CITY OF FORT WORTH—EXECUTIVE SUMMARY

TEAM EFFICIENT SEA FEBRUARY 24, 2013

The City of Fort Worth would like to significantly reduce its energy consumption. In this proposal we lay out a robust approach to achieving energy savings throughout the city. Our recommendations focus on enabling these savings by creating new markets for efficiency, promoting voluntary measures, and leveraging public-private partnerships to unlock the private financing that will be necessary to achieve both rapid and lasting reductions in energy consumption.

We believe that an initial goal of 20% energy reduction by 2020 is commendable but unrealistic. While there are policy interventions that would motivate energy savings on this scale in such a short time frame, such interventions would have a low probability of success in Fort Worth. We recommend that Fort Worth scale back its goal and focus on a long-term strategy. By expanding programmatic and market infrastructure the City may achieve strong, sustainable improvement.

Our recommendations focus on two central themes that take advantage of Fort Worth's assets and situate the city as a leader in the efficiency field:

1. ***Establish energy data infrastructure*** *through voluntary means that build a market for energy efficiency and give the City the ability to benchmark and measure its energy consumption and efficiency gains.*
2. ***Reorient the city government's approach to efficiency*** *to be more outward-facing by strategically leveraging public-private partnerships and the institutional strengths of Fort Worth to unlock private financing for energy improvements.*

Within this architecture we recommend that Fort Worth focus its energy in three sectors: single-family, multifamily, and large commercial and industrial. The opportunities and barriers posed by these sectors and our recommendations for each are summarized below:

	Single-Family Residential	Multifamily Residential	Large Commercial and Industrial
Opportunities	Most common building type	High potential for social impact	High per-site savings
	Consistency across housing stock	Ripe for aesthetic upgrades	Leverage existing partner network
Barriers	Fragmented ownership	Split incentives	Difficult to standardize
Recommended Actions	Develop advanced energy data infrastructure		
	Centralize municipal operations		
	Conduct outreach to Better Buildings and grassroots religious partners		
	Advocate for expansion of LoanSTAR eligibility		
	Work with utilities to boost building energy code compliance		
	Pursue green buildings ordinance		
	Modify Neighborhood Empowerment Zone eligibility	Modify community action program eligibility	Advocate for and develop commercial PACE program
	Support On program	Support space heat conversion	Pursue CHP in long-term plans

INTRODUCTION

Fort Worth is a rapidly growing city of over 700,000 people. The City's participation in the Better Buildings Challenge has thus far been a resounding success, with Fort Worth making significant progress towards its 20% energy savings goal in municipal buildings in its first year as a Better Buildings participant. Having advanced in the area of "Efficiency of City Operations", Fort Worth is now ready to focus on the other phases of its sustainability plan: Sustainable Development and Residential and Business Involvement.

It is understandable that Fort Worth would want to strive for similar reductions in privately owned buildings, also targeting 20% savings by 2020. However, in examining citywide programs, municipal leaders must consider the challenges posed by distributed ownership and split incentives. In municipal buildings, the City has direct control over investment strategies and energy upgrades, so the challenges faced are predominantly technical and financial. While the financial and technical barriers to energy efficiency are present in both public and private sectors, there remain significant hurdles in motivating families, landlords, and businesses to consider energy efficiency projects.

Thus Fort Worth must adopt a strategy for private sector energy savings that is fundamentally different from its approach in municipal buildings. Our guiding principle is that Fort Worth should focus on maximizing private sector involvement and investment in building energy efficiency. This goal can be achieved through strong public-private partnerships, voluntary reporting and participation, and increased coordination with Oncor and Atmos. Further, we emphasize the value of creating a new energy data infrastructure capable of catalyzing growth in the Fort Worth efficiency market and providing the City with the ability to measure its consumption and progress. Our proposed targets and data infrastructure reflect market realities and provide an essential mechanism for feedback and adaptive learning.

OPPORTUNITIES AND SUGGESTED APPROACH

According to a recent energy poll conducted by University of Texas, 84% of Americans are concerned about the cost of electricity; 78% about the portion of their household budget spent on energy; and 73% about energy efficiency in their homes (University of Texas Energy Poll, 2012).

