Cleaner, Cheaper Power for Texas Communities

Bulk power can reduce pollution and save residents money

ENVIRONMENT TEXAS RESEARCH & POLICY CENTER

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Written by

J. David Lippeatt and Lauren Phillips-Jackson, Frontier Group

Luke Metzger, Environment Texas Research & Policy Center

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Cover: Community solar facility in Sealy, Texas. Photo courtesy of Sean Andrews at e-volve energy.

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Executive summary

Texas cities are key players in the drive to cut carbon pollution that causes global warming. Texas is the nation's biggest carbon polluter, producing almost one-seventh of total U.S. carbon dioxide (CO_2) emissions in 2017.[1] Major Texas cities are significant contributors to the problem – Houston and Dallas alone produced nearly 6% of total state CO_2 equivalent (CO_2e) emissions in 2014 (the latest year for which full data are available).[2]

Now, however Texas cities are emerging as part of the solution. Houston, Dallas, San Antonio and Austin – Texas' four largest cities, accounting for more than one-fifth of the state's population – have ambitious climate action plans to reduce their contribution to global warming.[3] These cities are targeting key sectors to reach net-zero carbon emissions by 2050, establishing bold intermediate emission reductions goals along the way.[4]

Texas cities and counties can help reach their climate goals by pooling the electricity purchasing power of their residents and buying renewable electricity. Across the country, such **community bulk power programs**, including so-called community choice aggregation, have given a boost to clean energy while in many cases saving money for consumers. Texas cities and counties should follow suit.

Texas cities have ambitious clean energy goals but limited tools to meet them. Dallas' climate plan sets the goal that 50% of residents and businesses be enrolled in renewable electricity plans by 2050.[5] Houston's Climate Action Plan calls for generating 5 million megawatt hours (MWh) of local solar power per year by 2050.[6] However, these cities operate in a deregulated market with limited government oversight, so the power of their authorities to drive significant changes in their respective energy mixes is restricted.

Community bulk power programs around the U.S. buy clean, affordable energy. Community bulk power programs known as Community Choice Aggregations (CCAs) appeared in the 1990s and 2000s as states deregulated their electricity markets, and are now authorized in nine states: California, Illinois, Massachusetts, New Hampshire, New Jersey, New York, Ohio, Rhode Island and Virginia.[7]

- Through CCAs, local governments use their bulk purchasing power to negotiate discounts to purchase electricity on behalf of their residents, often securing more renewable energy than can be achieved via buying power from a utility or individual purchasing decisions.
- CCAs are effective – in 2017, 750 CCAs secured 42 million MWh of electricity for 5 million consumers, about 1.1% of all U.S. retail power purchases.[8]
- Bulk purchasing via CCAs can secure electricity rates up to 15-20% below residential retail rates for their participants.[9]

- In 2017, CCAs procured about 8.9 million MWh of renewable energy – enough to power around 836,000 homes – beyond the amount required by state mandates.[10]
- Some CCAs also provide other member services and incentives. CCAs in Cleveland, Ohio Carbondale, Illinois, and the Cape Cod/Martha's Vineyard area of Massachusetts, for example, all have provided members lower electricity rates, substantial amounts of renewable energy and energy efficiency services (see Appendix, page 18).

Community bulk power can help Texas cities and counties achieve climate goals and save residents money.

While CCAs akin to those in other states are not explicitly authorized in Texas, **cities and counties can act using other mechanisms in existing Texas law to conduct bulk electricity purchasing**, enabling communities to secure lower prices for power and obtaining more renewable energy than they would be able to do otherwise.

Houston and Dallas, as the first- and third-largest Texas cities, are both deregulated markets where consumers choose their own local retail electricity providers (REPs).[11] These, other Texas cities and Texas counties have the potential to establish community bulk power entities that could purchase bulk electricity directly or contract with an REP to do so, to bring residents lower power prices and the chance to secure more renewable electricity. No new legislation or change in regulation at the state level is needed.[12]

To develop a community bulk power program, cities and counties should explore using Texas Public Utility Commission (PUC) rules (§25.111, Registration of Aggregators) that allow for the creation of an aggregation for the purpose of purchasing electricity.[13] A city or county could register as an aggregator itself, or could register another body, such as a non-profit, public corporation owned by the city or county, which would then contract with an REP to administer the program.[14] Under PUC rules any city or county customer could choose to participate in such a program.[15]

While not a CCA, such a community bulk power entity could be set up with the goals of negotiating bulk purchases of electricity at lower costs and of securing higher proportions of renewable energy for its members. This would help Texas cities and counties reduce greenhouse gas (GHG) emissions and benefit consumers. There appear to be neither legal impediments nor market size constraints to establishing such a structure, and PUC rules lay out clearly how such a community bulk power aggregation could be established.[16] Texas cities and counties should examine potential operational or logistical challenges of such structures, including how to acquire and bill customers under a customer choice framework, but could begin with small-scale pilot projects to test effective models for community bulk power.

Houston, Dallas and other Texas cities and counties with deregulated markets and strong climate goals should adopt a community bulk power purchasing approach, similar to that of CCAs, to bolster their purchases of clean energy and help them cut GHG emissions in line with their goals. To do this, they should explore using PUC rules to aggregate their citizens and negotiate for bulk electricity purchases.[17]

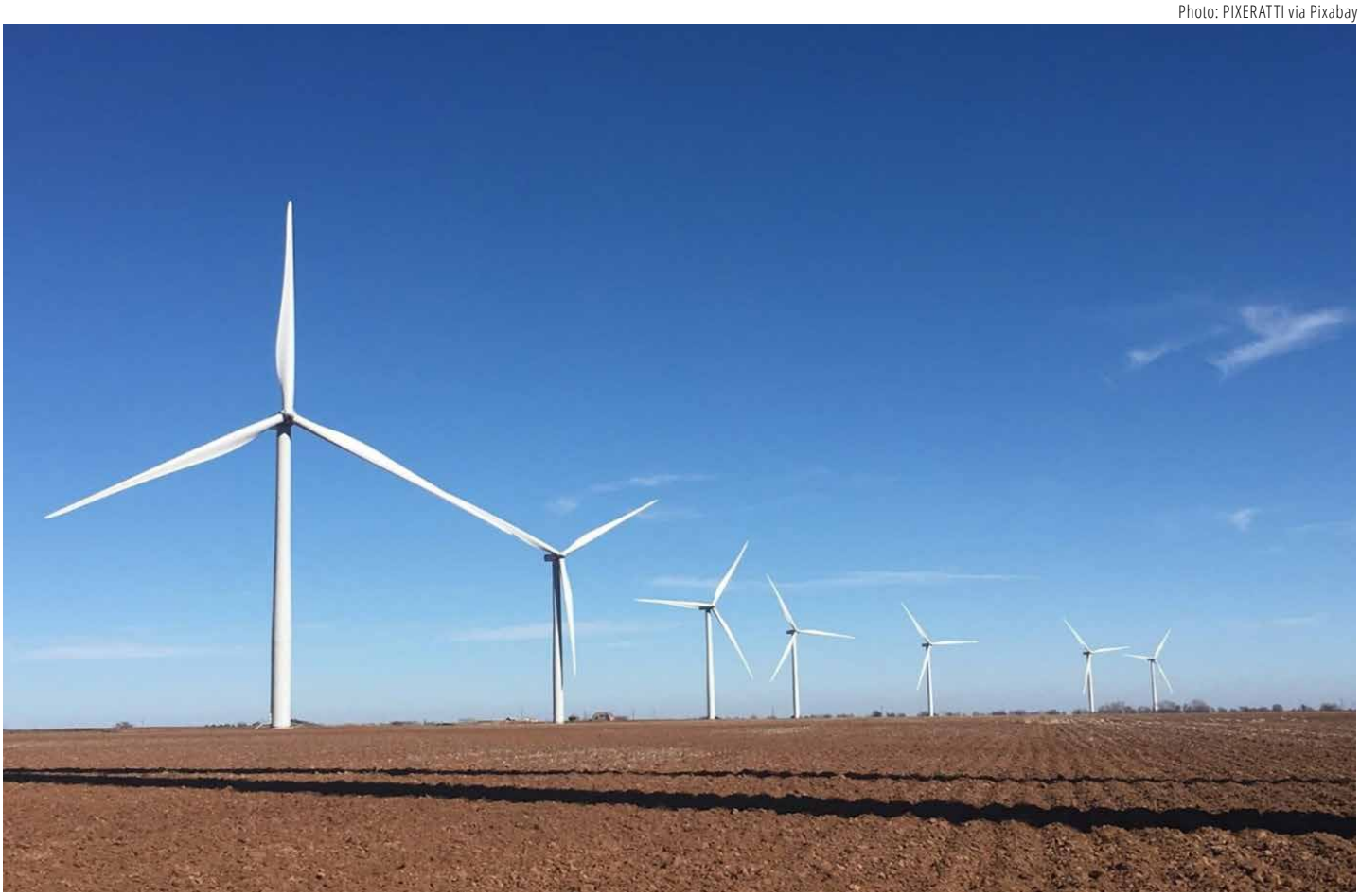
Community bulk power purchasing can also help meet other community goals. Cities and counties can use their buying power to negotiate as part of bulk purchasing investments in weatherization, bill assistance, or on-site solar to improve energy reliability.

