to have greater control over their energy system (via municipalization of utilities, for example) should have minimal barriers to doing so.
- Energy democracy means that the wide distribution of power generation and ownership, and access to governance of the energy system be equitable by race and socioeconomic status."[3]

[3] https://ilsr.org/a-new-logo-and-a-definition-of-energy-democracy/

III. Findings

Table 1: Overview of Operational Community Choice Aggregator Attributes

Operational Community Choice Aggregator Attributes						
	Marin Clean Energy	Sonoma Clean Power	CleanPower SF	Peninsula Clean Energy	Silicon Valley Clean Energy	Lancaster Clean Energy
Service Territory	Marin County, Napa County, Benicia, El Cerrito, Richmond, San Pablo, Walnut Creek, Lafeyette	Sonoma County	San Francisco City and County	San Mateo County	Campbell, Cupertino, Gilroy, Los Altos, Los Altos Hills, Los Gatos, Monte Sereno, Morgan Hill, Mountain View, Saratoga, Sunnyvale and unincorporated County of Santa Clara.	City of Lancaster
Definition of Local Region	Territory + 100 mile radius	Sonoma County	San Francisco City & County	San Mateo County	Santa Clara County	City of Lancaster
Land Area (square mile)	1,397	1,576	46.87	744	1,304	95
Green Program Offers (% Renewables)	Option 1: Light Green Power Mix: 52%	Option 1: SCP Clean Start: 36%	Option 1: Green: 40%	Option 1: Ecoplus: 50%	Option 1: GreenStart: 50%	Option 1: Clear Choice Power Mix: 35%
	Option 2: Deep Green Power Mix: 100%	Option 2: SCP Evergreen: 100%	Option 2: SuperGreen: 100%	Option 2: ECO100: 100%	Option 2: GreenPrime: 100%	Option 2: Smart Choice Power Mix: 100%
Incumbent Utility Renewable Mix	Pacific Gas & Electric: 30%					Southern California Edison: 25%
Total Renewable Energy Goals	80 % by 2020	50% by 2020	50% by 2020	100% by 2025	In Progress	In Progress
Energy Mix Data Source: http://www.energy.ca.gov/pcl/labels/						

CCA Specific Barriers

Table 2: Overview of Specific Barriers Faced by Operational and Emerging CCAs

		Overview of Barriers Faced
Operational	Marin Clean Energy	• Power Charge Indifference Adjustment • Opt-out/churn rate
	Sonoma Clean Power	• Power Charge Indifference Adjustment • Creation of inclusive and equitable Joint Powers Authority
	Lancaster Choice Energy	• Power Charge Indifference Adjustment • Risk Averse Municipalities • Complex technical requirements to participant in California's Energy Market (CAISO)

	Peninsula Clean Energy	• Power Charge Indifference Adjustment
		• Marketing
		  • Customer confusion of purpose and switchover from incumbent utility
		• Increasing customer expectations to build local renewable energy infrastructure
		  • Cost prohibitive real estate as challenge to reaching this goal

	Silicon Valley Clean Energy	• Power Charge Indifference Adjustment • Obtaining Bridge Financing • Opt-out/churn rate
	CleanPowerSF	• Power Charge Indifference Adjustment • Risk Averse Municipalities • Political Interference • Perception that CCAs only serve the wealthy
Emerging	East Bay Community Energy	• Public Charge Indifference Adjustment • Conflicting Stakeholder Interests
	Redwood Coast Energy Authority	• Public Charge Indifference Adjustment • Conflicting Stakeholder Interests • Lack of Startup Capital & Bridge Financing • Lower Median Income Households in Service Territory

2010-2017: A Changing Landscape for Community Choice Aggregation

The establishment and growth of community choice aggregation in California provide rich case studies that highlight the changing landscape of barriers that CCAs have faced since their legalization in 2001. My interviews conducted with key individuals integral to the formation of six operational and two emerging community choice aggregators in California have elucidated the persistence of some of these barriers while highlighting the changing nature of other challenges CCAs currently face. In this section, I compare the qualitative data from the interviews I conducted with past barriers stated in the literature to examine if these challenges have persisted through time.

Startup funding for planning and feasibility studies have been easier to access through public agencies

Although city and county governments generally still face challenges accessing start-up funding for CCA programs, resources for planning and feasibility are generally well provided for. Whereas CCAs in the past had to leverage resources from other public agencies to provide start-up capital for feasibility studies and planning for community choice energy, as was the case with Marin Clean Energy and Sonoma Choice Power, CCAs that have emerged since have had relatively easy access to county and city general funds to finance these phases of CCA development. For example, with the help of political champions at the County level inspired by the success of MCE and Sonoma Clean Power (SCP), advocates for Peninsula Clean Energy (PCE) were able to get a loan from the County in addition to staffing capacity from the county's Office of Sustainability with relative ease to assess the feasibility of and plan for community choice energy.

A new coalition of CCAs has created a robust network of resource sharing to overcome barriers to formation

Each new CCA develops the vibrant ecosystem of community choice energy, and deepens understanding of CCA business structure and potential for local benefits. Early CCAs like MCE and SCP faced significant challenges in developing business structures to meet the priorities of their local constituencies given the nascency of community choice aggregation in California. In 2017, a coalition of existing CCAs formed a network, CalCCA: California Choice Association, to represent the interests of the community choice energy community at the State's legislative and regulatory governing bodies. CalCCA acts as a resource sharing, capacity building, and advocacy network that serves as an indispensable source of knowledge for cities and municipalities interested in creating a CCA. Numerous interviewees stated that this network provided information gained from first-hand

experiences that informed not only their respective CCA's business structures, but also their human resources policies, operations and administrative procedures, and energy service provision strategies. For example, CEO of Silicon Valley Clean Energy Tom Habashi stated,

> *Well, now certainly things are considerably easier. For example, the first thing that I had to face was putting HR manuals together. Because, I had to figure out exactly [what] our HR policy was going to be and what the organization was going to be like, what kind of classifications and write all that stuff down. if you're the first one doing this, it's a bit of a task... In my case, I called the folks up in Marin and said what do you got. And I got a flood of information from them. This is what the organization looks like this, this is all the job classifications for every position that we have, here's our HR policies. You can copy out of it anything you want to copy out of it. You are free to do so, and they were very generous with their information. So were all the other CCAs that were in place, and that's the one thing that really is very different with CCAs, that they are incredibly generous with the information. If they've gone through something, they tell you immediately here's the stuff that we've gone through, watch out for this and for that. This is a good thing.* (T. Habashi, phone interview, March 30, 2017.)