Support for these issues is clearly strong in the US as a whole—the desire to save money is universal. The same is surely true in Fort Worth, though the City must approach these issues with its constituents' politics in mind. Fortunately, the City can achieve significant energy savings using a combination of tested strategies and innovative market-based mechanisms. To explore the City's options, we briefly examine successful programs in similar cities, consider Fort Worth's existing resources, and propose three sectors in which the City can focus its efforts.

Peer City Comparison

It is important to consider the work undertaken by other municipalities in order to learn from their successes and failures. After an initial review of several cities similar in size and demographics to Fort Worth, we chose to highlight programs in Memphis and Charlotte. We also discuss initiatives in Dallas and examine relevant program elements from New York City.

Public-private partnerships like the *Mayor's Energy Challenge* in Memphis, *Envision Charlotte*, and *Power2 Charlotte* are invaluable in building a network of support for potential energy-savers, unlocking private sector investment and business growth, and drawing attention to the efficacy of energy efficiency projects. Memphis commissioned a Green Buildings Task Force composed of real estate professionals, academics, and building engineers, which provided recommendations and set goals for the Office of Sustainability.

Dallas has passed a green building ordinance, and provides expedited plan reviews for projects meeting the requisite LEED requirements. The city's *forwardDallas!* plan serves as an example of incorporating and communicating sustainability topics in a manner acceptable to a more conservative constituency.

While New York City does not share many characteristics with Fort Worth, its building energy efficiency program is robust and thus worthy of exploration. Important practices include targeting high impact building owners (2% of buildings representing approximately 50% of total square footage in NYC); partnering with institutions of higher education and healthcare organizations for accelerated savings targets; and the creation of the NYC Energy Efficiency Corporation, whose mission is to increase access to energy efficiency financing for private building owners.

Existing Resources and Sector Selection

Instead of prescribing strict and politically fraught command-and-control mandates, we recommend that Fort Worth take a more nuanced approach, using market forces to encourage energy savings. Such an approach is complex but also likely more sustainable and less disruptive than command-and-control regulation.

Fortunately, the city has ample resources to leverage in developing such a program. These include:

- **A record of success.** Fort Worth's success in its own buildings demonstrates the opportunities afforded by energy efficiency to actors throughout the city.
- **Existing outward-facing municipal initiatives.** The City can adapt existing programs affecting the built environment to include efficiency considerations.
- **Strong utility partnerships.** Both Oncor and Atmos have been strong proponents of efficiency in Fort Worth, offering incentive programs to target energy savings.
- **An active network of Better Buildings Partners.** Many of Fort Worth's commercial and industrial actors have already made voluntary energy efficiency commitments.

- **Existing energy data infrastructure.** Texas is a leader in developing a smart grid, providing both precedent and key enabling technologies.

All of these assets will be crucial as Fort Worth targets energy efficiency gains. To that end, we have identified three building sectors where a market-based efficiency approach can overcome organizational barriers to achieve substantial impact:

- **Detached Single-Family Residential.** Single-family homes are the most common building type found in the city and represent the largest aggregate square footage of any sector. However, the highly distributed nature of ownership makes the sector difficult to penetrate. It is crucial that Fort Worth establish an approach to energy savings in the sector that drives homeowners to invest in their property absent direct municipal coordination.
- **Large (>5 units) Multifamily Residential.** Multifamily is one of the most difficult sectors for efficiency program managers to reach, but offers large savings per building and high impact for many individuals simultaneously. Nearly 40% of the multifamily square footage in Fort Worth is in a condition that will eventually require a whole-systems upgrade, representing a significant opportunity for retrofitting that merges functionality, aesthetics, and energy saving upgrades.[1]
- **Large Commercial and Industrial.** Manufacturing space and office buildings provide the greatest opportunity for the city to deliver energy savings through direct partnerships with private actors, as a single investment can deliver substantial energy savings. The city can also leverage the existing inroads made in this sector through their roster of Better Building Partners.