Creating a community bulk power option for electricity is a versatile tool that Texas cities and counties can use to meet their climate goals and transition to clean power. By bundling together their residents' power purchases, communities can deliver cleaner, cheaper power for all.

Introduction

In recent years, Texans have seen the effects of climate change worsen dramatically, with storms like Hurricane Harvey battering the Houston area, causing billions of dollars in damages and inflicting widespread harm.[18] The impacts of climate change on states like Texas will only become more severe as time goes on unless every city and state takes action to cut carbon pollution and help the U.S. reach net-zero carbon emissions by 2050.[19]

Photo: PIXERATTI via Pixabay



Texas wind farm.

As a pioneer in renewable energy, Texas is uniquely positioned to lead. Texas is the largest producer of wind power in the country, generating 84 million MWh of wind energy in 2019, far more than any other state and about 28% of total U.S. wind production.[20] Texas also has more potential for solar power, energy efficiency improvements, and demand response than any other state in the country.[21]

Cities are playing a key role in making Texas a clean energy leader. Houston, Dallas, San Antonio and Austin, for example, were among 407 U.S. cities in 2017 committing to implement and uphold the goals of the Paris Climate Agreement, despite the Trump administration's plan to withdraw from the deal.[22] In November 2020, all four cities joined the "America Is All In" coalition of over 1,500 U.S. cities, businesses, civil society organizations and other institutions, representing nearly half of all Americans, pledging to work with the new Biden administration to uphold Paris Agreement goals.[23]

Texas already has four cities in the Clean Cities Coalition committed to implementing alternative fuels and fuel-saving technologies.[24] To take the next step toward a clean energy future, however, Texas cities and counties will need new tools. Adopting a community bulk power option is an important step in this process. This would allow Texas municipalities, from big cities like Houston and Dallas to smaller ones across the state, to shift away from their reliance on fossil fuels and gain more control over their energy markets, capitalizing on the potential of bulk purchasing to catalyze renewable energy growth.

A recent survey showed 69% and 63% of Texans, respectively, support increased use of solar power and wind power.[25] Community bulk power serves as a practical model for Texas municipalities and counties to provide better, cheaper and cleaner electricity options to their residents. Texas cities and counties can use a community bulk power option to reduce GHG emissions and move toward 100% renewable energy by 2050, while also providing financial benefits to their residents.

Texas cities are leading the effort against global warming

Texas' largest cities have laid out ambitious goals for reducing global warming pollution, matching or exceeding those of other major U.S. cities. This is essential to national efforts to address global warming, since Texas produced 707 million metric tons of CO_2 in 2017, the most of any U.S. state, and almost one-seventh of total U.S. emissions.[26] Texas cities contributed significantly to this amount – Houston and Dallas alone produced almost 6% of state GHG emissions in 2014 (latest data available).[27]

Houston, Dallas, San Antonio and Austin consequently are actively working to cut their GHG emissions. All four have adopted climate action plans committing to net-zero GHG emissions by 2050 – in line with the emission reductions science tells us are required worldwide to prevent the worst impacts of global warming – with intermediate goals along the way.[28] Switching to clean electricity is critical to achieving those goals, reducing emissions from electricity use today and opening the door for repowering transportation, buildings and other users of fossil fuels with zero-carbon electricity tomorrow.

These four cities are taking concrete steps to cut their GHG emissions:

Houston: (Population: 2,323,660).[29] After Houston suffered devastation from Hurricane Harvey – which at least one study showed was made stronger by global warming – the city became a member of the group 100 Resilient Cities in 2018, and worked to prepare a Resilient Houston plan, released in February 2020.[30] The plan committed the city to numerous steps to reduce its climate impact, including reaching carbon neutrality by 2050.

In parallel, Houston brought together city departments to consult extensively with subject-matter experts, local businesses, community stakeholders and residents in developing its Houston Climate Action Plan (CAP), released in April 2020.[31] The CAP enshrined the goals of cutting citywide GHG emissions 40% by 2030 and 75% by 2040 (compared with baseline 2014 levels), on the way to reaching net-zero carbon emissions by 2050.[32] The plan focuses on reducing emissions in four sectors: transportation, energy (via transitioning to renewable energy), building optimization (energy efficiency) and materials (waste) management.[33]

Dallas: (Population: 1,347,120).[34] Dallas over the past decade has worked to strengthen green building codes and secure more renewable power for

municipal facilities. In 2017, the city committed to upholding Paris Agreement goals and reaffirmed this commitment in 2019.[35] The city conducted extensive public outreach and consultation, feeding into preparation of Dallas' Comprehensive Environmental and Climate Action Plan (CECAP), adopted in May 2020.[36]

Dallas' CECAP includes an interim target of cutting GHG emissions 43% from 2015 levels by 2030, on the way to making the city carbon net-zero by 2050.[37] The plan includes eight component plans covering everything from air and water quality to use of renewable energy, energy efficiency, clean transport and protection of green spaces.[38]

San Antonio: (Population: 1,581,730).[39] In October 2019, San Antonio adopted the city's Climate Action and Adaptation Plan (CAAP), which noted that the city reduced GHG emissions by 10% from 2014 to 2016, even as the economy and population grew.[40] The CAAP highlighted San Antonio's success in increasing the use of solar power, noting the city's place in 2018 as #1 in Texas and #7 in the nation for local installed solar capacity.[41]

San Antonio's CAAP set interim goals of cutting city GHG emissions 41% by 2030 and 71% by 2040 versus 2016 levels, toward the goal of net-zero carbon emissions by 2050.[42] The city identified six strategies through which to pursue GHG mitigation: 1. Increase carbon-free/renewable energy; 2. Cut building energy use; 3. Cut energy use in the transportation sector; 4. Expand recycling and the circular economy; 5. Support biodiversity and healthy ecosystems; and 6. Promote behavior change through education and empowerment.[43]

Austin: (Population: 1,011,790).[44] Austin was an early climate leader in Texas, and in 2014 adopted a resolution to reach net-zero GHG emissions by 2050.[45] The city Office of Sustainability followed with the Austin Community Climate Plan, adopted in 2015.[46] Like Houston and Dallas, Austin's plan targets emissions reductions in electricity and natural gas, transportation and land use, materials and waste management, and industrial processes.[47] Austin began implementing 58 priority actions to secure rapid emissions savings, including decreasing energy use in new and existing buildings, lowering the greenhouse gas intensity of its power generation, expanding public transit options, improving land use to facilitate access to public transit and biking/walking trails, promoting resident behavior change to reduce emissions and better manage transportation demand, improving electric vehicle support infrastructure, reducing methane emissions from landfills, increasing recycling effectiveness, and others.[48]

Austin's plan includes an interim emissions reduction target of 47% by 2030 below the base year of 2010, on the path to net-zero GHG emissions by 2050.[49] Decarbonization of electricity will be essential for the city to meet its GHG reduction commitments.[50]

All four cities are thus actively moving to meet their goals by securing dramatic increases in use of renewable power by their residents as a key element of their strategies to reach net-zero carbon emissions by 2050. The cities not only aim to decarbonize their current electricity supply but also count on shifting more fully to electricity to power vehicles and buildings.

Photo: ETA+ via Unsplash

Texas transformer station.

Cleaning up electricity is critical to meeting cities' climate goals

Texas is making progress in changing its energy mix, with wind and solar power combined overtaking coal in their share of electricity production in 2019 (see Figure 1).[51]

However, to meet their GHG emissions reductions goals, the four largest Texas cities will need to move farther and faster in using renewable energy to decarbonize their electricity production, which still accounts for about half of their GHG emissions. In Houston, for example, stationary energy use in homes, businesses, institutions and industry (most of which was electricity, with the remainder in the form of natural gas) accounted for 49% of GHG emissions in 2014, the baseline date for Houston's climate action plan.[52] In Dallas, electricity accounted for 50% of GHG emissions in 2015, the baseline date for that city's environmental and climate action plan.[53] These rates are similar in San Antonio, where stationary energy accounted for 48% of GHG emissions in 2016 and Austin, where electricity generated 51% of the city's GHG emissions in 2010.[54]

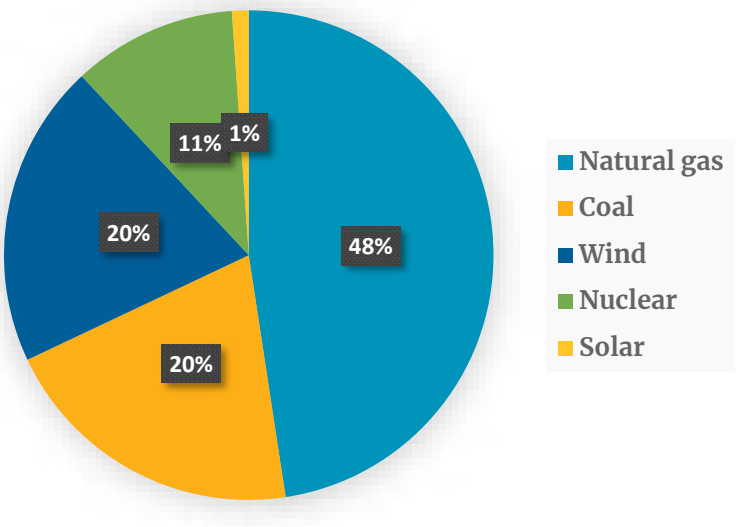


Figure 1: Texas electricity generation by fuel source, percent, 2019[55]

These cities, as well as other major Texas cities, need to continue work toward decarbonizing their electricity if they are to meet their climate goals, since they draw from the Texas state grid, which remains heavily reliant on dirty fuels for generation. Community bulk purchasing can be an important tool to move toward decarbonization, accompanied by other steps including more reliance on clean distributed energy resources (for example, rooftop solar) and improvements in energy efficiency.

