

Appendix D

Population Projection Analysis

Planning Challenge

Planning for accurate population growth is often an inexact science even under ideal circumstances. Predicting accurate population increases during volatile, high-growth circumstances (like the growth associated with the Eagle Ford Shale Play and other similar energy developments), using incomplete and speculative data, is particularly challenging. Further, growth associated with energy development is oftentimes dependent on volatile commodity prices or other economic factors that are outside the control of local government influence.

Beyond the unpredictable volatility, communities associated with large-scale energy development have been historically shown to go through boom-bust cycles, where a severe economic downturn begins as the construction and development phase of development completes and the much less labor intensive production phase begins.

This natural boom-bust cycle cannot be overstated. In fact, the boom-bust cycle of energy development has been well-documented over the past several decades in many different parts of the country. In some cases, “credible research evidence has grown showing that resource dependent communities can and often do end up worse off than they would have without exploiting their extractive sector reserves.”¹

Due to this growth uncertainty, local governments often have to find the right balance between immediately responding to new service demands and protecting their long-term future from overbuilding for a population that is no longer large enough to cover the increased maintenance and replacement costs. This reality was described by Feser and Sweeney in their 1999 study of communities associated with resource extraction.

During the boom period, the county's physical infrastructure was planned and installed to accommodate an expanding population. The nature of infrastructure such as roads, sewer and water facilities, and schools is that once it is built, it generates ongoing maintenance costs (as well as debt service costs) even if consumption of the facilities declines ... the departure of mine

1 Kay, David, “The Economic Impact of Marcellus Shale Gas Drilling. What Have We Learned? What are the Limitations?” Working Paper Series on A Comprehensive Economic Impact Analysis of Natural Gas Extraction in the Marcellus Shale. April 2009. http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf

workers and higher income, mobile professionals left the burden of paying for such costs to the remaining smaller, lower-income, population.”²

While it is evident that energy development will create demand for retail businesses, hospitality industries (e.g., hotels and restaurants), and of course construction activities, there are reasons to be cautious. As pointed out in a 2010 article by Jannette Barth,³ many of the economic development increases associated with energy development have poor long-term consequences. Further, this problem is often many more times difficult in rural communities which are historically unaccustomed to making such rapid policy and service changes.

Despite these challenges, an analyses were performed using the latest local and national data available to predict the City of Cuero’s increase in population over the next 20 years.

Why is this Important?

The 2030 population estimates for Cuero will guide future growth and development by:

- Quantifying the demands on public facilities and services, such as fire and police protection, water and wastewater facilities, transportation and drainage infrastructure, parks and open space, and municipal buildings and staff, among other development impacts.
- Influencing advanced planning for new development, coordinating timely provision of adequate infrastructure, and equitably distributing fiscal resources.
- Assisting in the determination of realistic economic development strategies in line with the City’s long-term future.

Impacts of Transient Residents

Since 2010, the City of Cuero has absorbed a significant number of transient residents living in temporary quarters

- 2 Christopherson, Susan and Rightor, Ned. “How Should We Think About the Economic Consequences of Shale Gas Drilling?” Working Paper Series on A Comprehensive Economic Impact Analysis of Natural Gas Extraction in the Marcellus Shale. May 2011. http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf
- 3 Barth, Jannette. 2010. “Unanswered Questions about the Economic Impact of Gas Drilling in the Marcellus Shale: Don’t Jump to Conclusions.” J.M. Barth & Associates, Inc., March 22.

within and immediately surrounding the City limits. This demographic shift directly correlates to the boom-and-bust cycle associated with natural gas extraction, as witnessed elsewhere in the Eagle Ford Shale region and other natural resource communities throughout the country. While these residents moved to Cuero for the primary purpose of temporary employment, their longevity is contingent on diversified employment opportunities that extend beyond gas production.

Recent Trends

With 90 percent occupancy rates,⁴ the temporary housing market responded quickly to the new demands of transient residents with new recreational vehicle (RV) parks, man camps, hotels, and motels. Between 2011 and 2012, the capacity of RV parks, hotels/motels, and man camps increased by 100 percent.⁵ Hotel and motel activity confirms this trend, increasing annual tax revenue at a 34.6 percent compound annual growth rate between 2007 (\$176,039.35) to 2012 (\$776,345.40).⁶ The City is currently reviewing development plans for six additional hotels, which will more than double current capacity and add close to 500 new rooms. Conversely, traditional single-family home sales reflect very little movement, as seen with two shovel-ready subdivisions, “The Quarry” and “Pebble Ridge.” This disparity between temporary and permanent housing sales reflects the rapid or gradual growth rate of each respective population sector.