Furthermore, Dan Lieberman of Peninsula Clean Energy illustrates the importance of the CCA network in avoiding potential pitfalls associated in the formation process by stating,

> *So when I talk about the challenges, and obstacles and how to avoid them number 1 is to have someone do it first. They learned a lot of lessons. Since there's not really a turf battles, or I guess most places where there are CCA's, the jurisdiction is done by municipality or county or joint powers authority, that makes it less territorial and the other CCA's are willing to help out. So I've just learned a ton from them, I've avoided a ton of pit falls and I know that's the case for other folks in the organization. (*D. Lieberman, phone interview, March 22, 2017.)

Grassroots advocacy and organizing work have been crucial in making CCAs politically feasible

Uneven political leadership has hindered the formation of CCAs in the past, but has increasingly given way to enthusiastic political champions advocating for, and spearheading processes to form community choice aggregators across California. Every CCA interviewed have had county or city elected officials, or robust coalitions of grassroots, community-based organizations and unions providing political leadership that has resulted in the formation or planning of a CCA except CleanPowerSF. Whereas the sub-prime mortgage crisis and subsequent recession coupled with a lack of proof of concept for CCAs resulted in uneven political leadership advocating for community choice energy in the late 2000s, the political, economic, and environmental success of early CCAs

have largely persuaded elected officials and the public of their benefits and utility best exemplified by the formation of CleanPowerSF. As Director Michael Hyams states,

> *"I think that the political hurdles here were overcome a couple of different ways: One, another community launched a [CCA] program, and used a model that showed it would work-- that's Marin County. I think that did two things. It gave us something to point to. It proved out a business model, and it also… gave some of the elected officials comfort that it could work, and maybe reduce some of the concerns that they had about the financial risks and implications of launching this new business…the political alignment with respect to concerns on climate change, and views of investing in renewable energy had become a no brainer in SF that those were things that voters supported. I think it created a good political environment for the mayor, to push it forward."* (M. Hyams, phone interview, March 2, 2017)

Newer CCAs like Silicon Valley Clean Energy, experienced a similar political alignment with climate related goals that bolstered political support for community choice aggregation. CEO Tom Habashi expands on this point stating,

> *A partnership was created between three cities-- Sunnyvale, Cupertino, and Mountain View-- all of them realizing that climate change and what they need to do in those cities to address climate change is going to be paramount. One way to deal with it was to form a CCA, because if we formed it and if we do something that's beyond what's required by state law to reduce greenhouse gases, anything associated with that extra work that we do becomes a credit that these cities can take. It reduces their requirement to do on their own, what they need to do in order to meet the climate change requirements that they are required by AB 32. I think that was the premise behind a lot of the CCA's. Basically, cities coming together saying that we can do more. We can bring more green resources into this area.... And in the process, benefit the cities…When we came in and decided to go 100% carbon free on day one… the cities that make up our membership will probably realize an immediate reduction of 30-40% of greenhouse gases in the city. And we'll be able to take credit for that. That has been the driver behind Silicon Valley Clean Energy and to some extent, behind a lot of the CCA's that have been formed in the past couple of years.* (T. Habashi, phone interview, March 30, 2017)

Obstructionist utilities and ill-defined regulations have been overcome through coalition-based grassroots advocacy work

Robust advocacy efforts to prohibit anti-competitive from incumbent utilities was successful due to ac coalescence of political support from supporters of Marin Clean Energy. As Alex Digiorgio of MCE explains,

> *Yes, there was political will. Yes, there were powerful leaders like Charles McGlashan was one of them, and MCE's CEO…Don Wise, and she was the municipal planner with the county of Marin, and she wasn't on the political side of things so much as she was on the administrative side of things but that's what made things actually operate, those diligent administrators who kind of made sure that the rubber met the road. There was a coalescence of political will. There were leaders, and the Marin communities who*

> *were willing to embark on something. And it was controversial at the time because the investor owned utility was not supportive. In fact, if you want to do some research on it—the history of it. I encourage you to look up proposition 16… PGE sent $46 million to change the California constitution so that community choice aggregation would basically be impossible to create… That ballot proposition was defeated thankfully, even though it outspent the proponents of CCA—who had very few resources at the time… Proposition 16 failed and it actually had the unintended consequence of galvanizing a lot of support. Now this was 2010, so MCE was already created and it wasn't yet operational in terms of providing service, but I'm giving this context because it took a lot of political will at the local level. People had to be courageous to go against this very well financed campaign to stop this movement. So political will was important.* (A. Digiorgio, phone interview, 4 January 2017)

Dan Lieberman of Peninsula Clean Energy illustrates the extent of the conditions of possibility enabled by the advocacy work of the supporters and staff of Marin Clean Energy.

> *Marin broke the ground for us back in 2010 when they launched, and so PCE now has a very high participation rate-- everything has gone very smoothly. A lot of people look at us as a model of how to develop and launch a CCA here in California. It happened very fast for us, it was minimally contentious, and we have the lowest opt out rate of any CCA… We owe a huge debt of gratitude to Marin because they paved the way and made it much easier for us.* (D. Lieberman, phone interview, March 22, 2017)

Whereas early CCA's still struggled with anti-competitive behavior due to ill-defined regulations, particularly with respect to the full cooperation clause of SB 790, clearer norms and definitions constituting the utility code of conduct have emerged since 2010. As a result, all operational and emerging CCAs since have experienced significantly less-hostile relationships with the incumbent IOU in the region they are based. As Cathy DeSalco of Lancaster Choice Energy notes,