Houston is setting an example in its municipal energy use. In 2017, the city signed a 20-year

agreement to purchase power from a 50 megawatt (MW) solar facility in Alpine, Texas. [56] Although municipal government operations account for only a small percentage of total electricity use in Houston, the city secured more than 92% of the electricity for its municipal operations from wind and solar sources in 2020, making Houston the largest municipal buyer of renewable electricity in the country.[57] Further, in April 2020 Houston signed a power purchase agreement (PPA) committing the city to buying 100% renewable energy for municipal operations beginning in July 2020, for a contract period of five years with two one-year renewal options.[58] Dallas, for its part, already buys renewable energy credits (RECs) to offset 100% of municipal operations, and has set goals that 50% and 100% of municipal buildings achieve carbon neutrality by 2030 and 2050 respectively.[59]

More broadly, Houston's Climate Action Plan calls for generating 5 million MWh of local solar power per year by 2050.[60] Dallas' climate plan aims for 50% of residents and businesses to be enrolled in renewable electricity plans by 2050.[61] Even if these and other Texas cities aggressively increase energy efficiency, they will need to source more renewable power in the future than they have available today. While new wind and solar generation prices are expected to continue to fall, which will promote further expansion of renewables vs. fossil fuel-generated power, new policy approaches will be needed to accelerate renewable energy use in these and other Texas cities.

This will only be possible through wise local power purchasing decisions, which in the case of Houston and Dallas will depend on creative use of specific characteristics of Texas' deregulated retail electricity market. San Antonio, Austin and other cities with municipal utilities can use city purchasing directly to secure more renewable power for their residents.

Community bulk power is a versatile tool to unlock affordable green energy

How community bulk power works via municipal aggregation

Community bulk power purchasing is an important tool cities and counties can use to access affordable, clean renewable energy. Several states around the country have authorized one form of community bulk power, Community Choice Aggregation (CCA).[62] Texas does not authorize the formation of CCAs, but the experience of CCAs around the country illustrates some of the benefits Texas cities and counties can achieve by bringing their residents together to buy electricity.

CCAs are local government entities that allow municipalities to procure electricity for a lower price on behalf of their residents and businesses from a different supplier than their default utility provider.[63] CCAs do this by aggregating demand from many consumers on an "opt-out" basis (i.e. they can choose not to participate), which gives CCAs bulk purchasing power they use to negotiate prices below individual retail power prices, saving their members money. In addition to cheaper energy, CCAs provide communities with greater control over their electricity supply options and the opportunity to purchase more renewable power than the existing utility generally offers.[64]

CCAs emerged in the late 1990s and early 2000s as states began to deregulate their electricity markets, enabling retail customers to choose their electricity sources.[65] Nine states have enacted legislation allowing community choice aggregation: California, Illinois, Massachusetts, New Hampshire, New Jersey, New York, Ohio, Rhode Island and Virginia.[66] (Note: Texas has not legally authorized CCAs: see pages 18–19). Apart from Virginia and New Hampshire, which authorized CCAs in 2018 and 2019 respectively, CCAs have made a significant mark in these states.[67] A study by the National Renewable Energy Laboratory (NREL) estimated there were 750 CCAs operating in these states in 2017, securing about 42 million MWh of electricity for 5 million consumers.[68] This represents about 1.1% of total U.S. retail power sales in 2017.[69] CCAs have been most widespread by far in Illinois, where 490 CCAs secured 16.2 million MWh of power, 11.8% of total state retail sales of 137 million MWh, in 2017.[70]

To establish CCAs in states where they have been authorized, local governments must first hold public hearings, and then generally must vote to authorize community choice aggregation.[72] Once CCAs are approved, local governments or third parties choose an electricity provider to provide energy to retail electricity customers within a geographical area.[73] While the energy supplier changes under CCAs, energy is still distributed by the existing

Table 1: Estimated CCA numbers and electricity sales by state, 2017[71]

State	Number of CCAs	Sales (million MWh/year)	Number of customers (thousands)	Percentage of total state sales	Percentage of total state customers
California	9	11.8	1,239	5%	8%
Illinois	490	16.2	1,960	11%	34%
Massachusetts	110	5.1	870	10%	27%
New Jersey	15	1.7	210	2%	5%
New York	1	0.7	93	0.4%	1%
Ohio	120	6.6	660	4%	12%
Rhode Island	1	0.2	2	3%	0.4%
Total	**750**	**42**	**5,000**	**5%**	**12%**

local utility (investor-owned utility – IOU), which owns the poles, wires and other infrastructure.[74] CCAs become the default provider for residents within the specified geographic area, which boosts CCA participation since customers must actively choose if they wish to return to receiving their electricity supply from the incumbent utility or get electricity from a different retail electricity supplier.[75] (Note: Since Texas has not legalized CCAs, the state does not allow such "opt-out" arrangements.)

Aggregating purchasing power allows CCAs to secure electricity rates up to 15-20% less than the residential retail price.[76] Another CCA advantage is that they give municipalities greater control over the type of energy they provide to their participating residents, allowing them to source more from wind, solar and other renewable generators or encourage the development of renewable energy through the purchase of renewable energy credits (RECs).[77] The percentage of renewable energy a local government with a CCA provides to its residents thus can be well above that required by states.[78] Since residents are automatically enrolled in their local CCA unless they opt out, CCAs provide renewable energy to large numbers of consumers with no added effort on their part.[79]

NREL estimates that 100 CCAs across the country offer more renewable energy to members than required by relevant state law, either through default options or a tiered system allowing residents to choose how much renewable energy to purchase.[80] Some towns, such as Carbondale, Illinois, have provided 100% renewable energy to their residents through a CCA.[81] (See Appendix.) NREL reported that in 2017 CCAs procured an additional 8.9 million MWh of renewable energy above that required by state mandates, about 21% of all CCA sales nationally and enough to power about 836,000 homes.[82]

Between the financial benefits and increased possibilities for renewable energy use, CCAs benefit both consumers and the environment. Some CCAs go further – providing services such as energy efficiency programs, incentives for boosting energy efficiency in buildings, energy audits and even consumer advocacy. CCAs in Cleveland, Ohio; Carbondale, Illinois; and the Cape Cod/Martha's Vineyard area of Massachusetts, for example, all have provided members lower electricity rates, substantial amounts of renewable energy and a range of energy efficiency services. (See case studies in Appendix.)

While CCAs are not authorized in Texas, the successes of the CCA model around the country illustrate the power and potential of bringing residents of a city or county together to buy electricity. Texas cities and counties can achieve some of the same benefits by engaging in community bulk power purchasing.

Texas cities can make community bulk power a reality

The deregulation of most of Texas' electricity market required consumers to choose their retail power providers. While CCAs of the kind that have been successful elsewhere in the country are not authorized in Texas, cities and counties can use creative means to develop community bulk power mechanisms that can gain consumers lower prices, greater use of renewable power, and potentially other benefits, including greater energy reliability.