Transient Population Assumptions

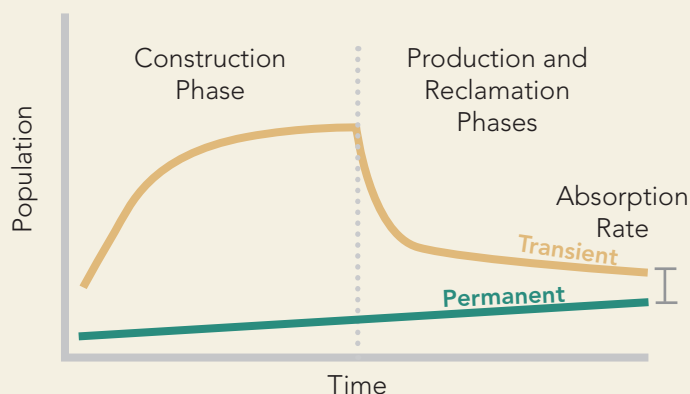
- Transient residents are defined as the segment of the population living in temporary or mobile housing structures (e.g., man camps, RV parks, mobile homes, and hotels).
- Permanent residents are defined as the segment of the population living in single- and multi-family homes.
- The population density per temporary housing unit is assumed to be two residents per dwelling unit.

Findings

The City’s current transient resident population is calculated to be 1,063 persons,⁷ adding a 16 percent increase to the total population (and infrastructure demands). Assuming Cuero is still in the construction phase, this percentage will continue to increase in the near-term according to traditional growth cycles documented in communities undergoing similar energy development, as conceptualized in **Figure D.1, Natural Gas Extraction Trends**. Transient growth will reach a tipping point after

⁴ Based on Kendig Keast Collaborative phone interviews and Cuero Community Development Corporation (CDC) findings.
⁵ Based on Kendig Keast Collaborative phone interviews.
⁶ Based on Texas Comptroller of Public Accounts (First Quarter, 2007, 2012) tables.
⁷ Based on data collection of man camps, RV parks, mobile home communities, hotel/motel occupancy rates, and other information resources.

Figure D.1, Natural Gas Extraction Trends



the initial construction phase, in which the population may drop off as steep as 98 percent during the production and reclamation phases. Due to their variable nature, these generalized trend lines are shown for illustrative purposes only.

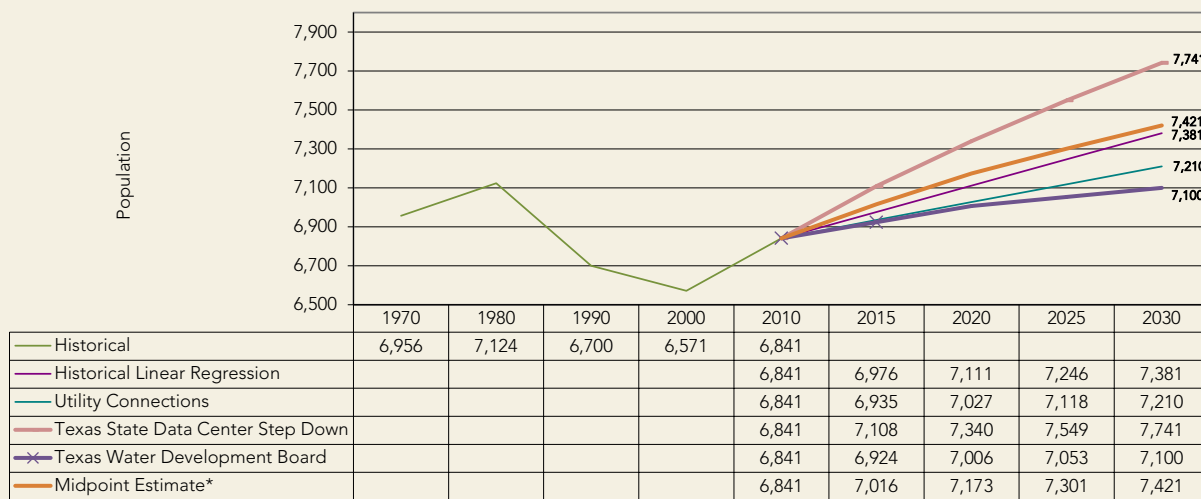
While single- and multi-family housing should reflect permanent resident projections only, the City’s utility and transportation network must adapt to sharp increases and decreases in transient growth. Although some public investments are inevitable, such as facility upgrades that are proportionate to total population demands, others must be strategically located to prevent unnecessary sprawl and support longer-term development patterns.