> *We didn't have any of the issues that Marin had with PGE. As a result from the issues, there was a proceeding that resulted in the CCA code of conduct. And so, Edison through that code of conduct can't behave in the manner that PGE behaved. We met early on with [Southern California Edison's] CCA team and worked together. We consider ourselves partners with [Southern California] Edison. They present the bill to the customer. They still bill for transmission and delivery. They work with us to find programs to collaborate on to the benefit of all our customers… it's been good but it's been a learning experience for them as well, and there were growing pains on all sides. But we work closely with their team, and we have a good relationship with them.* (C. DeSalco, phone interview, March 28, 2017)

Under-developed market maturation for CCAs

The market for CCAs has matured in the seven years since California's first CCA began providing electricity services to residents. As noted previously, 60 percent of California's eligible population will be potentially served by CCAs by 2020 (Kahn, 2016). Similarly, according to Lean Energy US, if the City of San Diego forms a CCA "it will reduce the need for more than half of [San Diego Gas & Electric's] generation contracts" (Farrell, 2016). Across the board, operational CCAs have had consistently lower than forecasted opt-out rates. Lancaster Choice Energy and Peninsula Clean Energy have opt-out rates of just 7% and 1.7% respectively. Furthermore, on top of electricity provision and procurement, administering feed-in tariff and PACE financing programs, MCE currently has 19 megawatts of renewable energy projects online, under construction, or soon to be under construction within their service territory in the seven years since their inception. MCE is demonstrating process innovation and new product development typified by businesses in the growth stage of an industry life cycle, signifying the maturation of the CCA market (Porter, 1980).

A New Horizon of Challenges

The changing landscape of CCA formation since 2010 has highlighted the underdeveloped capacity to catalyze local economic development benefits community choice aggregators may catalyze, but has largely brought into relief the barriers to CCA development identified in previous research. In this chapter I discuss several findings about the industry-wide and context specific challenges emerging CCAs face in their development which include:

1. Variable Power Charge Indifference Adjustment (PCIA)
2. Difficulty Obtaining Bridge Financing for CCAs serving lower-income municipalities

The Power Charge Indifference Adjustment

Although the exit fee called the Power Charge Indifference Adjustment (PCIA) has been named as a barrier to CCA realization, the PCIA has become a more significant challenge to CCA formation and growth within the past two years.

Recently, drastic increases in PCIA fees prompted concerns over the transparency, accountability, and proper valuation of the PCIA. In December 2015 per the review process conducted in regulatory decision, A.15-06-001, PG&E proposed doubling the PCIA fee. PG&E cited several factors including decreases in market prices, changes in PG&E's energy mix, and expiration of contracts amongst factors as reasons for the sharp increase in prices without providing proof that their calculations of the charge and the management of their supply portfolios was done in a way that demonstrated due diligence in mitigating the costs passed onto customers in the form of the indifference charge (Public Utilities Commission of the State of California, 2015). Although Sonoma Clean Power found the calculation of PCIA charge technically correct, advocates for CCAs have found the underlying assumptions that went into calculating the different factors of the charge to be opaque. Information provided to parties regarding the calculation of the exit fees are heavily redacted, and there is currently no way of identifying the costs and variables for each input into the PCIA. Variable PCIA charges can have serious economic consequences for CCAs. For example, because the pre-2015 PCIA charge represented approximately 15% of the generation-side charges for MCE customers (meaning MCE had to procure electricity at less than 95% of PG&E's generation costs to remain cost competitive), the 100% increase in the PCIA charge post-2015 has meant that MCE and other CCAs with a 2015 customer vintage must now procure power at less than 74% of PG&E's generation costs (Public Utilities Commission of the State of California, 2015). Specifically, in 2016 MCE customers are paying $11.3 million dollars more in PCIA charges than they did in 2015 (Center for Climate Protection, 2017). Furthermore, the degree to which the PCIA can be sun-setted is unclear. Utilities use their status as legal "provider of last resort" as a means to justify the right to continue to make power purchases on behalf of Community Choicer customers into the future.

Utilities state that the purpose of the PCIA is to recoup costs associated with procuring electricity on behalf of ratepayers that switch energy providers. In contradistinction to community choice energy advocates such as the California Alliance for Community Energy and CalCCA, that have taken a harder stance against the current methodology by which the PCIA (California Alliance for Community Energy, 2015) is calculated, some staff members of community choice aggregators have a more nuanced view of the PCIA. For example, Cathy DeSalco of Lancaster Choice Energy sympathized with the logic behind the purported need for the PCIA by stating, "I think that we all agree that the theory behind [the PCIA]... makes sense." Yet DeSalco also highlights the

aforementioned issues with the transparency, accountability, and current methodology by which the PCIA is calculated by stating,

> *However where the issue comes from most of the CCA's is transparency of how those charges are formed/created, we don't have visibility into the contracts. There's unknowns related to the lengths of the contracts; there should be contracts that fall off after a certain period of time, that we don't know if they are or not. And it also should be restricted to unavoidable costs. Without that visibility into what they're using to come up with the PCIA, we don't know if they're truly [representing] only unavoidable costs... it's a hot topic. I don't know if we'll get to a resolution that everyone's happy with, but as long as it's fair everybody will be okay with it.* (C. DeSalco, phone interview, March 28, 2017)

This tension appears to signify there still exists underlying tensions between utilities and CCAs despite the emergence of clearer regulatory norms, and legislation that outlaws anti-competitive behavior from utilities outright.

PCIA charges account for a substantial proportion of ratepayer costs. As Tom Habashi of Silicon Valley Clean Energy states, the PCIA, "will constitute about 25% of the total collection that we make for the supply. We have to give 25% to PGE as an indifference charge, we've still got to be competitive so that the customer doesn't feel like they have to pay more in order to be our customer" (T. Habashi, phone interview, March 30, 2017). Furthermore, given that the PCIA is a huge expenditure that endangers a CCA's ability to remain cost competitive, the short timeframe by which CCAs must adapt their rates and financial holdings to remain cost competitive once the PCIA is announced is another challenge resulting from the PCIA. As Habashi further states,

> *We don't know about it until the December 31 of every year, and then it gets implemented January 1. You have one day to make an adjustment that we need to make to remain competitive and that's obviously not an easy task. especially if that PCIA charge can jump up by you know, 100% which it did in 2016, and in 2017 it jumped up by another 25%.* (T. Habashi, phone interview, March 30, 2017).