History of Texas electricity market deregulation

For most of the state's history, Texans did not have retail choice, instead receiving power from monopoly retail electricity providers.[83] The state created an organization, the Electric Reliability Council of Texas (ERCOT), in 1970 to manage the flow of power across the electric grid for most of the state.[84] The state PUC in 1996 designated ERCOT as an Independent System Operator (ISO), enshrining ERCOT's role as an independent third-party operator that ensures impartial, equal access to the power grid.[85] ERCOT now handles 85% of the state's electrical load and works with the utilities that manage transmission and distribution across the state, serving 24 million customers.[86] ERCOT's role and effectiveness are now under review by the state after an Arctic freeze and widespread power outages caused havoc across Texas in February 2021.[87]

The first major step toward deregulation came in 1995, when the state legislature deregulated power plant generation.[88] To promote increased consumer choice, expansion of state generating capacity, and less direct government involvement in the system, in 1999 the legislature passed Texas Senate Bill 7, which took effect in 2002.[89] SB7 changed the landscape radically by reducing regulatory oversight of most of the state's retail electricity market and opening it to competition. The law required electricity providers to unbundle into deregulated power generating companies (wholesalers), regulated transmission and distribution companies (which own the wires transporting power to customers in a specific area) and deregulated retail electric providers, which buy power from wholesalers and resell it to retail customers.[90] This opened the market to competition in service areas for five distribution and transmission utilities covering about 70% of Texas residents.[91]

However, while many other states that deregulated created opportunities for municipalities to bundle the purchasing power of residents by allowing cities to choose "default" service providers for residents, Texas did not, and is not among the U.S. states that have legalized CCAs. The City of Dallas attempted in 2010 to become an REP, arguing it could secure lower prices for residents than existing REPs.[92] The PUC denied Dallas' application, saying Texas codes did not allow a

city to become an REP; Dallas then took the PUC to court, which ruled against Dallas.[93]

Texas law does, however, provide a way for municipalities or counties to aggregate the demand of their residents. This does not require the city or county to become an REP per se but requires more proactive steps on the part of consumers than do CCAs (see below). This increases the challenge for Houston, Dallas and other cities or counties in deregulated markets to directly affect electricity sector emissions and the proportion of power coming from renewable sources.

The severe ice storms and deep freezes in February 2021, which triggered power outages lasting for days for millions of Texas residents, have highlighted the downsides of Texas' deregulated market, including lack of investment in system resilience, minimal oversight by the state government and wild price swings for retail customers.[94] Addressing these failures will require state actions and utility investment in grid and supply resilience (not addressed in this paper).

How community bulk power could work for Texans

Although Texas cities and counties cannot form formal CCAs, they could establish aggregations that would give these cities similar leverage to that enjoyed by CCAs. To do this, these cities and counties should seek to use existing Texas Public Utility Commission rules (§25.111, Registration of Aggregators) to aggregate citizens for the purpose of purchasing electricity.[95] A city or county potentially could register as an aggregator itself, or it could register another body, such as a non-profit, public corporation owned by the relevant city or county, which would then contract with an REP to administer the program.[96] Under PUC rules, any city or county resident could opt-in to participate in such an aggregation program (differing from CCAs, which automatically enroll residents unless they opt out of participation).

While not a CCA, such a community bulk power body could negotiate bulk purchases of electricity at lower

Photo: Austin Energy

La Loma community solar farm in east Austin.

costs and with higher proportions of renewable energy for its members, helping Texas cities and counties both reduce GHG emissions and benefit consumers. There do not appear to be legal impediments in state law, nor market size constraints, to establishing such a structure, and PUC rules lay out clearly how community bulk power aggregation could be established.[97]

Texas cities and counties will need to examine possible operational or logistical challenges of setting up a community bulk power body. REPs face the logistical and cost challenges of acquiring, enrolling and tracking new customers, since customers have to choose positively to participate, which could deter the REPs from wanting to manage a community bulk power body. The process could be made simpler and cheaper by consolidating electricity billing with other city utility billing (e.g. water bills) or finding other cost-saving means of billing.[98] Choosing between electricity companies can be confusing to consumers, and as trusted institutions to many, a city or county-branded community bulk power arrangement would be an advantage in marketing local renewable power to residents. The cities and counties nevertheless would also need corresponding public education campaigns to inform residents about the new options for securing cheaper and cleaner power.

A good way to begin could be via small-scale pilot projects. Houston, for example, could conduct a pilot to aggregate a small number of customers (e.g., 5,000) to establish a model for how community bulk power would work, though this initial scale might limit the ability of an aggregator to negotiate significant price savings or more renewable energy.[99] The pilot could expand to encompass the entire city as managers learn how to administer the program most effectively. Vendors such as Local Sun, a small generating company based in Sealy, Texas, which offers 100% solar energy, could be the type of provider tapped by community bulk power programs to offer more renewable power to their customers.[100]

As more Texas cities and counties in areas with competitive retail electricity markets adopt GHG emission reduction goals, they could look to this model to offer community bulk power benefits to their residents and provide a larger proportion of the state's population the chance to secure clean power. This could work in parallel with steps by San Antonio, Austin and other cities with municipal utilities to source greater and greater amounts of renewable power for their residents, accelerating overall statewide GHG emissions reductions.

Recommendations: Community bulk power for Texas cities

Houston, Dallas and other Texas cities and counties with competitive retail electricity markets and strong climate goals should adopt a community bulk power aggregation approach to bolster their purchases of clean energy and help them reduce GHG emissions. To do this, these cities and counties should explore using existing Texas Public Utility Commission rules (§25.111, Registration of Aggregators) to aggregate citizens for the purpose of negotiating for bulk electricity purchases.[101]

A city or county could register as an aggregator itself or could direct the registration of another body, such as a city-owned non-profit public corporation, which would then contract with a private retail electricity provider to administer the program.[102] Under PUC rules, any resident could opt-in to participate the program (differing from CCAs, which automatically enroll residents unless they opt out of participation).[103]

While not a CCA, such a community bulk power body could negotiate bulk purchases of electricity at lower costs and with higher proportions of renewable energy for its members, helping Texas cities and counties both reduce GHG emissions and benefit consumers. There do not appear to be legal impediments in state law, nor market size constraints, to establishing such a structure, and PUC rules lay out clearly how community bulk power can be established.[104] Texas cities and counties should examine potential operational or logistical challenges of such structures, including around how to acquire and bill customers under a customer choice model, but could begin with small-scale pilot projects to iron out kinks in how community bulk power would work.

Community bulk power purchasing can also help meet other community goals. Cities and counties can use their buying power to negotiate as part of bulk purchasing investments in weatherization, bill assistance, or on-site solar to improve energy reliability.

Establishing community bulk power under Texas PUC rules would help cities like Dallas and Houston with ambitious climate action plans reach their clean energy targets. As other Texas cities and counties with deregulated markets adopt climate plans, they could use this model to expand offerings of renewable power to their residents as well, increasing the proportion of the state's population using clean power and enjoying lower electricity prices. Texas law already envisions a community bulk power option – cities and counties should not wait to take advantage of this opportunity to reduce costs to consumers, expand use of renewable energy, and add substantially to Texas' contribution to meeting the challenge of global warming.

Appendix: Community choice aggregation success stories

Community choice aggregation has been successful around the country and continues to expand. The examples below demonstrate the effectiveness of CCAs as an option for cities to both save money and secure increased supplies of renewable power for their members.

Cleveland and the Northeast Ohio Public Energy Council (NOPEC)

Ohio legalized community choice aggregation in 1999, but only for areas served by investor-owned utilities. [105] Ohio once had a strong statewide commitment to clean energy, but state law unfortunately has gone backward – a 2019 law, HB6, weakened renewable energy standards, mandating that utilities need to draw only 8.5% of their power from renewables by 2026 and eliminating any renewable requirement after 2026.[106] The law also cut the energy efficiency standard for utilities from 22% to 17.5% in cumulative savings, and expanded the ability of large industries to opt out of these energy efficiency standards.[107] CCAs, which have long worked to save Ohio consumers money on their electric bills, represent an important tool to keep Ohio's clean energy progress on track.

The city of Cleveland has adopted strong GHG reduction commitments despite state government backpedaling. In 2018, Cleveland amended its Climate Action Plan to add goals to reduce residential and commercial energy use by 50% by 2030, and to provide 100% of electricity demand with renewable energy by 2050.[108]

In 2018, Cleveland also entered into an agreement with the Northeast Ohio Public Energy Council (NOPEC), Ohio's largest CCA, to provide energy backed with 100% RECs to 50,000 residential and 5,000 small commercial customers of Cleveland Electric Illuminating Company at no added cost.[109] NOPEC serves more than 900,000 residential and small business customers in over 235 communities in 19 Ohio counties.[110] NOPEC buys bulk electricity from NextEra Energy Services Ohio, a subsidiary of U.S.-based NextEra Energy Inc., one of the world's largest producers of wind and solar energy.[111] Regarding the new agreement, Mayor Frank G. Jackson said in 2018 that "giving Clevelanders options for creating more sustainable households is important to our city's future. We selected this electric aggregation service to help provide neighborhood residents an opportunity to save and help better the environment."[112]

Beyond Cleveland, NOPEC also has worked to expand access to renewable energy for its members across northeastern Ohio. In 2017, NOPEC offered consumers electric aggregation with 50% RECs without any individual action required.[113] As of 2020, that rate dropped to 11%.[114] For an additional 50¢ monthly, NOPEC customers can opt-in to a plan offering RECs for 100% of the customer's energy usage.[115]

