A Contemporary History of Georgetown's Switch to Renewable Energy

Turning a Red County Green

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Contents

Abbreviations

AEP - American Electric Power

CREZ - Competitive Renewable Energy Zone

DOE - Department of Energy

EPA - Environmental Protection Agency

ERCOT - Electric Reliability Council of Texas

GUS - Georgetown Utility Systems

LCRA - Lower Colorado River Authority

RES - Renewable Electricity Standards

RPS - Renewable Portfolio Standard

SEAK - Students for Environmental Activism and Knowledge

SB 7 - Senate Bill 7

MW - Megawatt

Abstract

In 2017 the City of Georgetown, Texas, began to supply its residents with 100 percent renewable energy. With 150-megawatt solar power and 144-megawatt wind power agreements, Georgetown Utility Systems became one of the largest renewable-sourced municipally-owned utilities in the United States. As a city with a well-known reputation for conservative politics, Georgetown complicates the assumption that support for renewable energy is a progressive environmentalist position. The case study of Georgetown reveals much about the political economy of renewable energy in Texas, a state that's long known for its favorable relationship with the fossil fuel industry. This paper aims to create a contemporary history of Georgetown's switch to renewable energy. Topics in this article include (1) an analysis of the political economy of Texas renewable energy, (2) an explanation of the cultural, economic, and logistical context of Georgetown's decision to switch to renewable energy, (3) and a discussion of whether or not Georgetown may serve as an example to other municipalities weighing the decision to go green.

Introduction

Energy use in the United States has changed significantly as renewable sources have diversified the energy landscape as a cheaper and cleaner solution to increased energy demands. Although fossil fuels continue to dominate, reasonably new concern about global consequences of their use has sparked a revolution in the energy sector. Exponential increases in global population and energy consumption have led to a conglomerate of consequences including the accelerated depletion of resources, global environmental damage, increased monetary costs and sociopolitical risks (Holdren, 1991). Climate change is a "threat multiplier" (CNA Corp., 2007), with the potential to exacerbate many of the challenges nations currently face – and intensify the challenges of global instability, hunger, poverty, and conflict. This dissemination of research has continued to influence consumer preference and increase political action towards adopting cleaner forms of energy. Currently leading the country in energy production is the state of Texas, possessing one-third of all oil reserves and one-fourth of the nation's natural gas (EIA, 2017). Texas is a state long known for its reputation for conservative politics and favorable relationship with the fossil fuel industry, yet within it is a maturing renewable energy economy. In 2017 the City of Georgetown, Texas began to supply its residents with 100 percent renewable energy. With 150-megawatt solar power and 144-megawatt wind power agreements, Georgetown Utility Systems became one of the largest renewable-sourced municipally-owned utilities in the United States. As a city with a well-known reputation for conservative politics, Georgetown complicates the assumption that support for renewable energy is a progressive environmentalist position. This case study of Georgetown reveals much about the political economy of renewable energy in Texas and offers a contemporary history of Georgetown's switch to renewables as well as Southwestern University's pivotal role in the switch.

Renewable Energy in Context

The rise in record-breaking weather anomalies has shifted global focus to the consequences of international fossil fuel dependence. In 2015, the Paris Climate Accord acknowledged the growing global threat of climate change and laid out a framework for countries to adopt clean energy and phase out fossil fuels to significantly reduce CO_2 emissions (Warner, 2017). The United States has attempted to curb emissions by instituting federal plans geared towards sustainability, and a growing renewable energy market is emerging. As of 2016, the United States consumes 10 percent of energy from renewable resources, an amount that has doubled from 2000. Of this 10 percent, wind and solar power contribute to approximately 30 percent of renewable energy consumption (Renewable Energy Explained, 2017) and interest in these technologies is on the rise.