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[1] Determined from Tarrant County Appraisal District parcel data.

WHAT IS ACHIEVABLE

Because of a lack of available energy consumption data at the city level, it is often difficult to determine a realistic goal for achievable city-wide energy savings. One available point of reference is New York City, where the Office of Long Term Planning and Sustainability's city-wide greenhouse gas inventory shows that through 2011 the city's aggressive energy efficiency programs were responsible for a 1% reduction relative to a 2005 baseline (NYC OLTPS 2012). In this light, a 20% city-wide savings target by 2020 is incredibly ambitious.

It is also important to benchmark existing efficiency efforts in the Fort Worth area. In 2011, Oncor's energy efficiency programs achieved 210 GWh savings throughout their service area, amounting to a 0.18% reduction in total end-use consumption (113,837 GWh). To confirm that this system-wide number applies to Fort Worth as well, we modeled energy consumption and savings within the city and calculated that Oncor achieved 2011 savings rates of 0.17% and 0.21% in Fort Worth's residential and commercial sectors, respectively.[2]

To reach 20% savings in a short time frame, the City would need to establish a stream of annual savings nearly 20 times what Oncor is currently able to achieve. Additionally, assuming a maximum achievable per-building savings of around 30%, a minimum of two-thirds of the city's buildings in a given sector would need to participate to reach sector-level savings of 20%. This is far above what any efficiency program could reasonably achieve without strict mandates for building improvements. Considering that Oncor's current program is already quite robust and targets high impact, cost-effective energy savings, it is very unlikely that such a program could be built to the necessary scale in a few short years.

We offer an alternate view of what can realistically be achieved by the City of Fort Worth. By prioritizing the largest energy consumers in each sector, energy service providers could achieve the greatest savings impact relative to effort. In our recommendations below, we propose investing in energy data infrastructure that will allow these sites to be identified based on their energy consumption. With such an infrastructure, not only could high-consumption users be identified, but service providers could target specific improvements at the building level based on estimated end-use consumption.

In the absence of detailed energy consumption data, we construct an initial estimate by modeling the energy savings that would result from retrofitting the highest consuming 75% of old (pre-1980) building stock. In the table below, we compare the rate of savings that Oncor currently achieves to those required by a 20% savings approach and by our recommended high-user strategy.[3]

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[2] Inputs to our model included county-level savings information from Oncor's 2012 plan and report and building characteristic data from the Tarrant County Tax Assessor.

[3] This analysis incorporates parcel data from Tarrant County Tax Assessor, EUI estimates from EIA CBECS and RECS, and industry-consensus values regarding achievable per-building savings and project costs.

	Residential (Single-Family and Multifamily)			Large Commercial and Industrial		
	Current (Oncor)	20% Savings	High-User Method	Current (Oncor)	20% Savings	High-User Method
Annual Savings (1000 MMBTU)	31	600	117	38	583	183
Annual Savings Rate	0.17%	3.30%	0.65%	0.21%	3.30%	1.00%
Targeted SqFt (Million)	N/A	300	55	N/A	200	57
% of Sector-Wide SqFt	N/A	67%	13%	N/A	67%	20%
Total Buildings/Units Reached	N/A	175,000	35,500	N/A	7,500	2,750
Total Retrofit Cost ($ Millions)	N/A	$420	$84	N/A	$390	$111

Reaching the highest-consumption buildings in the six years from an assumed 2014 start date to the beginning of 2020 would require an annual savings rate of 0.65% (totaling 3.9% by 2020) in the residential and 1% annually (6% by 2020) in the commercial market. Significantly, focusing on these buildings would only require that efficiency service providers target 13-20% of total building square footage, a much more manageable number than the two-thirds required by the 20% savings target.

This is still very aggressive considering the current pace of Oncor's efficiency program. Additionally, meeting this target would require nearly $200 million in capital to fund needed energy improvements. However, with the right interventions in the market this is an ambitious but achievable goal. In the next section we discuss strategies that the City can adopt to move markets and unlock private financing in order to reach its efficiency objectives.