Albert Lopez of the emerging CCA, East Bay Community Energy, summed up the challenges associated with the PCIA most succinctly when he stated, "The more the PCIA charge goes up, the more the feasibility of a CCA program goes down" (A. Lopez, phone interview, March 22, 2017).

Access to Startup Capital, Bridge Financing & Sufficient Financial Credit is harder for CCAs Serving lower-income Municipalities

A persistent challenge associated with CCA formation is the difficulty in procuring sufficient start-up capital despite easier access to private investment, especially for those CCAs in lower income communities. Early CCAs like MCE and SCP demonstrated proof of concept necessary for to reduce the perception of risk for potential private entities interested investing in community choice aggregation. Later CCAs in areas with higher median incomes benefitted from this fact, with Peninsula Clean Energy and Silicon Valley Clean Energy receiving a bank-based line of credit for CCA start-up costs and bridge financing relatively easily. This has been especially true for emerging CCAs within well-resourced county governments such as East Bay Community Energy. As Albert Lopez elaborates,

> *I think that they certainly deserve a lot of credit, they being MCE, for being one of the trailblazers.... I think a lot of the people coming behind them, like Silicon Valley Energy, and our program, are benefiting--- now the creditors and banks are a little more comfortable with the model, so we're able to get cheaper rates then they were able to get.*
> (A. Lopez, phone interview, March 22, 2017)

As a CCA that serves ratepayers with lower median income households, Redwood Coast Energy Authority has had to overcome the challenges associated with obtaining bridge financing, and sufficient financial credit through private-public partnerships. To mitigate this challenge, CCAs like Redwood Coast Energy Authority have engaged in strategies to structure their CCA formation phases in ways that allow them to defer payments on loans covering startup and operational costs that usually necessitate some form of bridge financing until revenue becomes available to do so. As Matthew Marshall from Redwood Coast Energy Authority states,

> *We basically were able to get all the technical and analytical and organizational pieces deferred until we actually had revenue coming into the program. So that let us overcome not having to have a couple of million dollars or at least several hundred thousand dollars [to cover startup costs]. (M. Marshall, phone interview, March 28, 2017)*

To meet additional financial and credit needs, Redwood Coast Energy Authority (RCEA) has partnered with a third-party entity like TEA, a not-for-profit power marketing and marketing corporation owned by eight municipal and start-chartered entities, that manages the technical aspects of power procurement while providing credit and cash management services to the CCA.

This partnership has enabled RCEA to work around the challenges of securing startup capital and bridge financing. As Matthew Marshall from Redwood Coast Energy Authority states,

> *they're [TEA] are providing the credit and cash flow management for power procurement, while we build up reserves... They're providing the credit [for Redwood Coast Energy Authority] so we can go and engage with other counter parties... it's on their credit balance sheets, and that's intended to be more limited so we can build up our reserves and be in a position where can get our own credit rating, and then they wouldn't have to you know, do that on our behalf.* (M. Marshall, phone interview, March 28, 2017)

For CCAs serving lower income municipalities, this strategy can exposure them to more financial risk than other well-resourced CCAs. Structuring a CCA formation process as a strategy to defer debt payments on loans although novel, is not fiscally sustainable for emerging CCAs serving lower-income households. The most common strategies newer CCAs have engaged in to procure startup capital and bridge financing have been to work with banks to establish a line of credit or to procure loans from municipal entities. These options are not available to all newer CCAs, highlighting an issue that is differentially impacting CCAs serving lower-income households.

Emerging Trends

Operational community choice aggregators in California continue to overcome new and enduring challenges with innovative strategies adapted to localized contexts to provide alternative renewable energy to ratepayers. The shifting landscape of barriers to CCA formation has also catalyzed new trends within the community choice energy field that are further discussed here.

Focus on local development

Growing market maturity of community choice aggregation has allowed some CCAs to focus on local economic development projects through renewable energy projects. Marin Clean Energy has again been a trailblazer in the community renewable energy field, by catalyzing renewable energy infrastructure projects in California. By contracting with project developers and ensuring a standard offer contract guaranteeing that the MCE will pay above-market rate prices for the renewable energy produced from the project, Marin Clean Energy has facilitated the creation or planning of nineteen megawatts of renewable energy projects in the Bay Area. MCE has used these opportunities to partner with non-profit agencies, and public entities (e.g. schools and city agencies) to provide the

public with the benefits of renewable energy and to create workforce development programs for under-served communities. To date though, MCE has had limited success in creating permanent jobs for local community members.

The promise of a community choice energy to deepen civic engagement, address climate change, and foster localized economic benefits has prompted advocates for emerging CCAs to ensure that these newly formed aggregators provide economic benefits for the communities they are situated in. The diverse coalition of constituents pushing for the formation of East Bay Community Energy in Alameda County has put a heavy emphasis on ensuring the CCA's capacity to spur local development to foster social and racial equity. Due to this advocacy work, a local development business plan is currently (at the time of this writing) being created as an integral step in the formation of East Bay Community Energy. The majority of the CCAs interviewed for this thesis — CleanPowerSF, Lancaster Choice Energy, Sonoma Clean Power, Peninsula Clean Energy and East Bay Community Energy — have stated that they are similarly taking concrete steps (e.g. hiring additional staff members) to follow MCE's lead in catalyzing economic development so that the economic benefits of community choice aggregation are felt within the counties they serve.

Despite these efforts, economic development is an underdeveloped area of expertise within the CCA sector. When asked about a CCA's ability to deliver localized economic developments, an interviewee who wished to remain anonymous stated,

> *That [economic development] part of the project has not yet been in my opinion, fully fulfilled yet. The PUC now, and rightly so is focused on how we launch and how do we run a brand-new enterprise department and have it be fiscally viable... We just need to make sure the bill[s] gets paid.*

When asked if local economic development was less of a priority than providing cost-competitive renewable energy to ratepayers, the interviewee stated, "that would be a good way to characterize that. let's get the basics done and then let's do the extras."