Transitioning towards a low carbon economy is no easy task. In fact, in a previous study by Wilson and Grubler, the authors analyzed past energy transitions by sector and service to identify features that may serve as examples for future developments (2011). However, to accommodate more than approximately 30 percent electricity generation from renewable sources will require new approaches to extending and operating the grid. Most energy is stored in fuels before converted into electricity. There are high-voltage transmission lines and miles of distribution lines connecting "about 19,023 individual generators and just under 7,000 operational power plants to homes and business in the continental United States, the system's approximately 3,200 utilities play an integral part in supplying electricity to more than 315 million people" (Lott, 2015). The total capacity of these power plants is about 1.15 terawatts (Lott, 2015). The replacement of the power plants alone will cost nearly $2.7 trillion not including the depreciated value, which is another near $1 trillion (Lott, 2015). Overall, the breakdown of the value is about 56 percent power plant, 9 percent transmission system, and 35 percent distribution system (Lott, 2015). Nevertheless, with the developing storage and transmission systems, the complete transition to a 100 percent renewable energy economy is a feasible but gradual process.

Small penetrations of renewable generation on the grid could be smoothly integrated. The grid faces the following three technological challenges for renewable accomodation: location, variability, and transmission technology. Renewable resources are located in the mid-continent region of the United States which is far from populated areas, thus requiring additional long distance high-capacity transmission to match supply with demand. The variability issue is correlated with weather characteristics which introduce uncertainty in generation output. These risks, affect up to 70 percent of daytime solar and 100 percent for wind capacity which is larger than the uncertainty percentage resources that the grid accommodates in response to demand (Lott, 2015). The uncertainty and variability of renewable energy could be addressed by installing large-scale storage on the grid or by long-distance transmission of

renewable electricity enabling access to larger pools of resources to balance regional and local excesses or deficits (Lott, 2015) .

Furthermore, with climate change contributing to increased interest in renewable energy programs, federal government mandates and incentives are primarily responsible for the increased development of renewable energy. The Energy Policy Act of 1992 was one of the first to address U.S dependence on imported energy and emphasized investment in renewables and overall efficiencies in building and production (Energy Policy Act § 776). The Energy Policy Act of 2005 required the Department of Energy (DOE) to study and report upon current renewable energy resources including wind, solar, waves, and tides; the act also provided generous tax cuts for energy producers (Public Law §§ 109-58). The push for renewables became nationally affirmed with the 2009 American Clean Energy and Security Act that set the first-ever carbon cap on CO_2 emitters, directed primarily at coal power plants (Energy Policy Act § 2454). Furthermore, the American Recovery and Reinvestment Act of 2009 boosted government investment in renewable research, development, and incentives by 90 billion dollars. In addition to federal acts, Renewable Portfolio Standards (RPS), also referred to as Renewable Electricity Standards (RES), emerged as an efficient and accessible tool for promoting a cleaner renewable power supply at the state level. These regulatory mandates require states to include renewable sources into their energy supply portfolio and allow for growth and financial investment in the renewable energy market. Currently, twenty-nine states have RPS, and nine states have renewable energy goals (Durkay, 2017).

State leadership has demonstrated that initiating renewable standards can reduce market barriers and stimulate new clean energy markets. The state of Texas has taken remarkable advantage of contemporary renewable markets and not only leads the nation in fossil fuel production but is the most significant producer of renewable energy in the United States. The RPS of Texas set goals and mandates in 1999 requiring a total of 5,880 MW to come from renewable sources by 2015. Today in 2017, Texas produces more than double the goal amount at approximately 18,500 MW of renewable energy daily - enough for roughly 5.3 million homes (EIA, 2017). The significant development of renewable energy in Texas was achievable through three distinct factors. First, the state's energy grid functions independently from other American grid systems and is maintained and administered by the Electric Reliability Council of Texas (ERCOT). The grid infrastructure consists of more than 40,000 miles of transmission lines supplying high voltage industrial consumers and low voltage rural radios and possesses more than 550 power distribution stations around the state (ERCOT, 2017). ERCOT is responsible for meeting the real-time demand of the market and providing an open trading floor for consumers and producers. Secondly, the legislative deregulation of the energy markets established in 2001 by Senate Bill 7 (SB 7) broke up previously existing energy co-ops and structures. As for municipal utilities, SB 7 exempted existing municipalities from deregulation based on the need to provide energy to whole cities consistently. Deregulation was coupled with legislative market support through a "price to beat" that aggregated the price for all sources based on the most