Traditional Population Projections

Several data sources and projection models were used to develop a traditional population estimate for 2030. These are shown in **Figure D.2, Historical Population and Traditional Projection Analyses** on the top of the next page. These traditional projections were generated using compound annual growth rate (CAGR) analyses, applied to the City’s historical population growth. As a projection, the CAGR analysis describes the rate at which a value changes if it grew at a steady pace from one year to the next. The following models were applied:

- **Historical Population Growth (0.38% CAGR).** This linear regression model projects populations along a trend line based on historical data between 2000 and 2010. The 40-year trendline indicated negative growth, so a shorter period of positive growth was used as an alternative.
- **Utility Connections (0.26% CAGR).** This linear regression model projects populations along a trend line based on changes in utility connections between 2001 and 2012.
- **Texas State Data Center Step Down(0.62% CAGR).** This step-down model extrapolates Cuero’s growth rate from the Texas State Data Center’s population projections for DeWitt County. These projections

Figure D.2, Historical Population and Traditional Projection Analyses



were adjusted to account for 2010 Census updates. Since the City has represented an increasing percentage of the county’s population between 2000 and 2010, a compound annual growth rate formula was applied to calculate the 20-year forecast.

- **Texas Water Development Board (0.19% CAGR).** These projections, which are derived from the Texas Water Development Board’s estimates, were adjusted to account for 2010 Census updates. No additional calculations were performed.

Using traditional population projection analysis tools, Cuero’s long-term population growth increases between 7,100 to 7,741 persons over the next 20-years.

Projection Analysis Using Growth Associated with the Eagle Ford Shale Play (EFS)

Since Cuero is currently undergoing a population boom associated with growth stemming from the Eagle Ford Shale Play, traditional tools based on historical population growth, like those denoted in *Figure D.2, Historical Population and Traditional Projection Analyses*, are inherently not applicable. Therefore, a second population projection analysis was undertaken using EFS and other data to determine Cuero’s long-term population during the horizon of this plan.

Projection Assumptions

This section outlines the assumptions used to determine the population projections.

- The City of Cuero’s energy development is assumed to be in the early stages of a 16-year⁸ production horizon associated with the Eagle Ford Shale Play.
- The available energy resources able to be extracted are uniform across DeWitt County.
- Commodity prices and the rate of drilling will remain constant for the duration of 16-year production horizon.

8 Pack, William. “Economist puts Eagle Ford Lifespan at 16+ years.” San Antonio Express-News. October 4, 2012. <http://www.mysanantonio.com/business/article/Economist-puts-Eagle-Ford-lifespan-at-16-years-3919231.php>

- In 2011, the total direct and indirect jobs associated with the Eagle Ford Shale Play in DeWitt County were 3,573,⁹ which was 37 percent of the total labor force (11,900 person¹⁰) in the county.
- Cuero’s total labor force (direct and indirect jobs) around the same time was 2,932 persons.¹¹ Using the same percentage (i.e., 37 percent), Cuero’s labor force associated with the EFS was approximately 1,804 persons. A majority of this EFS labor force is transient.
- Based on a study done by KKC on the transient population in 2012, it was determined that there was an additional 1,063 transient workers living in Cuero. Adding this to the 2010 Census population of 6,841 persons, takes the total Cuero population to 7,904 persons in 2012.
- In 2021, the total direct and indirect jobs associated with the Eagle Ford Shale Play in DeWitt County are predicted to be 11,296 persons.¹² Assuming that proportions stay the same, it is estimated that Cuero’s portion of that labor force will equal 3,427 persons.
- Using the same analysis as identified above, these numbers could be extended out to the 2028, which is the most recent estimate of the duration of the Eagle Ford Shale Play. If that was the case, the total direct and indirect jobs associated with the Eagle Ford Shale Play in DeWitt County and Cuero is 25,288 and 7,762 persons respectively. However, according to other reports,¹³ drilling phase jobs do not compound over time and as new drilling permits start to wane, the number of total workers begins to taper off.
- Once no new wells are needed and the drilling and construction phase completes, the amount of produc-

9 Center for Community and Business Research and the University of Texas at San Antonio Institute for Economic Development. “Workforce Analysis for the Eagle Ford Shale. October 2012.

10 <http://m.research.stlouisfed.org/fred/series.php?sid=TXDEWI3L FN&show=obs&allobs=1>

11 Cuero Development Corporation. “Cuero Labor Market Information 2012”

12 Center for Community and Business Research and the University of Texas at San Antonio Institute for Economic Development. “Workforce Analysis for the Eagle Ford Shale. October 2012.

13 Marcellus Shale Education & Training Center. MSETC Needs Assessment, Summer 2009.

tion phase workers diminishes to an historically proven two percent of the overall labor force that was associated with the energy development. This two percent becomes a stable, permanent work force that remains in the community until the resource extraction is no longer commercially viable or production is complete.

These assumptions were used to determine the 20-year population projections identified in **Figure D.3, Cuero Population Projections 2012 - 2030**. Based on the results of this analysis, it shows Cuero’s population increasing to a maximum of 10,699 persons by 2021. This increase in population is mostly comprised of the transient population associated with the energy development of the Eagle Ford Shale Play. As the number of new wells start to decrease in the area, this predominantly transient work force starts to taper off as energy development fully transitions from the drilling and construction stage to the production stage. As Cuero fully enters the production stage, the total population will decrease concurrently as the EFS work force decreases to about two percent of the maximum work force associated with the Eagle Ford Shale Play, which is about 8,209 persons. This 8,209 persons becomes a permanent population that will reside in Cuero until the resource is fully extracted and production ends.