To date, operational CCAs have been unable to implement strategies that meaningfully utilize the form and capacities of community choice aggregators to effectively generate jobs for local communities within their service territories. Alex Digiorgio of MCE points to the complexities of conducting local economic development in ways that align with a Just Transition framework when he stated,

> *There is a misconception of what community ownership can and can't look like. Community choice aggregators, are not the installers for the direct developers of project, they are the ones that would contract with project developers to make a project feasible. The best example that I can give you is MCE's feed-in tariffs… Basically, what we're saying is that if you build it, we will buy it… It's just one way of catalyzing local development. I would argue that it's a form of community ownership because community choice programs are public entities.*
>
> *So lots of times when people are talking about community ownership, they are talking about individuals—they are actually talking about private ownership by members of the public. It's weird, it gets kind of inverted because in the public, public ownership can mean different things, and if people are really talking about a solar shared or solar mosaic kind of thing where anyone in the community can invest a certain amount of money in a project, and the net revenues of the project get redistributed to these investors, it's a really different model, and those types of programs are great but they require a whole lot of scalability, because a 1 megawatt solar project loses the economy of scale so it's not going to be likely to generate net revenue.* (A. Digiorgio, phone interview, 4 January 2017)

Digiorgio's statement points to the fact that currently, CCA sponsored local economic development that incentivizes private developers to build out local renewable energy projects is incompatible in some ways to the smaller-scale, decentralized, community-owned renewable energy infrastructure development that proponents of a Just Transition envision as economic development. The existing CCA typology of economic development inherently privileges larger scale developers of renewable energy projects, with no guarantees of producing local jobs for ratepayers in CCA territories.

What is clear through these interviews is that despite renewed focus on catalyzing local economic development, CCA's ability to do create meaningful jobs has been limited by the imperative to make CCAs fiscally viable in their early stages or by the economy of scale that they now operate at. For more established community choice aggregators like MCE, local economic development has currently taken the form of incentivizing development of renewable energy infrastructure that benefits private developers over ordinary people. Despite the best intentions of CCA staff members to spur localized economic development and generate permanent jobs, to date they have fallen short of this goal.

Changing regulatory landscape

Although regulations have become clearer, and legal protections have been put into place to protect CCAs from obstructionist utilities since 2010, the potential for increased regulation from the

California Public Utilities Commission (CPUC) pose new challenges to the future of community choice aggregation.

The proliferation of CCAs and the prodigious growth in the number of customers they now serve has increased regulatory scrutiny over community choice aggregators. As Cordel Stillman of Sonoma Clean Power states,

> *"Having this much higher profile... has brought us to the attention of the [California Public Utilities Commission]. Now they're starting to get concerns that we're not regulated enough. There may be some rules coming down where we have to comply to the same sort of oversight that the CPUC exercises over those investor owned utilities. Now, the whole point of a CCA is that this is done in the public trust... with elected officials making the decisions, whereas the IOUs cannot be trusted to act in the public interest because they are for profit corporations...the CPUC doesn't like losing control, but they don't have the mandate to do the oversight, so there's going to be some fights about that in the future I believe."* (C. Stillman, phone interview, March 24, 2017.)

The future that Stillman has spoken about has manifested in proposed legislation currently moving through the California legislature. Under current state law, CCAs must comply with the same renewable portfolio standards as IOUs, along with other regulatory mandates to meet greenhouse gas reduction goals, and provide resource adequacy for their customers demonstrated through integrated resource plans CCAs must submit to the CPUC annually. SB 618 (D-Bradford), would vest the CPUC with authority to approve or disapprove a CCA's integrated resource plan beyond compliance with the requirements of current state law. CalCCA has opposed this legislation arguing this will unduly give CPUC the ability to interfere with the ability of CCAs to "locally control electricity procurement, subject to state mandates applicable to all load serving entities" (Hale, 2017). At the time of this writing, a staff member was recently hired at Lancaster Choice Energy to actively monitor fifteen different regulatory measures that could impact CCAs across the state (C. DeSalco, phone interview, March 28, 2017).

Third-party Contractors and the Unbundling of Services

Long standing partnerships between community choice aggregators and third party contractors to fulfill complex technical requirements to participate in and provide expertise navigating the California Independent Service Operator (CAISO), are evolving. Typically contracted agreements between such parties and CCAs take a "soup to nuts" approach where the aggregator will stipulate a

price for a quantity of renewable energy or energy-related services which the third-party contractor will procure on behalf of the CCA. For CCAs like Lancaster Choice Energy, this arrangement is ideal as the technical requirements to participate in the electricity market are complex. As Cathy DeSalco from LCE states,

> *Honestly, it's such a technical environment and its so volatile as far as how quickly it moves and how much that movement can impact our ability to be successful, it just makes sense to engage with somebody that really knows what they're doing.* (C. DeSalco, phone interview, March 28, 2017).

Redwood Coast Energy Authority (RCEA) has recently taken a more "standard utility approach" by working with their contractor to procure services in an "unbundled" manner by working with them through their master services agreement counter parties to buy energy services separately (e.g. buying resource adequacy separate from energy) to exercise more control over the energy procurement process. As the CEO of Redwood Coast Energy Authority (RCEA), Matthew Marshall, has succinctly stated, "Instead of them [the contractor] saying here's the price, we're working with them directly to pick what pieces we want to do, when, and how that plays out" (M. Marshall, phone interview, March 28, 2017).

In theory, this strategy will allow RCEA to be more cost effective by bypassing energy with baked in hedging costs from other companies, and instead allow RCEA to put a risk-contingency hedge into the energy procurement cost themselves that they determine. In July 2016, Marin Clean Energy selected a new contractor to provide scheduling coordination, load forecasting, and portfolio management services with the goal of engaging in this unbundled approach as well. With CCAs speculated to serve 60 percent of eligible ratepayers in California by 2020, these strategies may be adopted by more community choice aggregators as the scale and scope of their service provision increases. Yet, as third party contractors are increasing used to perform the functions of the ostensibly public electricity service and provision CCA model one may see this trend as an increasingly neoliberal approach to electricity procurement. If the functions of a CCA are increasingly carried out by for-profit contractors, then CCAs may someday be vulnerable to capture from the private industry in order to maximize profit for stakeholders.