expensive, allowing renewables to be competitive from the time of their introduction to the market. Finally, the geographic conditions in Texas made it an ideal location for renewable energy development where half of the state experiences heavy winds and sunshine the majority of the year.

While Texas remains long known for its significant fossil fuel reserves and favorable relationship with the industry, it has emerged as a global leader in renewable energy. Once price and production were competitive in the Texas energy market, renewables surpassed goals outlined in the state's own RPS, passing the 2015 goal in 2005 and the 2025 target in 2009 (Texas RSP, 2016). By 2005, the renewable energy produced surpassed the grids transmission capabilities, requiring legislative action to allocate direct funds to update and increase the state's transmission ability (HB 41, 2006). Also, it created Competitive Renewable Energy Zones (CREZs) in the sun and wind-rich state, linking the isolated renewable power plants with the urban populations of central and east Texas through high voltage transmission lines. Today, renewables makeup roughly 12 percent of the Texas power grid and are capable of peak production at 21,045 MW (AWEA, 2017). With the expansion of transmission capacity and market reforms, Texas leads the nation with over 24,000 wind energy jobs (BLS, 2015) and wind turbines built on private property generate substantial royalties averaging $47,879 per landowner per year (Brannston et al., 2015).

As Texas leads in renewable energy production, a small Texas city has fully invested in its future. In 2017, the City of Georgetown became the first city in Texas to supply its residents with 100 percent renewable energy. With 150-megawatt solar power and 144-megawatt wind power agreements, Georgetown Utility Systems became one of the largest renewable-sourced municipally-owned utilities in the United States. Despite existing in a state with a robust economic and historical relationship with the fossil fuel industry, Georgetown—a city of 63,000 residents—has chosen to switch to renewable energy. After announcing this change, the city has received extensive media coverage both nationally and internationally within the past 18 months. Georgetown's energy switch has been so profound due to the juxtaposition of energy within the current political culture, and the assumption that sustainability is a traditional liberal issue.

The Politicization of Sustainability

Depletion of fossil fuel resources and concerns about greenhouse gas emissions solidify renewable energy development as a significant goal in the United States (Abelson, 1991). However, the notion of sustainability often gets caught in political culture. When environmental issues first erupted in the public scene after the start of the environmental movement, it was widely declared a consensual public concern that would help unite Americans after the divisive anti-war, civil rights and student power movements of the 1970s (Dunlap, Xiao, & Mccright, 2001). However, this coalescence has since faltered due to anti-environmental stances taken by presidential administrations such as those of Reagan, Bush and most recently Trump. Despite concern gaining traction after the first Earth Day in 1970, environmental science is now part of a

broader environmental politics (O'Riordan, 2004), linking sustainability with expert science and economic governance. Market-based values challenge environmentalist perspectives in policy processes, with Congressional Republicans significantly less likely to vote for legislation compared to their Democratic counterparts (Dunlap, Xiao, & Mccright, 2001).

In the 1970s environmentalism was seen as a motherhood affair. However, a new political language had developed during the bipartisan build-out of federal environmental laws and agencies. After these agencies stepped in to regulate, American people began to protest and resist federal overreach. Within the political sphere, environmentalism had become woven into two strands, one in opposition to environmental restrictions and the other in favor of the protective legislation. While it's not the science of climate change that is the stumbling block, but the politics of science (O'Riordan, 2004). The gap between Republican and Democratic support for environmental legislation in Congress has grown substantially since the 1970s (Dunlap, Xiao, & Mccright, 2001). In the United States, liberals are predominantly expected to be more in favor of taking actions towards climate change and environmentalism in contrast to their conservative counterparts. Conservatives have been known to block such measures and even demonize messengers of scientific findings within popular media. Environmental science can lie close to political sensitivities, and at times threatens established political positions. While sustainability is a rising concern, it confronts the current arrangement of the American energy and economy infrastructures where fossil fuels play a significant role. This disruption often evokes hesitance and rejection of environmentalist stances, and while environmental policy may arguably not be wholly partisan, the Texas city of Georgetown disrupts the assumption that "going green" is traditionally a liberal issue.