NOPEC also has programs to help consumers improve energy efficiency, including via a Property Assessed Clean Energy Financing (PACE) program and a Savings Through Efficiency Program (STEP). PACE offers low-interest rate financing for energy efficiency improvement projects between $100,000 to $500,000

for government, commercial, industrial or multi-family housing properties in NOPEC communities.[116] STEP provides loans of $5,000 to $100,000 for commercial property owners with 3% fixed-rate financing for up to 10 years for energy efficiency or renewable energy projects.[117] Since 2001, NOPEC has also awarded over $28 million to member communities for increases in energy efficiency and infrastructure through its Energized Community Grants.[118]

Carbondale, Illinois, and Homefield Energy

Illinois, which has allowed CCAs since 2009, has the highest number in the country.[119] Of the 700 communities in the state that have considered CCAs, 82% have voted in favor.[120] A 2013 study found that 91 Illinois towns included 100% RECs in their CCA agreements, the highest proportion of any state.[121] Illinois's Renewable Energy Standard currently requires investor-owned utilities and retail suppliers to provide 25% renewable energy by 2025, which is building momentum for Illinois to meet Governor J.B. Pritzker's goal of having the state use 100% clean energy by 2050.[122]

In 2013, the city of Carbondale signed an agreement with retail electricity provider Homefield Energy to provide them with 100% renewable energy.[123] Homefield, a subsidiary of Dynegy Energy, serves over 1 million homes and businesses in the Northeast, Midwest and Texas.[124] The new aggregation agreement saved customers 22% over their prior, non-aggregated retail rates.[125] The agreement continued to save customers money for several years, and in 2017, the City extended the agreement through the end of 2020.[126] In 2021, the City discontinued the agreement since customers could get cheaper power from incumbent provider Ameren, which had lowered its rates.[127]

Cape Light Compact, Massachusetts

Massachusetts authorized CCAs in 1997 and currently has over 150 across the state.[128] Seventeen of those 150 communities have aggregations whose default power supply exceeds the renewable energy content required by the state Renewable Energy Standard (RES).[129] The Massachusetts' RES requires that a percentage of the electricity that retail suppliers provide for their customers must be from Class I renewable energy sources (primarily solar, wind, geothermal, tidal or sustainably secured methane from biomass), beginning at 1% in 2003 and increasing 0.5% annually.[130] After the requirement reached 4% in 2009, the Massachusetts Green Communities Act stipulated a 1% annual increase.[131] In 2018, the state Clean Energy Standard mandated that utilities and competitive retail suppliers obtain at least 16% of their power from clean sources, increasing by 2% annually until the level reaches 80% in 2050.[132] Massachusetts also has a state goal of reducing greenhouse gas emissions by 80% below the 1990 baseline level by 2050.[133]

The Cape Light Compact, formed in 1997, is an award-winning program serving 21 towns and 200,000 customers on Cape Cod and Martha's Vineyard.[134] In 2017 the Compact became a green aggregator, providing RECs for 100% of its customers' energy.[135] The Compact partners with NextEra Energy Services Massachusetts to procure energy.[136] The Compact also offers a Local Green program that allows customers to support local, New England-based renewable energy projects by matching consumers' usage with an additional 50% or 100% of RECs.[137] The Compact's standard residential supply cost was 9.98¢/kWh, while the Local Green 50% and 100% programs cost 11.28¢/kWh and 12.68¢/kWh, respectively, in 2020.[138] The additional premium for the Local Green program is tax deductible.[139]

The Cape Light Compact supports energy efficiency projects in the towns it serves, recently converting more than 15,000 municipal street lights to LEDs, performing free energy audits, and incentivizing the building of more energy efficient homes with $350 – $7,000 awards and free energy efficiency technologies.[140] The Compact is managed and overseen by a Cape Light Compact Board including representatives from each of its communities.[141] The Compact advocates for members' interests at the state level, and its administrative, legal and legislative wins have saved millions of dollars for Cape Cod and Martha's Vineyard residents.[142] The Compact also offers discounted energy services for low-income customers and teaches elementary and middle schoolers about energy efficiency.[143]

Notes

1. U.S. Energy Information Administration, *U.S. States, Texas, State Profile and Energy Estimates, Rankings, Total Carbon Dioxide Emissions 2017*, available at https://www.eia.gov/state/rankings/?sid=TX#/series/226. Texas total versus national total calculated from underlying EIA data at this site.

2. Houston emissions: City of Houston, *Houston Climate Action Plan*, April 2020, page 20, available at http://greenhoustontx.gov/climateactionplan/CAP-April2020.pdf Dallas emissions: CDP GHG disclosure open data portal, *2014 citywide GHG emissions*, available at https://data.cdp.net/widgets/imj3-eat7. Texas total emissions: Johannes Friedrich et al., World Resources Institute, *6 charts to understand U.S. state greenhouse gas emissions*, 10 August 2017, archived at https://web.archive.org/web/20210114025654/https://www.wri.org/blog/2017/08/6-charts-understand-us-state-greenhouse-gas-emissions.

3. City populations: World Population Review, *Top 500 Cities in Texas by Population*. Based on WPR projections for 2020 of 2018 U.S. Census data. Available at https://worldpopulationreview.com/states/cities/texas; State population: World Population Review, U.S. states ranked by population, available at https://worldpopulationreview.com/states.

4. City of Houston, *Houston Climate Action Plan*, April 2020, page 20, available at http://greenhoustontx.gov/climateactionplan/CAP-April2020.pdf; City of Dallas, *Dallas Comprehensive Environmental and Climate Action Plan,* May 2020, page xvi, available at https://27aabd9a-6024-4b39-ba78-f6074e2fc631.filesusr.com/ugd/349b65_e4f9a262cebf41258fd4343d9af0504f.pdf; City of San Antonio, *SA Climate Ready: a Pathway for Climate Action and Adaptation,* 17 October 2019, page 32, available at https://www.sanantonio.gov/Portals/0/Files/Sustainability/SAClimateReady/SACRReportOctober2019.pdf; City of Austin, *Austin Community Climate Plan,* June 2015, page 5, available at http://austintexas.gov/sites/default/files/files/Sustainability/FINAL_-_OOS_AustinClimatePlan_061015.pdf.

5. City of Dallas, *Dallas Comprehensive Environmental and Climate Action Plan,* May 2020, page 30, available at https://27aabd9a-6024-4b39-ba78-f6074e2fc631.filesusr.com/ugd/349b65_e4f9a262cebf41258fd4343d9af0504f.pdf.

6. City of Houston, *Houston Climate Action Plan*, April 2020, page 21, available at http://greenhoustontx.gov/climateactionplan/CAP-April2020.pdf.

7. LEAN (Local Energy Aggregation Network) U.S., *CCA by State*, accessed 3 February 2021 at https://www.leanenergyus.org/cca-by-state.

8. NREL study: Eric O'Shaughnessy et al., National Renewable Energy Laboratory, *Community Choice Aggregation: Challenges, Opportunities, and Impacts on Renewable Energy Markets*, February 2019, page iv, available at https://www.nrel.gov/docs/fy19osti/72195.pdf; Percentage of retail purchases in the U.S.: U.S. Energy Information Administration, Electricity Data, *Electricity Data Browser*, accessed 27 January 2021 at https://www.eia.gov/electricity/data/browser/#/topic/5?agg=0,1&geo=g&endsec=vg&linechart=ELEC.SALES.US-ALL.A~ELEC.SALES.US-RES.A~ELEC.SALES.US-COM.A~ELEC.SALES.US-IND.A&columnchart=ELEC.SALES.US-ALL.A~ELEC.SALES.US-RES.A~ELEC.SALES.US-COM.A~ELEC.SALES.US-IND.A&map=ELEC.SALES.US-ALL.A&freq=A&ctype=linechart&ltype=pin&rtype=s&pin=&rse=0&maptype=0.

9. U.S. EPA, *Community Choice Aggregation*, 27 October 2020, archived at http://web.archive.org/web/20201018055339/https://www.epa.gov/greenpower/community-choice-aggregation.

10. Eric O'Shaughnessy et al., National Renewable Energy Laboratory, *Community Choice Aggregation: Challenges, Opportunities, and Impacts on Renewable Energy Markets*, February 2019, page iv, available at https://www.nrel.gov/docs/fy19osti/72195.pdf; Number of homes powered: U.S. average home electricity usage per year in 2019 was 10.649 MWh, U.S. Energy Information Administration, *Frequently Asked Questions, How much electricity does an average American home use?,* archived at https://web.archive.org/web/20210112194802/https://www.eia.gov/tools/faqs/faq.php?id=97&t=3. 8.9 million megawatt hours/10.649 MWh = 835,759 homes.

11. Eric Goff, Texas energy consultant, personal communication, 27 January 2021. Mr. Goff has worked on energy regulatory issues in Texas for 15 years.

12. Ibid.

13. Texas Public Utility Commission, Rules and Laws, Chapter 25, Subchapter E, Certification, Licensing and Registration, §*25.111, Registration of Aggregators*, effective 28 June 2000, page 203, archived at https://web.archive.org/web/20190904230520/http://www.puc.texas.gov/agency/rulesnlaws/subrules/electric/ch25complete.pdf.