MOVING THE MARKET

Towards the goal of creating market opportunities for energy efficiency in Fort Worth, we have identified two key areas where the city should focus its attention and resources: *the creation of publicly available energy data infrastructure*, and *the consolidation and improvement of municipal programs focusing on energy efficiency*. We expand on each below.

Energy Data Infrastructure

Markets function best under conditions of perfect information, and the energy efficiency market is no exception. This market will grow substantially when all actors are fully informed about the costs of energy. Therefore, we recommend that Fort Worth develop robust energy data infrastructure that makes energy data open and transparent. Such an initiative would centralize publicly available energy data in an easily accessible online database, increasing the impact of energy information and establishing a powerful market resource. One possibility would be to build on the existing Green Button initiative, which provides utility customers with the opportunity to download their own data and is developing a similar process for customers to share it with third parties on a continual

basis. Throughout the development of an energy data initiative, the City should aim to satisfy three key ends:

1 **Reporting** key metrics about energy consumption and savings.
2 **Distributing** energy information for public use.
3 **Learning** from energy data to improve program design and performance.

The data collection capacity of energy utilities, and of the electric grid in particular, will expand greatly in the next decade. Due to the progress that has been made in Texas towards a smarter grid, Fort Worth has a unique ability to be a leader in determining how this data is used and the terms on which it is made public. Last year, Oncor finished deploying 3.3 million smart meters throughout its service area. Oncor is also a partner in the Green Button initiative. The City of Fort Worth has the ability to dramatically transform energy markets by increasing data access, and we propose a robust public-private partnership that will unlock the potential of energy data.

Particularly when combined with existing asset information available from the Tarrant County Tax Assessor, open energy data would provide an in depth view of the energy consumption and efficiency potential of the city's buildings. This would have many benefits for private, public and institutional actors:

- Property owners and tenants would benefit by being able to more reliably incorporate energy costs into their decision-making, particularly in the housing market. *Metrics to track: Monthly energy costs per unit compared to both past consumption and to that of similar units.*
- Accessible data would attract private sector investment and encourage innovative businesses in the energy sector that leverage open data, highlighting opportunities and enabling the micro-targeting of services. *Metrics to track: Energy consumption patterns by aggregated group, including comparison to similar groups (e.g. by sector).*
- The City could use energy data to benchmark Fort Worth's energy consumption and track progress toward its efficiency goals. Additionally, this information could be used for program evaluation, creating a feedback loop between historical performance and future program design. *Metrics to track: Energy intensity by sector.*
- Fort Worth's utilities, Oncor and Atmos, could take advantage of the new infrastructure to increase the capacity of their own efficiency programs and provide closely tracked savings to statewide regulators. *Metrics to track: Energy intensity change for utility program participants relative to non-participants.*
- The City of Fort Worth would have first-mover advantage in the energy data field, and could set the terms by which the rest of country treats energy data. Fort Worth can encourage the deployment of energy data infrastructure in a way that is consistent with principles of open markets and the primacy of private actors. *Metrics to track: Participation in an energy disclosure initiative.*

Despite the promise of energy data, there are several substantial barriers to implementation. First, energy data has typically been closely guarded by utilities and regulators due to privacy concerns. Second, the top-down approach that other

municipalities have taken to sharing energy data has elicited strong opposition from various stakeholders, including realtors, building owners, and other constituencies. Called Energy Disclosure Ordinances, these mandates require property owners to collect and disclose consumption data. The cities that have successfully enacted disclosure ordinances—Austin, New York, Philadelphia, San Francisco, Seattle, and the District of Columbia—all have citizen demographics that are permissive of strong government regulation. If Fort Worth is to encourage the development of energy data infrastructure, it must do so in a way that reflects the politics and preferences of its constituency.

With this in mind, we recommend that Fort Worth develop an energy data initiative in collaboration with, rather than in spite of, these stakeholders. Acknowledging that the City's limited capacity to act likely precludes disclosure mandates, it should organize a voluntary benchmarking and disclosure program with the understanding that poor performance would force the City to enact a mandatory ordinance to ensure results. Fort Worth should set a firm timeline for program evaluation, and maintain flexibility to enact top-down regulation if a voluntary disclosure program does not deliver the necessary results. Collaborating with the City on this initiative would give stakeholders both the ability and the incentive to help create a successful energy disclosure program on their own terms.