At the center of red state republican America, Georgetown Texas has become among the first cities in the country to be powered by 100 percent renewable energy. This city of 63,000 is locally known for its conservative politics and vocally republican Mayor. In a state known for its politics and relationship with fossil fuels, it may seem surprising that a predominantly red city would make the switch to green energy. Georgetown makes headlines not only because it's one of the first American cities to run on renewable energy, but because it has a conservative mayor willing to negotiate in a hyper-partisan era where climate change is one of the most divisive subjects.

In a series of interviews conducted with Mayor Dale Ross, City Manager Jim Briggs, Resource Manager Chris Foster, and others involved with transforming Georgetown's energy grid it became apparent how Georgetown offers an exception to the political assumptions of environmentalism. When asked about the switch, one aspect rose before all others. Georgetown's decision to go renewable was strictly business, not brought about by economics or highlighting the environmental benefits of renewable energies. While the political assumptions were attached to the concept of relying on renewable energy, Mayor Dale Ross claimed that Georgetown was only attempting to mitigate price volatility and regulatory risk (Dale Ross, Personal Communication, Nov. 11, 2017). Renewable energy was decidedly the best fit for the city's

utility needs due to the ability to set reliable long-term contracts, diversify the energy portfolio, and availability of the opportunity to capitalize on competitive pricing. But before Georgetown would make this historic decision to "go green," many factors paved the way for the city to have the ability to move on from fossil fuels.

Georgetown, Texas: A Case Study

Methods: Much of the information obtained for this case study was obtained through interviews with the following people. (All interviewees had an opportunity to view the transcript, 6 interviews, one conference call, and one email interview).

- Jake Schrum, former president of Southwestern University, November 13,2017.
- Dr. Laura Hobgood, professor & faculty adviser for SEAK, October 30, 2017.
- Jim Briggs, Georgetown city manager, October 30, 2017.
- Keith Hutchinson, Georgetown Public Communications Manager, October 30, 2017.
- Mayor Dale Ross, Current Georgetown Mayor, November 3, 2017.
- Chris Foster, Manager of Resource Planning, October 30, 2017.
- Rachael Jonrowe, Georgetown councilperson, November 13, 2017.
- Bob Mathis, Associate Vice President for Facilities and Campus Services at Southwestern University, November 2, 2017.

First Steps Towards Utility Expansion

One unique aspect facilitating the switch was the public ownership of the city's utilities, meaning they are maintained and operated by the municipality. Many Texas cities privatize their utilities allowing the residents to have a variety of energy providers to choose from, whereas the Georgetown Utility Systems (GUS) decides those options for its consumers (Keith Hutchinson, Personal Communication, October, 2017). Since the 1930s, the Lower Colorado River Authority (LCRA), a publicly owned utility, has been under contract as the energy supplier for GUS. In an interview, City Manager Jim Briggs noted that since the 1990s he had been wary of Georgetown's previous energy contract. With the LCRA, the city was concerned about lack of authority regarding the type of deployed resources or schedule as they applied to the city's rates (Jim Briggs, personal communication, Oct. 30, 2017). When deregulation of the energy framework occurred in 2001 with SB 7, GUS had already been looking to diversify their energy

portfolio and now could approach producers with a large, guaranteed consumer base to secure commercial contracts. With a sense of discontent regarding their existing contract, Georgetown began looking towards renewables to satisfy their energy needs. After issues emerged regarding energy portfolio diversity and scheduling, Jim Briggs made the argument to the LCRA. Briggs stated, "If I have a [100 unit] full agreement with LCRA and you only have 70 units of assets to meet my full demand… I should be able to turn that 30 unit balance for another source".