IV. Potential Pathways Forward

Although a maturing CCA market and a robust CCA network have helped to substantially lower barriers to CCA formation, persistent and new challenges remain in realizing new community choice aggregators, inhibiting their potential to realize a Just Transition. The PCIA and lack of access to startup capital, bridge financing, and sufficient financial credit are significant but solvable issues that can be overcome.

The Public Charge Indifference Adjustment

The current methodology that dictates the way the PCIA is calculated is not transparent and does not hold utilities accountable to any third-party auditor, which in turn produces a PCIA value that may not clearly reflect *only* the costs associated with procuring electricity on behalf of customers who have switched out of the utility's service program. Furthermore, efforts to reform the PCIA have been justified in order to minimize unnecessary costs to ratepayers, protect customers from rate shocks through predictable and reasonable rates, better service ratepayer electricity needs, and manage risks through long-term planning and responsible procurement using transparent inputs. To better serve the public in these ways, I recommend the California Public Utilities CPUC should adopt regulation that:

- Requires utilities to provide un-redacted actual and projected costs included in the PCIA calculation;
- Subjects utilities to third-party audits of PCIA fee calculations;
- Requires utilities to bear the burden of proof that they are taking adequate and meaningful steps to (1) reduce costs and risks imposed on departing customers, and (2) make reasonably accurate projections about annual departing load to better prepare for churn rates;
- Revises the existing PCIA calculation methodology to more accurately reflects long term energy costs or creates a fixed exit fee that incorporates reasonable energy costs projections and reflects benefits from retained customers; and
- Sets a cap on the percentage by which the PCIA may increase by every year or at set a minimum lead time between the announcement of the PCIA charge and its implementation to allow community choice aggregators to plan for it.

Lack of access to startup capital, bridge financing, and sufficient financial credit

The rise in the number of operational CCAs is a testament to the tenacity of community choice energy advocates to obtain the adequate financial capital and requirements necessary to enter the electricity markets, and not a result of any current financial or government mechanism. As not-for-profit entities that are formed and governed by democratically elected officials, community choice aggregators are good candidates for tailored and specific government investment. Although CCAs are not utilities by definition, in many respects they provide electricity as if they were. Publicly owned utilities provide ratepayers with electricity that costs 10-15 percent less than electricity provided by private companies while contributing about 18 percent more of its revenues to municipalities than IOUs (Birol, et. al., 2014). Investments in CCAs therefore have the potential to generate equally impactful social benefits, given that any profits accumulated by CCAs are re-invested into the CCA or for publicly beneficial energy services.

Recent studies have regarding community choice energy in California have optimistically projected that CCAs could produce substantial economic benefits, in contradiction to the limited capacity of existing CCAs to do so. In a local economic impact assessment of community choice energy in San Jose, under the scenario with the highest level of solar deployment through local renewable energy investments the Center for Climate Protection projects that "more than 2,000 jobs per year will be created regionally from [community choice aggregation] activity, with an associated $1.25 billion of incremental economic activity over six years, from 2018 to 2023." The report goes on to state that "using current deployment percentages by jurisdiction, San Jose could realize $425 million of the total estimated economic impact within the city itself" (Center for Climate Protection, 2016). What this report ultimately finds is that CCA-related local economic development is directly correlated with local renewable energy investment. However, what the research I have conducted has shown is that there has been no substantial job generation or significant economic development activity for the communities that CCAs are currently situated in. If as the aforementioned study has stated, that CCA's ability to catalyze significant local economic development hinges on substantial state investment particularly for renewables, more state investment will needed to help CCAs better catalyze local economic development.

Opportunities for State Investment

Existing legislation in California could be a source of state investment for community choice aggregators. Assembly Bill 32, the Global Warming Solutions Act of 2006, instated a Cap and Trade system that generates revenue for programs to reduce greenhouse gas emissions. SB 535 (de Leon) quantifies the minimum Cap and Trade revenues that must be delivered to "disadvantaged communities" with at least 25% of auction revenues set aside for projects that could benefit these communities and further mandates that 10% of these projects located within these communities. Most recently, more legislation has passed increasing investments in environmental justice and vulnerable communities. AB 2722 (Burke & Arambula) creates the Transformative Climate Communities program, which will fund large-scale climate projects that have public health, social, and economic benefits in areas that are on the frontlines of climate change. AB 1550 (Gomez) similarly increases the set aside of climate investments going to vulnerable communities allocating additional Greenhouse Gas Reduction funds for low-income households and areas directly adjacent to environmental justice communities. Community choice aggregators could benefit from specific investment flows that could be channeled from these legislatively enabled funding sources to help aggregators better fulfil their other goals.

Public-Public Partnerships

A public-community-based model between CCA's, electric cooperatives, and unions can result in a symbiotic relationship that addresses the challenges that each formation faces in developing community renewables. Electricity cooperatives could leverage the good credit score ratings, the capacity to act as a financial guarantor, and the land-based and infrastructural assets CCA's own to overcome the barriers that federal tax incentives (via passive income requirements), and federal/state securities laws. CCA's in turn can leverage the existing distribution and transmission infrastructure of electricity cooperatives to spur co-operative expansion through contracts to build out more community controlled renewable energy infrastructure (e.g. community solar). Unions could work with both CCAs and electricity cooperatives to create unionized jobs through renewable energy infrastructure projects. In this way, CCA's could double down on their commitments to facilitating local economic development, while continuing to provide clean electricity to their customers and widen the portfolio of products they provide while creating jobs. Additionally, this triad of community-based models can work together to better advocate for state investment to

catalyze economic development through renewable benefits as demonstrated in the aforementioned Center for Climate Protection report.

Considerations

The path to creating this type of public-community model for clean energy provision and local economic development is unprecedented and necessarily has challenges for deployment. It is unclear whether CCA's can legally or be politically and economically incentivized to act as a financial guarantor or utilize their assets to facilitate clean energy infrastructure development through electricity cooperatives. Furthermore, more research is needed into the local ecosystem of electric cooperatives in the states that have legalized community choice energy to determine whether they are fiscally and organizationally capable of undertaking larger scale energy infrastructure development in partnership with CCA's.