14. Eric Goff, Texas energy consultant, personal communication, 18 December 2020. Mr. Goff has worked on energy regulatory issues in Texas for 15 years.

15. Ibid.

16. See note 13.

17. Ibid.

18. World Vision, *2017 Hurricane Harvey: Facts, FAQs, and how to help*, 7 September 2018, archived at http://web.archive.org/web/20201112025146/https://www.worldvision.org/disaster-relief-news-stories/2017-hurricane-harvey-facts.

19. Joeri Rogelj, Drew Shindell and Kejun Jiang, Intergovernmental Panel on Climate Change, *Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development*, Executive Summary, 2018, page 2, archived athttps://web.archive.org/web/20210221010414/https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_Chapter2_Low_Res.pdf.

20. U.S. Energy Information Administration, *Electricity Analysis and Projections, Detailed State Data, 1990-2019 Net Generation by State by Type of Producer by Energy Source*, available at https://www.eia.gov/electricity/data/state/.

21. John Hall, Environmental Defense Fund, *Texas' Clean Energy Economy*, February 2017, page 4, archived at https://web.archive.org/web/20210222172545/http://blogs.edf.org/energyexchange/files/2017/02/EDF-Texas-Report-to-Legislators-2017-FINAL.pdf.

22. Climate Mayors, Medium, "407 U.S. Climate Mayors commit to adopt, honor and uphold Paris Climate Agreement goals," 1 June 2017, available at https://medium.com/@ClimateMayors/climate-mayors-commit-to-adopt-honor-and-uphold-paris-climate-agreement-goals-ba566e260097.

23. We are still in, *America is all in*, 2020, archived at https://web.archive.org/web/20210228094326/https://www.wearestillin.com/.

24. U.S. Department of Energy, *Clean Cities Coalition Network*, accessed 10 December 2020, archived at http://web.archive.org/web/20201016211913/https://cleancities.energy.gov/about/; US Department of Energy, *Clean Cities Coalition Locations*, accessed 10 December 2020, archived at http://web.archive.org/web/20201020090115/https://cleancities.energy.gov/coalitions/locations/.

25. University of Houston, Hobby School of Public Affairs, *Texas Policy and Politics 2021*, Legislative Issues, January 2021, page 2, available at https://uh.edu/hobby/tx2021/issues.pdf.

26. See note 1. Texas total versus national total calculated from underlying EIA data at this site.

27. Houston emissions: City of Houston, *Houston Climate Action Plan*, April 2020, page 16, available at http://greenhoustontx.gov/climateactionplan/CAP-April2020.pdf. Dallas emissions: CDP GHG disclosure open data portal, *2014 citywide GHG emissions*, available at https://data.cdp.net/widgets/imj3-eat7. Texas total emissions: Johannes Friedrich et al., World Resources Institute, *6 charts to understand U.S. state greenhouse gas emissions*, 10 August 2017, archived at https://web.archive.org/web/20210114025654/https://www.wri.org/blog/2017/08/6-charts-understand-us-state-greenhouse-gas-emissions.

28. City of Houston, *Houston Climate Action Plan*, April 2020, page 9, available at http://greenhoustontx.gov/climateactionplan/CAP-April2020.pdf; City of Dallas, *Dallas Comprehensive Environmental and Climate Action Plan,* May 2020, page xvi, available at https://27aabd9a-6024-4b39-ba78-f6074e2fc631.filesusr.com/ugd/349b65_e4f9a262cebf41258fd4343d9af0504f.pdf; City of San Antonio, *SA Climate Ready: a Pathway for Climate Action and Adaptation,* October 17, 2019, page 10, available at https://www.sanantonio.gov/Portals/0/Files/Sustainability/SAClimateReady/SACRReportOctober2019.pdf; City of Austin, *Austin Community Climate Plan,* June 2015, page 5, available at http://austintexas.gov/sites/default/files/files/Sustainability/FINAL_-_OOS_AustinClimatePlan_061015.pdf.

29. World Population Review, *Top 500 Cities in Texas by Population*. Based on WPR projections for 2020 of 2018 U.S. Census data. Archived on 5 February 2021 at https://web.archive.org/web/20210205025752/https://worldpopulationreview.com/states/cities/texas.

30. Hurricane Harvey stronger due to global warming: Mark Risser and Michael Wehner, "Attributable human-induced changes in the likelihood and magnitude of the observed extreme precipitation during Hurricane Harvey," *Geophysical Research Letters,* doi: 10.1002/2017GL075888, 12 December 2017; Resilient Houston plan: City of Houston, *Resilient Houston,* February 2020, pages 4 and 9, available at https://www.houstontx.gov/mayor/Resilient-Houston-20200518-single-page.pdf.

31. City of Houston, *Houston Climate Action Plan*, April 2020, page 11, available at http://greenhoustontx.gov/climateactionplan/CAP-April2020.pdf.

32. Houston Climate Action Plan, *Spreadsheet*, April 2020, page 12, available at http://greenhoustontx.gov/climateactionplan/CAP-April2020-Spreadsheet.pdf.

33. Katie Watkins and Jen Rice, "5 Things You Should Know about Houston's Climate Action Plan," *Houston Public Media*, 17 June 2020, available at https://www.houstonpublicmedia.org/articles/news/energy-environment/2020/06/17/376385/5-things-you-should-know-about-houstons-climate-action-plan/.

34. See note 29.

35. City of Dallas, *Dallas Comprehensive Environmental and Climate Action Plan,* May 2020, page xiv, available at https://27aabd9a-6024-4b39-ba78-f6074e2fc631.filesusr.com/ugd/349b65_e4f9a262cebf41258fd4343d9af0504f.pdf.

36. Ibid., xvii.

37. Ibid., 23.

38. Ibid., xiii.

39. See note 29.

40. City of San Antonio, *SA Climate Ready: A Pathway for Climate Action and Adaptation*, October 2019, page 10, available at https://www.sanantonio.gov/Portals/0/Files/Sustainability/SAClimateReady/SACRReportOctober2019.pdf.

41. Ibid. Original data from Abigail Bradford et al., Environment Texas, *Shining Cities 2019: The top U.S. cities for solar energy,* April 2019, page 8, available at https://environmenttexas.org/sites/environment/files/reports/TX_Shiningcities2019_scrn.pdf.

42. City of San Antonio, *SA Climate Ready: A Pathway for Climate Action and Adaptation*, October 2019, page 32, available at https://www.sanantonio.gov/Portals/0/Files/Sustainability/SAClimateReady/SACRReportOctober2019.pdf.

43. Ibid., 33.

44. See note 29.

45. City of Austin, *Austin Community Climate Plan*, June 2015, page 2, available at http://austintexas.gov/sites/default/files/files/Sustainability/FINAL_-_OOS_AustinClimatePlan_061015.pdf

46. City of Austin, *Austin Community Climate Plan*, June 2015, title page, available at http://austintexas.gov/sites/default/files/files/Sustainability/FINAL_-_OOS_AustinClimatePlan_061015.pdf.

47. City of Austin, *Austin Community Climate Plan*, June 2015, pages 76-77, available at http://austintexas.gov/sites/default/files/files/Sustainability/FINAL_-_OOS_AustinClimatePlan_061015.pdf.

48. City of Austin, *Austin Community Climate Plan*, Implementation Plan Phase I, March 2016, pages 1-27, available at http://austintexas.gov/sites/default/files/files/2016-03-25_2015-16_ACCP_Implementation_Plan_-_Phase_1_Actions.pdf.

49. See note 37.

50. City of Austin, *Austin Community Climate Plan*, June 2015, page 13, available at http://austintexas.gov/sites/default/files/files/Sustainability/FINAL_-_OOS_AustinClimatePlan_061015.pdf.

51. Lisa Minton, Texas state comptroller, *Texas' electricity resources: where power comes from and how it gets to you*, August 2020, archived at https://web.archive.org/web/20210301103503/https://comptroller.texas.gov/economy/fiscal-notes/2020/august/ercot.php.

52. Houston emissions: City of Houston, *Houston Climate Action Plan*, April 2020, page 16, available at http://greenhoustontx.gov/climateactionplan/CAP-April2020.pdf. Houston's GHG inventory was prepared using the City Inventory Reporting and Information System (CIRIS) tool developed by C40 Cities. CIRIS in turn was developed following the Global Protocol for Community-scale Greenhouse Gas Emission Inventories (GPC) which is an internationally accepted methodology developed jointly by the C40 Cities Climate Leadership Group (C40), the World Bank, ICLEI-Local Governments for Sustainability (ICLEI), and the World Resources Institute (WRI).

53. City of Dallas, *Dallas Comprehensive Environmental and Climate Action Plan*, May 2020, page 22, available at https://27aabd9a-6024-4b39-ba78-f6074e2fc631.filesusr.com/ugd/349b65_e4f9a262cebf41258fd4343d9af0504f.pdf. Dallas' GHG inventory was also prepared using the Global Protocol for Community Scale GHG Inventories (GPC).