With the expected growth of Georgetown, GUS secured the ability in a retooled contract in 2008 that allowed them to shop for 10 percent of their energy needs within the open market. When looking to diversify their energy portfolio, city officials initially used this choice power agreement to negotiate commercial renewable energy contracts. This arrangement would allow GUS to evaluate the economics and logistics of a large-scale renewable deal and begin future financial planning with what they found as a constant fixed rate protected from volatile natural gas prices (Chris Foster, personal communication, Oct. 30, 2017). Furthermore, the city preferred a move away from coal production because of prices being controlled and influenced by railroads, where the city of Austin had to file an emergency tariff to cover the cost of broken coal transportation agreements. The common problems related to fossil fuel energy production are marginal cost, fuel necessity, and resource depletion. All significant factors to consider regarding meeting city utility needs. Renewables also carry the nuance that aside from the price of construction, the energy is effectively free while the maintenance required creates a flourishing economy and job market in itself (Chris Foster, personal communication, Oct. 30, 2017). While the city had finally placed a firm grasp on incorporating renewables into their energy portfolio, the first renewable contract would be trialed in 2008 by Southwestern University, an institution whose student body had been previously campaigning for renewable energy.

Southwestern University Trial

In 2007, students at Southwestern University first began the endeavor towards campus sustainability by proposing the idea of using power generated through renewable energy sources. This initiative helped set the stage for the eventual renewable energy switch in the city of Georgetown. Due to student concern about the effects fossil-fuel activities and their contribution to climate change, this small liberal arts school became the first university in Texas to sign an agreement to switch 100 percent to renewable energy sources. The transition was possible in part by the influence of a growing renewable economy, deregulated energy market and affordability. The decision came on the heels of standing University President Jake Schrum signing the Talloires Declaration and the American College and University Presidents' Climate Commitment, both of which are commitments to move higher education towards environmental sustainability (ULSF, 2015). In addition to President Schrum's progress towards making the university more environmentally conscious, the school's environmental club, Students for Environmental Activism and Knowledge (SEAK) were responsible for providing strong initiative towards obtaining the use of renewable energy. In 2009, the students of SEAK were

interested in convincing the university to switch as a way to reduce the school's carbon footprint (Laura Hobgood, personal communication, October 30, 2017). However, Georgetown was unable to offer its energy consumers, including Southwestern, more than 30 percent of renewable energy at that time because of the contract with LCRA (Jim Briggs, personal communication, Oct. 30, 2017). Due to this issue, city management was able to negotiate with them to modify their contract.

This modification took place in 2008 and allowed the city to shop for their remaining 10 percent of energy usage outside of the LCRA with a different energy provider. If Georgetown could find a consumer within the municipality large enough (about 10 percent of the city's total energy consumption), they could offer them 100 percent renewable energy at a rate that would not change for the length of the contract. Southwestern University's energy usage, which is approximately equivalent to 450 homes, was large enough to fit the bill (Laura Hobgood, personal communication, Oct. 30, 2017). SEAK then took the initiative to ensure this decision would succeed by meeting with several city employees and Southwestern facilitators such as Jim Briggs and Bob Mathis (AVP for Facilities and Campus Services at Southwestern University). In these meetings, they discussed what it would take to make the switch. Once the city examined existing costs and comparative analysis, it became clear that a switch was indeed doable, as the economic argument would provide needed incentive. SEAK students not only encouraged the university president to agree to make this switch, but also stated their case to the university council, board of trustees, and city residents. On January 12, 2010, President Schrum signed an agreement with the City of Georgetown to supply all of Southwestern University's electric needs for the next 18 years from renewable energy, specifically wind power (Dr. Laura Hobgood, personal communication, Oct. 30, 2017). The university's trial would eventually pave the way for the city to make the switch as well (Rachael Jonrowe, personal communication, Nov. 13, 2017). Chris Foster, the Resource Manager for Georgetown Utility Systems, stated,

> "Southwestern was a case study for us [Georgetown] to play into the options in that future market so we could establish trading, risk management, and collateral behaviors to allow us to execute these contracts financially. It was an amazing case study for that because it gave us the real world application to set up our procedures" (Chris Foster, personal communication, Oct. 30, 2017).