As discussed in more detail in the next section, Fort Worth should leverage its existing relationships with Better Buildings Challenge Partners and deploy community-based social marketing techniques to encourage residents and businesses to make their energy data public. Privacy concerns can be addressed by publicly disclosing data only at an appropriately aggregated level—such as an entire apartment building or a block of single-family residences.

By deploying a program built around market adoption, voluntary participation, and public-private partnerships, the City will play to its strengths. By doing so, we are optimistic that Fort Worth can set a standard for using strong data infrastructure to achieve significant, sustained energy savings.

Municipal Operations and Partnerships

Fort Worth has made admirable gains in the efficiency of municipally-owned buildings, fulfilling the second of its three primary sustainability objectives. To address the other elements of its sustainability plan, the City must reorient its approach to energy efficiency to be more outward-facing. We make several recommendations to improve Fort Worth's municipal operations.

First, Fort Worth should *centralize its various efforts related to energy efficiency and conservation and create a single office for residents and business owners to interact with on the subject of sustainability*. One way to achieve this would be to expand the existing Energy Conservation Program—which currently coordinates efficiency initiatives in city-owned buildings—into a more comprehensive and outward-facing sustainability office, in line with the recommendations of the AIA (Fort Worth SDAT Report 2008). Another option would be to modify the existing Business Smart Program to provide resources for

residential as well as commercial users. This consolidation should also be paired with the creation of a unified energy plan, potentially as an addition to next year's Fort Worth Comprehensive Plan.

Second, we suggest that the city modify two of its current initiatives to incorporate efficiency goals into existing municipal operations:

- **Community Action Partners.** In 2011, the city's Community Action Partners program provided emergency energy bill payment assistance for about 10,000 households. It also offered co-payments for weatherization services to about 79 low-income homes (CAP Annual Report, 2012). To ensure both efficiency gains and wise spending of government funds, we recommend that the City require energy crisis assistance recipients to participate in the weatherization co-payment program to guard against the risk of needing crisis assistance again in the future. Helping homeowners use less is a sustainable means by which to avoid these crises. It is possible that the City will need to work collaboratively with the statewide Department of Housing and Community Affairs to implement these programmatic changes.
- **Neighborhood Empowerment Zones.** In order to encourage affordable housing and economic development, the City offers tax abatements, fee waivers, and the release of city liens to homeowners and property owners in designated zones. We recommend that the goals of this program be modified to include an energy efficiency requirement in order to be eligible for incentives. This modification would encourage private investment in efficiency without requiring any additional cost from the city government.

Third, the city should leverage its existing partnerships and community ties to encourage private investment in efficiency and encourage residents and businesses to contribute to a *voluntary energy disclosure program.*

- **Community-Based Social Marketing.** CBSM is based on the principle of using existing social networks to encourage new behaviors. To support its energy data initiative, Fort Worth should first disclose the energy consumption data of municipal buildings and then encourage families and businesses to contribute their energy data to a public database. Specifically, the city should reach out to its local partners in the Better Buildings Challenge and encourage them to act as role models for energy disclosure in the private market. Also, the city should take advantage of a growing grassroots movement within Fort Worth's religious community that encourages energy efficiency and environmental stewardship. Two groups in particular, Ideal Impact and Texas Interfaith Power & Light, are active in Fort Worth and could impact the religious community.
- **Utility Partnerships.** Fort Worth's two major utilities, Oncor and Atmos, are crucial members of the City's Better Buildings Ally Network. Their involvement in encouraging participation in an energy data disclosure initiative will be crucial due to their ability to streamline the contribution of private data. Through a partnership with utilities, the current Green Button infrastructure capabilities offered by Oncor could be expanded to include natural gas and provide a safe and efficient means by which to distribute energy consumption information. As shown

in the Institute for Market Transformation's Report *Energy Transparency in the Multifamily Housing Sector*, there is precedent for a strong utility role in energy disclosure initiatives, as many cities that have enacted disclosure ordinances have also secured agreements from utilities to provide streamlined access to energy data (IMT, 2012).