Despite these challenges, this public-community model for clean energy development is a novel idea that warrants further exploration. What is at stake is the growth of clean renewable energy that catalyzes local economic development that is in part worker/community-owned.

Integrating CCAs into California's Clean Energy Future

In order to begin to coordinate such efforts, within the larger constellation of goals resulting a number of climate related legislation passed in the state of California, I join other scholars in the energy field to recommend the following:

- In the short term:
    - Identify a lead regulatory agency to develop a consolidated document and implementation plan with a detailed decision-making schedule of existing greenhouse gas reduction mandates and other climate-related legislation (e.g. AB 693) (Carl et. al., 2013);
- In the long term:
    - Establish clear agency responsibility for energy planning and solar PV deployment, and adopt consistent decision-making planning, procurement programs and agencies that explicitly incorporate CCAs in the governance processes;

- Reform current agency decision making to make cross agency planning easier and more efficient;
- Develop an investment plan for California that identifies the full range of possible costs and pathways to maximize public and private investment, particularly for CCAs;
- Allow or create a wider spectrum of business models for electricity service provision entities that provide incentives to drive the transformation of the electricity sector in ways that center Just Transition principles; and
- Establish clear regulations and reduce barriers for electricity cooperatives and unions to participate in the installation of municipal or utility-sponsored renewable energy infrastructure (e.g. rooftop solar PV).

V. Conclusion

Electric Power Systems embody the physical, intellectual, and symbolic resources of the society that constructs them.

— Thomas Hughes, *Networks of Power: Electrification in Western Society, 1880-1930*

The only way to avoid the pessimistic scenarios will be radical transformations in the ways the global economy currently functions.

— PricewaterhouseCoopers, *Too Late for Two Degrees?*

Inclusion of Indigenous knowledge systems in the energy systems we develop is a part of the decolonization and reconciliation process. If we are conscious of the energy choices we make, then putting in renewable energy systems... that move us closer to sovereignty, becomes an act of colonial resistance and the start of a path to reconciliation and addressing the intergenerational trauma that comes from the on-going desecration of Mother Earth for fossil fuel extraction.

— Crystal Lameman of the Beaver Lake Cree First Nation states

This thesis has shown that despite the significant growth of community choice aggregators across California since 2010, persistent and new barriers exist that inhibit the potential of CCAs to contribute to a Just Transition. To date, while operational CCAs have been able to provide cost-competitive electricity (a significant portion of which is generated from renewable energy sources), their ability to spur meaningful local economic development and deepen civic engagement remains minimal. Within the larger context of increasing (albeit slower) global demand and consumption for fossil fuels, the limited impact of CCAs in realizing a Just Transition is sobering.

However, since 2010 efforts to mitigate climate change have intersected with many different factors to create the conditions for unprecedented change through a combination of bottom-up and top-down political action in California. Governor Edmund G. Brown Jr. passed Executive Order B-30-15, establishing a statewide goal to reduce greenhouse gas emissions 40 percent below 1990 levels by 2030. Additionally, the Governor has mandated the state increase the percent of electricity from renewable energy sources to 50 percent by 2030. Governor Brown has also set forth goals to develop 12,000 MW of distributed generation by 2020 and 6,500 MW of combined heat and power (CHP) by 2030. Visionary coalitions of community-based organizations like the California Environmental Justice Alliance, within the state have continued to fight for, and have helped pass climate-related legislation that prioritizes the needs of low-income communities in environmental justice communities as the state faces more man-made and natural disasters. Inspiring grassroots

organizations like the Asian Pacific Environmental Network (APEN) in Oakland, California are spearheading initiatives to realize a Just Transition at the neighborhood-scale. APEN continues to lead with transformative leadership as evidenced by their recent decision to embark on a process with the Energy Solidarity Cooperative to work with their grassroots membership to create a community-owned and controlled solar micro-grid to develop local clean energy infrastructure in neighborhoods across Oakland.

Efforts to address climate change are producing significant results. Emissions in the US have decreased. U.S. based energy- related CO_2 emissions in 2015 were 12 percent below their 2005 levels.[xii] Between 2007 and 2015, California saw a 96 percent decrease in electric power consumption by coal, the steepest decrease by percentage of any state in the nation (Nikolewski, 2016). In March 2017, for the first time ever California met more than half its power needs through solar energy (EIA, 2017). To date Marin Clean Energy has singlehandedly eliminated 122,120 metric tons of greenhouse gas emissions or 2.3% of the US' total energy-related CO_2 emissions in 2015.

The recommendations listed in this thesis seek to address the barriers to CCA formation and present decision-makers in California with a set of short and long term recommendations that range from easily attainable to aspirational. Through these recommendations, I put forward potential solutions to address the challenges to CCA formation in alignment with the goals of climate-related legislation and social movements for energy democracy working towards realizing a Just Transition. In doing so, I suggest that these solutions can equip community choice aggregators with extra to further initiatives that decarbonize our electricity system in ways that provide more meaningful economic opportunities than they are currently providing now for communities, especially low-income communities of color already experiencing the impacts of climate change.

With each barrier that is overcome for community choice aggregation, another (small) opportunity is created to realize a Just Transition. As Thomas Hughes has noted, "Electric Power Systems embody the physical, intellectual, and symbolic resources of the society that constructs them" (Hughes, 1983)— let us re-create worthy of our most liberatory visions of a socially and ecologically just world.