The student initiative stemming out of Southwestern University provided a notable example of the importance of fostering an education-community participation that encourages engagement at the local government level and is one of the significant factors that ultimately motivated Georgetown's historic switch. Like Southwestern, more than 600 American institutions of higher education have committed to the transition towards 100 percent renewable energy on respective campuses (Blackwell et al., 2012). Southwestern University serves as a conceptual model for testing emerging sustainability approaches such as renewable energy efficiency, that is most likely attainable at a broader national level (Blackwell et al., 2012).

First and Foremost a "Business Decision"

The determination and experience of City Manager Jim Briggs, Resource and Energy Manager Chris Foster and several other city officials, as well as student-led initiative, spearheaded Georgetown Utility Systems' separation from the LCRA and ultimate conversion to 100 percent renewable energy. After negotiations with the LCRA to secure more renewable energy came up short, it became apparent to the City of Georgetown that they and the LCRA had differing goals. The LCRA was seeking to restrict the City's ability to diversify their energy portfolio, rather than foster it as they intended. During the GUS push for renewables, the LCRA was looking to add another conventional coal power plant online, despite financial metrics revealing a price per megawatt hour about 20 dollars above the open market, just to break even (Chris Foster, personal communication, Oct. 30, 2017). Nonetheless, the City of Georgetown sought energy from the open market at a much cheaper rate, prompting the LCRA to file suit against Georgetown and seven other utilities for breaking contract. The court decided in favor of the Utilities and allowed Georgetown the freedom to seek 100 percent of their energy on the market (Court ruling, 2014/Krotchengle, 2014).

When GUS came together to look at the future of energy in Georgetown, three goals emerged when searching for new contracts. First was price competitiveness with current sources, second a long-term deal that will mitigate any price volatility in the market, third is to have a strategy where we can avoid any regulatory or governmental influence (Jim Briggs, Personal Communication, Oct. 30, 2017). Furthermore, they wanted to provide a consistent, low-cost product to the consumers in Georgetown. In other words "it was a business decision, first and foremost" (Mayor Dale Ross, personal communication, Nov. 3, 2017). Given that direction moving forward, the best natural gas contract offered was a seven-year price guarantee that was equal to wind and solar, although the renewable contracts provided guarantees over 20 and 25 year periods, without harmful by-products. As for coal, concerns over government regulation utilizing a CO_2 cap or recognition by the EPA of CO_2 as a pollutant struck at the heart of coal energy production. Leaving renewable energy as the only source not subject to either of the Georgetown Utility System concerns. Renewable energy from wind and solar also promise minimal marginal cost with virtually no fuel necessary (Chris Foster, Personal Communication, Oct. 30, 2017). With technological developments in battery storage, any excess energy had the option to be sold into the Texas electricity market which also yields additional profits for the city. Furthermore, renewables use a fraction of the water needed for other forms of generation, and for a drought-prone area like Texas, this is good news for renewables.

To prove this model in practice, Georgetown contracted on behalf of Southwestern University to secure 100 percent wind energy from AEP from 2010 to 2028. In the proposal process Bob Mathis, AVP of facilities at Southwestern, estimated an overall net savings of 4 million dollars over 18 years at current energy prices and an assumed growth in energy consumption of 2.345 percent per year (Bob Mathis, Personal Communication, Nov. 6, 2017).