54. San Antonio: City of San Antonio, *SA Climate Ready: A Pathway for Climate Action and Adaptation*, October 2019, page 23, available at https://www.sanantonio.gov/Portals/0/Files/Sustainability/SAClimateReady/SACRReportOctober2019.pdf.

Austin: City of Austin, *Austin Community Climate Plan*, June 2015, page 13, available at http://austintexas.gov/sites/default/files/files/Sustainability/FINAL_-_OOS_AustinClimatePlan_061015.pdf.

55. See note 51.

56. City of Houston, *Houston Climate Action Plan*, April 2020, page 24, available at http://greenhoustontx.gov/climateactionplan/CAP-April2020.pdf.

57. Ibid.

58. City of Houston, Office of the Mayor, "The City of Houston Commits to 100% Renewable Energy," 30 April 2020, available at https://www.houstontx.gov/mayor/press/2020/100-percent-renewable-energy.html#:~:text=April%2030%2C%202020%20%2D%2D%20Mayor,the%20City's%20retail%20electric%20provider.&text=%E2%80%9CWe%20are%20proud%20to%20support,of%20Houston%20with%20renewable%20power.

59. Municipal use of RECs: City of Dallas, *Dallas Comprehensive Environmental and Climate Action Plan*, May 2020, page 71, available at https://27aabd9a-6024-4b39-ba78-f6074e2fc631.filesusr.com/ugd/349b65_e4f9a262cebf41258fd4343d9af0504f.pdf. Municipal building carbon neutrality: *Dallas Comprehensive Environmental and Climate Action Plan*, May 2020, page 29, available at https://27aabd9a-6024-4b39-ba78-f6074e2fc631.filesusr.com/ugd/349b65_e4f9a262cebf41258fd4343d9af0504f.pdf.

60. City of Houston, *Houston Climate Action Plan*, April 2020, page 43, available at http://greenhoustontx.gov/climateactionplan/CAP-April2020.pdf.

61. City of Dallas, *Dallas Comprehensive Environmental and Climate Action Plan,* May 2020, page 30, available at https://27aabd9a-6024-4b39-ba78-f6074e2fc631.filesusr.com/ugd/349b65_e4f9a262cebf41258fd4343d9af0504f.pdf.

62. See note 7.

63. See note 9.

64. Ibid.

65. Eric O'Shaughnessy et al., National Renewable Energy Laboratory, "Community Choice Aggregation: Challenges, Opportunities, and Impacts on Renewable Energy Markets," February 2019, page iv, vailable at https://www.nrel.gov/docs/fy19osti/72195.pdf.

66. See note 7.

67. Ibid.

68. See note 65.

69. U.S. Energy Information Administration, Electricity Data, *Electricity Data Browser*, accessed 27 January 2021 at https://www.eia.gov/electricity/data/browser/#/topic/5?agg=0,1&geo=g&endsec=vg&linechart=ELEC.SALES.US-ALL.A~ELEC.SALES.US-RES.A~ELEC.SALES.US-COM.A~ELEC.SALES.US-IND.A&columnchart=ELEC.SALES.US-ALL.A~ELEC.SALES.US-RES.A~ELEC.SALES.US-COM.A~ELEC.SALES.US-IND.A&map=ELEC.SALES.US-ALL.A&freq=A&ctype=linechart&ltype=pin&rtype=s&pin=&rse=0&maptype=0. Percentage determined by dividing CCA sales by total U.S. retail sales in 2017.

70. Illinois CCA sales in 2017: Eric O'Shaughnessy et al., National Renewable Energy Laboratory, *Community Choice Aggregation: Challenges, Opportunities, and Impacts on Renewable Energy Markets*, February 2019, page iv, available at https://www.nrel.gov/docs/fy19osti/72195.pdf. Total Illinois sales in 2017: U.S. Energy Information Administration, *Electricity Data, Electricity Data Browser,* available at https://www.eia.gov/electricity/state/archive/2017/.

71. See note 65, page 7.

72. See note 9.

73. See note 65, page 1.

74. See note 9.

75. See note 73.

76. See note 9.

77. See note 65, page 9. Note: Texas cities and environmental groups are turning more toward direct power purchase agreements rather than RECs to secure clean power, given difficulties ensuring RECs actually contribute to new clean energy projects being built, per David Roberts, "RECs, which put the "green" in green energy, explained," *Vox*, 9 November 2015, available at https://www.vox.com/2015/11/9/9696820/renewable-energy-certificates.

78. See note 65.

79. See note 65, page 8.

80. See note 77.

81. Explore Carbondale, electrical aggregation program, archived 16 January 2021 at https://web.archive.org/web/20210116113451/https://www.explorecarbondale.com/650/Electrical-Aggregation-Program.

82. Eric O'Shaughnessy et al., National Renewable Energy Laboratory, *Community Choice Aggregation: Challenges, Opportunities, and Impacts on Renewable Energy Markets*, page iv, February 2019, available at https://www.nrel.gov/docs/fy19osti/72195.pdf. Number of homes powered: U.S. average home electricity usage per year in 2019 was 10.649 MWh, U.S. Energy Information Administration, *Frequently Asked Questions, How much electricity does an average American home use?,* archived at https://web.archive.org/web/20210112194802/https://www.eia.gov/tools/faqs/faq.php?id=97&t=3. 8.9 million megawatt hours/10.649 MWh = 835,759 homes.

83. Direct Energy, *What Is Texas Electric Choice?*, archived 16 February 2021 at https://web.archive.org/web/20210216143835/https://www.directenergy.com/learning-center/texas-history-of-deregulation.

84. Tom Hunter, Public Utility Commission of Texas, *History of Electric Deregulation in ERCOT*, 17 April 2012, page 4, available at https://www.puc.texas.gov/agency/topic_files/101/PUC-History_Dereg_ERCOT.pdf.

85. Ibid., page 10.

86. Electric Choice, *The Ultimate Guide to Texas Electricity Deregulation*, (blog), archived 27 February 2021 at https://web.archive.org/web/20210227215332/https://www.electricchoice.com/blog/guide-texas-electricity-deregulation/.

87. Clifford Krauss et al., "How Texas' drive for energy independence set it up for disaster," *The New York Times,* 21 February 2021, available at https://www.nytimes.com/2021/02/21/us/texas-electricity-ercot-blackouts.html?action=click&module=Top%20Stories&pgtype=Homepage.

88. See note 86.

89. SB7 passed: Texas legislature online, history, available at https://capitol.texas.gov/billlookup/History.aspx?LegSess=76R&Bill=SB7. SB7 took effect: Direct Energy, *What Is Texas Electric Choice?*, archived 16 February 2021 at https://web.archive.org/web/20210216143835/https://www.directenergy.com/learning-center/texas-history-of-deregulation.

90. See note 86.

91. Ibid.

92. Gavin Dillingham, Houston Advanced Research Center (HARC), personal communication, 14 September 2020.

93. Ibid.

94. See note 87.

95. See note 13.

96. See note 14.

97. Texas Public Utility Commission, Rules and Laws, Chapter 25, Subchapter E, Certification, Licensing and Registration, §*25.111, Registration of Aggregators*, effective 28 June 2000, page 209, archived at https://web.archive.org/web/20190904230520/http://www.puc.texas.gov/agency/rulesnlaws/subrules/electric/ch25complete.pdf.

98. See note 14.

99. See note 11.

100. Local Sun, *How it works*, archived 19 October 2020 at https://web.archive.org/web/20201019205548/https://localsunenergy.com/how-it-works/.

101. See note 13.

102. See note 11.

103. See note 65.

104. See note 97.

105. When Ohio authorized CCAs: U.S. EPA, *Community Choice Aggregation*, 18 August 2020, archived at http://web.archive.org/web/20201018055339/https://www.epa.gov/greenpower/community-choice-aggregation. CCAs authorized for investor-owned utilities only: City of Cleveland Ohio, *City Announces Electricity Aggregation Agreement with Northeast Ohio Public Energy Council*, 19 April 2019, archived at http://web.archive.org/web/20201027130407/http://cleveland-oh.gov/4.19.2018NOPEC_AggregationAgreement.

106. Randy Chow, "Ohio's New Energy Law: What You Should Know," *Statehouse News Bureau*, 26 July 2019, available at https://www.statenews.org/post/ohio-s-new-energy-law-what-you-should-know.

107. David Roberts, "Ohio just passed the worst energy bill of the 21st century," *Vox*, 27 July 2019, archived at https://web.archive.org/web/20210125125451/https://www.vox.com/energy-and-environment/2019/7/27/8910804/ohio-gop-nuclear-coal-plants-renewables-efficiency-hb6.

108. The City of Cleveland, *Cleveland Climate Action Plan: 2018 Update*, 2018, available at https://d3n8a8pro7vhmx.cloudfront.net/sustainablecleveland/pages/56/attachments/original/1537383979/CAP_Update_2018_Snapshot_for_web_09-19.pdf?1537383979.