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Appendices

Appendix A: List of Interviewees

	Name	Organization	Title	Sector
1.	Alex Digiorgio	Marin Clean Energy	Community Development Manager	Quasi-public
2.	Joe Eto	Lawrence Berkeley National laboratory	Staff Scientist	Public
3.	Osama Idrees	Chevron Energy Solutions	Project Manager	Private
4.	Robert Lasseter	University of Wisconsin Emeritus Professor	CERTS Technical Lead	Public
5.	Matt Muniz	Alameda County	Energy Program Manager	Government
6.	Michael Hyams	CleanPower SF	Director	Government
7.	Jason Fried	San Francisco Local Agency Formation Commission	Executive Director	Government
8.	Tom Habashi	Silicon Valley Clean Energy	CEO	Non-profit
9.	Albert Lopez	East Bay Community Energy	Planning Director, Alameda County	Government
10	Matthew Marshall	Redwood Coast Energy Authority	CEO	Non-profit
11	Daniel Lieberman	Peninsula Clean Energy	Director of Marketing and Public Affairs	Non-profit
12	Jan Pepper	Peninsula Clean Energy	CEO	Non-profit
13	Cordel Stillman	Sonoma Clean Power	Project Manager	Non-profit
14	Cathy DeSalco	Lancaster Choice Energy	Energy Manager	Non-profit
15	John Farrell	Institute for Local Self Reliance	Researcher	Non-profit
16	Paul Gromer	Peregrine Energy	CEO	Private

Appendix B: Interview Questions

1. What is your name and the role that you played within the realization of this CCA?
2. What type of challenges did you experience with the rollout of this CCA?
    a. Specifically, what type of economic, political, technical, and/or regulatory barriers did you have to overcome?
3. How would you say the landscape of CCA formation has changed over time?
4. What partnerships were critical in realizing this project?
5. How did this CCA get the startup capital from? What challenges were associated with garnering these funds? What current challenges do you face in the financial operations of the CCA?
6. What frameworks and values (if any) were deployed to successful garner the necessary support to form this CCA?
7. How central were government climate-related plans, policies, and/or initiatives to the build out of this CCA?
8. What did local stakeholders report were the major tensions that arose when this CCA was founded?
9. What factors made this CCA realization process a success?
10. How successful has this CCA been in realizing local economic development benefits?
11. Have you explored or are you interested in developing renewable energy projects? Have you thought about partnering with electricity cooperatives to do so?

Endnotes

[i] The term, "just transition" was originally conceptualized in the early 1990s to encapsulate strategies that ensured workers in the fossil-fuel industry could maintain a livelihood after science had confirmed fossil fuels were causing global warming.

[ii] Although research has proven environmental regulations do not cause a significant decline in jobs overall and may actually result in net job increases (Belova et. Al., 2013; Berman & Bui, 2001) many labor unions see a just transition strategy as a "fancy funeral" for fossil-fuel related careers (Labor Network for Sustainability, 2016).

[iii] Pacific Gas & Electric and Southern California Edison retail customers were, at the time, still protected from high retail rates by rate freezes imposed by the restructuring plan.

[iv] AB 117 was sponsored by then Assemblywoman Carole Migden (D-San Francisco)

[v] In 2015, Al Gore stated that "[w]e're winning" the battle for a low-carbon society. In 2015, influential economist, Nicholas Stern touted that sustainable growth coupled with de-carbonization was not only possible but well under way. The following year, Greenpeace explicitly stated on their international blog platform that the "end of fossil fuels is near."

Issie Lapowsky, "10 Years After an Inconvenient Truth, Al Gore May Actually Be Winning," *Wired*, 24 May 2016;

Sky News, "Fmr Govt Climate Change Adviser Lord Stern On COP21 Paris Summit," 29 Nov 2015, youtube.com/watch?v=GvzLav-pDQc;

Kumi Naidoo, "COP21: shows the end of fossil fuels is near, we must speed its coming," 12 Dec 2015, http:www.greenpeace.org/international/en/news/Blogs/makingwaves/cop21-climate-talks-paris-negotiations-conclusions/blog/55092.

[vi] Sky News, "Fmr Govt Climate Change Adviser Lord Stern On COP21 Paris Summit," 29 Nov 2015, youtube.com/watch?v=GvzLav-pDQc

[vii] Total US energy-related CO_2 emissions in 2015 were 5,271 million metric tons. https://www.eia.gov/tools/faqs/faq.php?id=77&t=11;

[viii] Studies have also shown that three major structural barriers inhibit the scaling up of community renewable energy include: 1) federal and state securities laws 2) federal tax incentives that require specific and sufficient tax liability in ways that shut out community investors, and 3) legal limitations to sharing electricity output from community based renewable energy projects exist in many states (Farrell, 2016). According to the California Energy Commission, low-income customers face structural barriers to accessing clean energy which include: low home ownership rates; complex needs, ownership, and financial arrangements for low-income multifamily housing; insufficient access to capital; building age; and physical isolation or remoteness (Scavo, et. al., 2016).

[ix] San Joaquin Valley Power Authority was the first CCA in the state to have its implementation plan certified by the CPUC. However, on June 26, 2009 SJVP officials suspended the development of the CCA due to the unfavorable economic circumstances resulting from the sub-prime mortgage crisis. Marin Energy Authority (now known as Marin Clean Energy) had just formed a Joint Powers Authority that would have the authority to form a CCA at the time of writing of this report. This report was also written as a document to encapsulate

best practices and lessons learned from existing CCAs, so the inherent limitations of the examination of barriers to CCA realization are acknowledged in form.

[x] According to a Senate Floor Analysis of SB 790, "According to the author's office, SB 790 strengthens existing law by clarifying, amending and adding key provisions that enable CCA to function as originally intended, foster fair market competition, and allow jurisdictions to pursue CCA without undue barriers and excessive burdens." Crucially, SB 790 created a utility code of conduct that prohibits investor owned utilities (IOUs) from marketing against CCAs using revenue generated from rate payers. Specifically, the Analysis states, "PG&E representatives attending local hearings commonly misrepresented how the CCA mechanism works, commonly stated that taxpayers were liable for the costs of failed CCA programs despite CPUC decision 08-04-056, and the utility was reprimanded for soliciting opt-outs from outside the official process and for implying that to receive public good charge funded energy efficient benefits, customers must opt out of CCA."

[xi] The PCIA was introduced in 2006 (D.06-07-030) as a replacement for the Department of Water Resources charge component of the CRS, and applied to CCA customers beginning in 2007.

[xii] A UN reports that these emission pledges do not go far enough, and suggests that they will put the world on track to warm 3.4 degrees Celsius by 2100 without immediate further reduction. https://www.technologyreview.com/s/602804/the-paris-climate-pact-is-in-effect-but-its-not-enough/