- **Partnerships with Industry Trade Groups.** It is also crucial that the City solicit the participation of key industry stakeholders in advocating for energy disclosure. One particularly crucial partnership will be with the real estate community. The city should work with realtors to use low energy costs as a selling point on the housing market and demonstrate why energy disclosure is good for both homeowners and the health of the housing market. Additionally, the city should reach out to the construction and energy services trades to discuss how to incorporate newly available energy data into their business models.

Next, we recommend that the city take action to *expand the access of private actors to outside project financing.*

- **Commercial PACE Loans.** PACE loans provide low-cost financing for building owners to make energy improvements. While residential PACE programs have been stalled by concerns in the mortgage market, commercial PACE loans are a popular tool and a majority of states have made the legislative changes needed to enable the program. Texas has passed such legislation, but a required amendment is currently pending in the Texas state legislature. We recommend that the City of Fort Worth give its full support to this legislation and enact a PACE program once it becomes viable.
- **Expanded LoanSTAR Program.** Similar to PACE, Texas' LoanSTAR revolving loan program allows recipients to use the stream of energy savings to pay for upgrades over time. Building on the recent expansion of eligibility to include non-profit and religious organizations as part of the LoanSTAR Pilot Program, Fort Worth should *push to include private sector partners in the LoanSTAR Pilot Program.* Doing so would generate a new pipeline of projects with rapid payback periods, enabling the city and its partners to capture an untapped source of low-hanging energy savings.

There are several other key initiatives that the City should support in order to develop a robust energy efficiency program. Some of the suggestions may be easily implemented in the short-term, while others would require long-term planning efforts. We suggest the city consider the viability of each of the following programs:

Initiative	Impact
Green Buildings	As has been passed in Dallas, a green building ordinance will cause developers to maximize efficiency and avoid the lock-in of wasteful energy technologies. This ordinance should apply to both new construction and major building retrofits.
Solar Markets	The cost of photovoltaic panels has fallen rapidly, and solar-generated electricity has significant potential benefits. The City should support Oncor's new solar programs by lowering barriers to adoption, such as permitting and interconnection.
State Building Energy Codes	Texas recently strengthened its building energy codes, and Fort Worth should work with utilities to enforce them. Following the lead of Arizona and California, the City should encourage regulators to allow utilities to claim savings for their impact in increasing code compliance rates.
Fuel Switching	According to the US Census Bureau, 63% of residences (including 78% of rental units) are heated by electricity (American Community Survey 2011). Oncor and Atmos could both benefit from a co-sponsored fuel switching program, which the City should support via PUCT and Texas Railroad Commission testimony.
Distributed Generation	Distributed generation, and in particular natural gas-fueled combined heat and power (CHP) has great potential to strengthen the security of the electric grid and support the booming natural gas industry.

CONCLUSIONS AND SUMMARY

In sum, we believe that Fort Worth has an excellent opportunity to situate itself as a leader among cities committed to energy efficiency. It is vital that Fort Worth's approach to efficiency play to the City's strengths but also reflect its practical constraints. The core points of our findings and recommendations include:

- Fort Worth's best opportunity for energy efficiency is through strong public-private partnerships, not heavy-handed mandates.
- The success of the City's energy efficiency strategy will depend on building and maintaining positive relationships with vital stakeholder groups.
- Developing a robust energy data infrastructure is key to encouraging markets to account for energy costs, thereby unlocking the private investment needed for wide-scale efficiency gains.
- Centralizing and re-prioritizing existing municipal programs and services is a necessary step as the city shifts from a focus on public buildings to confront the challenges posed by the private sector.
- In the private sector, the City is unlikely to match its rate of energy savings in municipal buildings by 2020. However, over time the city can achieve durable, high-impact savings by affecting the way that private markets consider energy use.