109. Cleveland agreement with NOPEC: City of Cleveland Ohio, *Advanced and Renewable Energy*, accessed 27 October 2020, archived at http://web.archive.org/web/20200618112253/http://www.city.cleveland.oh.us/CityofCleveland/Home/Government/CityAgencies/OfficeOfSustainability/AdvancedAndRenewableEnergy. Ohio's largest CCA: NOPEC, *Who is NOPEC*, archived 11 January 2021 at https://web.archive.org/web/20210111222428/https://www.nopec.org/who-is-nopec/. Number of customers: The City of Cleveland, *Cleveland Climate Action Plan: 2018 Update*, 2018, available at https://d3n8a8pro7vhmx.cloudfront.net/sustainablecleveland/pages/56/attachments/original/1537383979/CAP_Update_2018_Snapshot_for_web_09-19.pdf?1537383979. RECs: Also called Renewable Energy Certificates, RECs are tradeable certificates representing the environmental benefits of one megawatt-hour of generation of clean energy. They can be sold together with or separately from the underlying electricity.

110. Northeast Ohio Public Energy Council, *2019 Annual Report*, 2019, pages 3 and 22, available at https://www.nopec.org/media/1914/2019-annual-report-nopec.pdf.

111. NOPEC purchases: NOPEC, *Who is NOPEC*, archived 11 January 2021 at https://web.archive.org/web/20210111222428/https://www.nopec.org/who-is-nopec/; World's largest producer of wind and solar energy: NextEra Energy, Sustainability, Environment, *Renewable energy*, archived 8 January 2021 at https://web.archive.org/web/20210108205612/https://www.nexteraenergy.com/sustainability/environment/renewable-energy.html.

112. City of Cleveland Ohio, *City Announces Electricity Aggregation Agreement with Northeast Ohio Public Energy Council*, 19 April 2019, archived at http://web.archive.org/web/20201027130407/http://cleveland-oh.gov/4.19.2018NOPEC_AggregationAgreement.

113. Mary Ripley, Northeast Ohio Public Energy Council, *Does NOPEC Offer a "Green" Electric Product?*, 15 February 2017, archived at https://web.archive.org/web/20201027134808/https://www.nopec.org/blognewsroom/blog/does-nopec-offer-a-green-electric-product/.

114. Joyce Mihalik, Chief Operations Officer, Northeast Ohio Public Energy Council, personal communication, 21 October 2020.

115. Northeast Ohio Public Energy Council, green product flyer, *Want to support NOPEC's renewable energy efforts?*, archived at https://web.archive.org/web/20210128202410/https://www.nopec.org/media/1473/green-product-flyer-final.pdf.

116. Northeast Ohio Public Energy Council, *NOPEC Pace Loan Program*, accessed 27 October 2020, archived at http://web.archive.org/web/20201019111235/https://www.nopec.org/small-businesses/energy-efficiency-financing/pace-loan/.

117. Northeast Ohio Public Energy Council, *NOPEC STEP Loan Program*, accessed 27 October 2020, archived at http://web.archive.org/web/20200804230346/https://www.nopec.org/small-businesses/energy-efficiency-financing/step-loan/.

118. Northeast Ohio Public Energy Council, *2019 Annual Report*, 2019, page 8, available at https://www.nopec.org/media/1914/2019-annual-report-nopec.pdf.

119. When Illinois allowed CCAs: United States Environmental Protection Agency, *Community Choice Aggregation*, 18 August 2020, archived at http://web.archive.org/web/20201018055339/https://www.epa.gov/greenpower/community-choice-aggregation. Largest number in country: Eric O'Shaughnessy et al., National Renewable Energy Laboratory, *Community Choice Aggregation: Challenges, Opportunities, and Impacts on Renewable Energy Markets*, February 2019, page 7, available at https://www.nrel.gov/docs/fy19osti/72195.pdf.

120. Hugh Bartling, "Choosing Community Choice Aggregation: The Experience of Illinois Municipalities in the Electricity Market," *Illinois Municipal Policy Journal*, 3(1):49-66, 2018.

121. Lynn Englum, World Wildlife Fund, *Leading From the Middle: How Illinois Communities Unleashed Renewable Energy*, March 2014, pages 5 and 7, archived at https://web.archive.org/web/20210222161427/https://c402277.ssl.cf1.rackcdn.com/publications/671/files/original/Leading_from_the_Middle_IL_Report_FINAL.pdf?1394741489.

122. Illinois RES requirements: National Conference of State Legislatures, *State Renewable Portfolio Standards and Goals*, 17 April 2020, archived at http://web.archive.org/web/20201019033512/https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx. 2050 clean energy goal: Office of Governor JB Pritzker, *Putting Consumers & Climate First: Governor Pritzker's Eight Principles for a Clean & Renewable Illinois Economy*, page 6, 21 August 2020, available at https://www.eenews.net/assets/2020/08/24/document_ew_03.pdf.

123. See note 81.

124. Homefield Energy, *Business*, archived 27 May 2017 at https://web.archive.org/web/20170527210127/https://www.homefieldenergy.com/business.

125. See note 81.

126. Ibid.

127. Ibid.

128. When Massachusetts authorized CCAs: U.S. EPA, *Community Choice Aggregation*, 18 August 2020, archived at http://web.archive.org/web/20201018055339/https://www.epa.gov/greenpower/community-choice-aggregation. Current number in the state: Larry Chretien et. al., "Green municipal aggregation in Massachusetts," February 2020, archived at https://web.archive.org/web/20201125030213/https://cdn2.hubspot.net/hubfs/260434/State%20of%20GMA%20Report%20FINAL.pdf.

129. Larry Chretien et. al., "Green municipal aggregation in Massachusetts," February 2020, archived at https://web.archive.org/web/20201125030213/https://cdn2.hubspot.net/hubfs/260434/State%20of%20GMA%20Report%20FINAL.pdf.

130. Percentage increase: Commonwealth of Massachusetts, *Program Summaries*, accessed 27 October 2020, archived at http://web.archive.org/web/20200902085856/https://www.mass.gov/service-details/program-summaries; Class I renewable energy sources: Law Insider, Dictionary, *Definition of Class I renewable energy sources*, accessed 27 January 2021 at https://www.lawinsider.com/dictionary/class-i-renewable-energy?

131. Commonwealth of Massachusetts, *Program Summaries*, accessed 27 October 2020, archived at http://web.archive.org/web/20200902085856/https://www.mass.gov/service-details/program-summaries.

132. Ibid.

133. Matthew A. Beaton, *Massachusetts Clean Energy and Climate Plan for 2020*, 31 December 2015, page 1, archived at https://web.archive.org/web/20201223075207/https://www.mass.gov/doc/clean-energy-and-climate-plan-for-2020/download.

134. Cape Light Compact, *About Us*, accessed 27 October 2020, archived at http://web.archive.org/web/20200809000857/https://www.capelightcompact.org/about-us/.

135. Cape Light Compact, *Green Aggregation*, accessed 27 October 2020, archived at http://web.archive.org/web/20200611234822/https://www.capelightcompact.org/green-aggregation/.

136. Ibid.

137. Cape Light Compact, *Cape Light Compact Local Green*, accessed 27 October 2020, archived at http://web.archive.org/web/20200611230258/https://www.capelightcompact.org/clcgreen/.

138. Ibid.

139. Ibid.

140. LED conversion: Cape Light Compact, *Energy Efficiency for Municipalities*, accessed 27 October 2020, archived at http://web.archive.org/web/20200612051057/https://www.capelightcompact.org/municipal/. Energy audits: Cape Light Compact, *Home Energy Assessments*, accessed 27 October 2020, archived at http://web.archive.org/web/20200808081742/https://www.capelightcompact.org/home-energy-assessments/. Incentivizing energy efficient homes: Cape Light Compact, *Residential New Construction*, accessed 27 October 2020, archived at http://web.archive.org/web/20200612035603/https://www.capelightcompact.org/home-energy-assessments/residential-new-construction/.

141. Cape Light Compact, Governing Documents, "First Amended and Restated Joint Powers Agreement of the Cape Light Compact JPE," 13 December 2017, page 7, archived at https://web.archive.org/web/20191110005040/https://3jy14ha9u771r7qzn35g0s6c-wpengine.netdna-ssl.com/wp-content/uploads/2018/01/First-Amended-and-Restated-JPA-FINAL-12-13-17.pdf.

142. Cape Light Compact, *Consumer Advocacy*, accessed 27 October 2020, archived at http://web.archive.org/web/20200612035601/https://www.capelightcompact.org/advocacy/.

143. Services for low-income customers: Cape Light Compact, *Consumer Advocacy*, accessed 27 October 2020, archived at http://web.archive.org/web/20200612035601/https://www.capelightcompact.org/advocacy/. Teaching about energy efficiency: Cape Light Compact, *Energy Education*, accessed 27 October 2020, archived at http://web.archive.org/web/20200808084352/https://www.capelightcompact.org/energyeducation/.