According to the City Resource Planning Department, this allowed the city of Georgetown to evaluate the economics and future price rates from a commercial renewable contract. Eventually, this resulted in two contracts: one for 150-megawatts of solar power through 2041, and the other for 144-megawatts of wind power through 2035, with Georgetown's official 100 percent renewable energy portfolio taking place in July 2018. To ensure any consumer doubt, Georgetown's Mayor lucidly stated, "in 2008 we were charging 11.4 cents per kilowatt-hour, in 2017 we're charging 9.2 cents" (Mayor Dale Ross, personal communication, Nov. 3, 2017). When asked how he was able to make this switch amidst a notably conservative town Mayor Ross put it simply “if you make the economic argument work, by default you win the environmental argument”.

A Unique Situation

Like Georgetown, a growing number of cities have already taken on renewable energy targets with some striving to meet goals of 100 percent renewable energy. Switching to renewables means rethinking the energy grid dominated by fossil fuels, integrating innovative technology, and rigorous planning and decision making (IRENA 2016). While switching to renewables can be a profound action benefiting the environment and the economy, this study reveals that the complete transition to a 100 percent renewable energy economy is a gradual but feasible process. According to the Global Status Report on Local Renewable Policies, policy processes at the local level can consist of renewable energy regulations, target goals, increasing awareness, and even voluntary actions at the local level or merely the renewable infrastructure transformation programs (ISEP 2011). However, Georgetown provides a compelling case in which the right set of opportunities existed to pave the way towards a completely renewable energy system.

It is important to note that the Texas legislature deregulated the state's electricity market in 2001, which dismantled monopoly providers and introduced a competitive marketplace. In other words, energy deregulation allows energy consumers to freely choose their energy provider for the area (Evans, 2015). These events played a fundamental role in 2008 when Georgetown had begun the search for new energy providers. As a result of building the LCRA’s existing contract on the same structures before deregulations with no price guarantee (Chris Foster, Manager of Resource Planning, October 2017), Georgetown and Southwestern’s newfound demand for renewable energy s prompted the boarding counsel to set up the following policy: by 2030, the renewable percentage should reach 30 percent of the Georgetown portfolio. Unable to achieve the given interest, the existing LCRA contract was terminated. The push from Southwestern, the break from the LCRA, and interest from the consumers worked simultaneously to place Georgetown on the path to an efficient and competitive renewable electricity market.

Benefits

Georgetown achieved affordability with renewable power while simultaneously obtaining the sustainability of supply in the context of decarbonization. The potential for renewable energy is occasionally addressed within the context of sustainability and green, eco-friendly programs in response to international targets. However, the economic benefits are consistent with the growing clean energy infrastructure. Economic development in regards to reduced pollution is unquestionably and mutually viewed benefits by all communities (Herman & Solomon, 2004). The city of Georgetown has grasped the considerable potential of its renewable energy resources to provide large quantities of affordable electricity while also contributing to global efforts against climate change. Institutional and University pressure, improved technology, available transmission lines, and a deregulated energy market needed to align for such a swift and massive step forward of renewable energy production in this city.

The ability to offer 100 percent renewable energy has proved fortuitous for Georgetown's economy and job market. Substantial corporate employers and economic drivers such as Wal-mart and St. David's hospital have committed to reducing their carbon footprint and overall price of energy at the request of both employees and economist. Additionally, large companies such as Amazon are considering a business location in Georgetown due to the beneficial stability of utility costs. As a result, the city provides a method for certifying businesses as powered entirely by renewable electricity. Also, the maturing renewable energy market has spurred innovation and business growth in the energy storage industry where companies with Department of Energy grants have approached the city of Georgetown to site a 125-terawatt battery (Chris Foster, Personal Communication, October 30th, 2017). Furthermore, sufficient energy storage coupled with localized energy production (solar panels on houses) could yield the potential for the City of Georgetown to become an energy producer selling excess electricity back to the grid. Within the context of a carbon economy, Georgetown could sell and trade carbon credits to businesses and surrounding cities. As for City promotion and advertisement over 65 news sources, 4 documentaries and a number of businesses have used Georgetown’s switch as an example and something worth sharing (Keith Hutchinson, Personal Communication October 30th, 2017)