Also shown on *Figure D.3, Cuero Population Projections 2012 - 2030*, is the high point projection from the Texas State Data Center (TSDC) Step Down which equals 7,741 persons. Out of all the traditional population projections shown in *Figure D.2, Historical Population and Traditional Projection Analyses* (on the previous page), the high point was selected because all of them did not account for the growth associated with the Eagle Ford Shale Play.

When comparing the two population projections, the total long-term impact of the Eagle Ford Shale Play (once fully within the production phase), is only 468 to 1,109 persons greater than what would have been predicted using historical population projection tools.

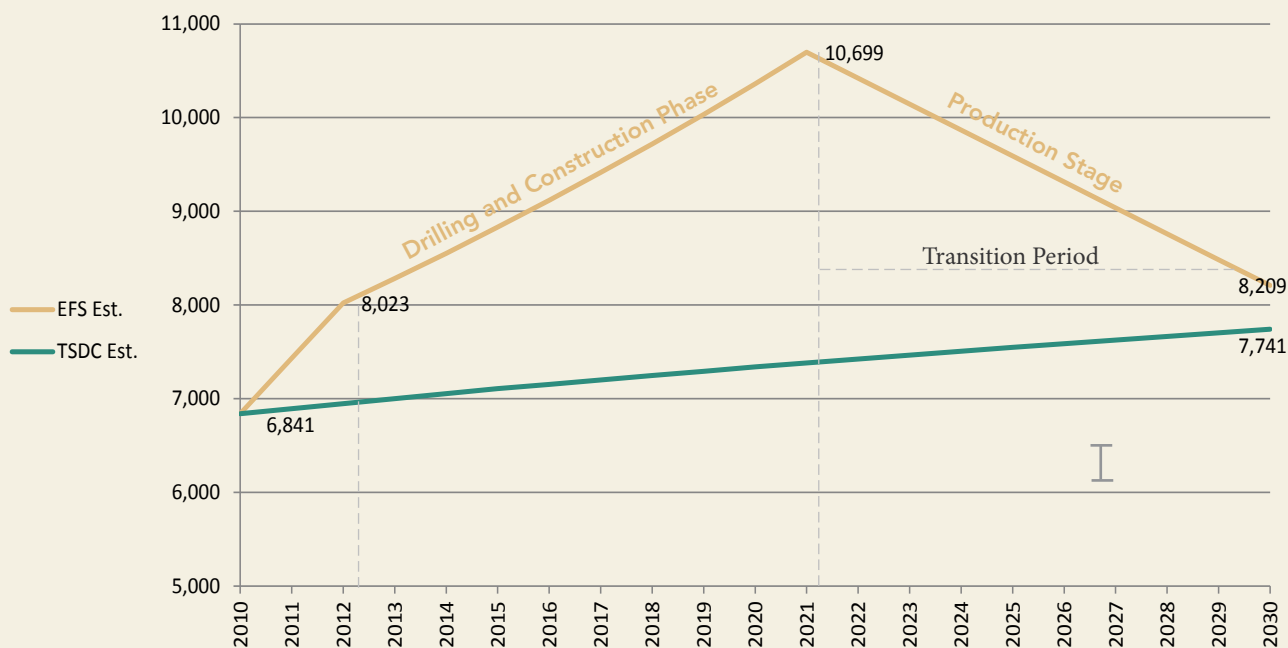
Conclusions

While the Eagle Ford Shale Play has and will continue to increase overall population growth within the City, historical trends show that these increases in population are unpredictable and temporary in nature. As a necessity, Cuero will have to be proactive in extending the necessary public services to meet the short-term needs of this growing interim population (e.g., public safety services). The City should also be proactive in developing economic development strategies intended to diversify employment within the City.

To the contrary, however, it is recommended that Cuero take a cautious approach toward extending infrastructure (e.g., utilities far outside of town) or other long-term commitments (e.g., a significant number of new single-family or multi-family housing developments, rather than incentivizing infill development where public infrastructure already exists) that are not absolutely essential or necessary to serve the predicted permanent population.

Finally, a specific person (e.g., the CDC Director) should be assigned the responsibility of monitoring on a monthly or semi-quarterly basis, those activities associated with the region’s energy development. Reports should be made to the Mayor and City Council as new trends start to become apparent and changes in policy or budgeting is warranted.

Figure D.3, Cuero Population Projections 2012 - 2030



Including the impact stemming from the Eagle Ford Shale Play, the total projected population in Cuero in 2030 is approximately 8,209 persons.