Georgetown as a Model

Climate change, emissions, and pollution continue to be a significant motivation for the drive for renewables. As population and economic developments continue to grow, so does the need to search for more reliable, cleaner, more renewable energy sources (Bevan, 2017). Georgetown's switch to renewable energy serves as an example for other cities in similar situations, either weighing the decision to go green, or those who are looking for a more stable, cost-effective energy alternative. Take Keith Hutchinson, for instance, the Public Communications Manager for the city who said, “The significance of what we did was showing that we could do it. We

showed that it was possible (Keith Hutchinson, Personal Communication October 30th, 2017).” Around the same time, on a global scale, accelerating the use of green energy offer another way to meet international development targets. With the increasing recognition of climate change due to human enhancement of greenhouse emissions, there is growing concern about the level of global attention on energy needs on a sustainable foundation. The United Nations have formed the Sustainable Development Goals which on the SDG 11, aims to "make cities inclusive, safe, resilient and sustainable" by 2030 (UN 2017).

The state's deregulation of existing energy structures created a competitive marketplace which offered lower prices and more choices for cities like Georgetown. Deregulation also allowed for new competitors and subsequently the addition of renewable energy options on the grid. Because the law granted the exemption by municipally-owned utilities and co-ops, those municipalities such as Georgetown Utility Systems could choose an electric provider for their entire city. This available choice aided in negotiating commercial contracts as GUS could approach energy providers with a long-term, growing, consumer base. In addition, Southwestern University students pressured the president and university to take on the responsibility of a test run with the first university of Texas switching to renewables and the unknowns that go with that. Bob Mathis, the Assistant Vice President for Facilities and Campus Services at Southwestern sums up the process: “To start with every situation is unique, but the ‘model’ of inclusive decision making, open and productive lines of communication, effective and pertinent analysis, clear goals and objectives, and dedicated students and administration can work to solve any problem - environmental, social, or economic” (Bob Mathis, Associate Vice President for Facilities and Campus Services at Southwestern University, November 2, 2017). In the case study of Georgetown, a diligently informed utility office sought the best available energy source based on three fundamental principles: 1) Price competitiveness with fossil fuels 2) long term fixed rates and 3) regulatory protection. This direction coupled with extensive infrastructure and renewable capacity made the switch to renewables a logical and clear decision.

Conclusion

The rise of renewables can directly attribute to the interest in a cheaper and cleaner solution to increased energy demands. While political assumptions were attached to renewable energy, this case study reveals that, despite partisan preference, finding common ground and making decisions based on facts can bring about beneficial change. Furthermore, the city of Georgetown can serve as a model for other US cities wanting to venture away from fossil fuels, although it is important to note that several predetermined factors allowed the city to transition. The state's prior deregulation of energy structures, an existing interest in diversifying the city's energy portfolio, and an inclination to mitigate market risk and volatility made Georgetown a unique

example. Regardless, Georgetown is an insightful example of what can be accomplished when multiple forces work together. Regardless of party affiliation, one thing individuals can all agree on is what's best for the planet. As Mayor Ross observed, "people of good" will come together to make the best decision for their community. In his opinion we have both an ethical and moral obligation to leave the planet better than we find it, and “if you have the political will you can make it happen. We’re making a change and I think the world can make a change” (Dale Ross, Personal Communication, Nov. 11, 2017). In this case study, Southwestern serves as an astute example of how a liberal institution can work together with a conservative city to make a lasting and favorable change for the future. Here, Jake Schrum said it best, "I think it's the best kind of story. It represents all of the good stories that it's students who had the light go up in their head about sustainability and resilience, and then say hey, we need to take charge of our future". As this case study reveals, starting small can make a difference, and that significant change can occur in unexpected places.

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