



The Reliable Texas Electricity Market *Resource Adequacy Hype Doesn't Fit the Facts*

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Findings

- The PUC should not make the reserve margin mandatory.
- Texas has enough existing and planned generation resources to maintain the reliability of the electricity grid for the next five to six years.
- Investment in new generation can be profitable and is adequate for maintaining future resource adequacy.
- ERCOT has overestimated demand for electricity 79 percent of the time since 2008.

This is the fifth in a series of papers examining the debate over the reliability of the Texas electricity market.

Executive Summary

Forecasts in 2012 of diminishing resource adequacy set the stage for a push to vastly increase government intervention in Texas' world-class electricity market. A more accurate assessment of the data since then has debunked the notion that Texas needs to adopt a capacity market with subsidies to generators as high as \$4 billion a year—on top of what Texans pay for electricity.

The current push away from competition and toward a capacity market is based on an over-reaction to 2012's faulty projections about the reliability of the market. This paper shows that despite the ongoing trend of underestimating resource adequacy in official projections, Texas has adequate resources to power Texas' growing economy for at least the next five or six years. Additionally, new investment in generation is generally profitable and sufficient to keep up with increased demand.

The Public Utility Commission of Texas (PUC) should not adopt a capacity market. Neither should it make the projected reserve margin mandatory; this would necessarily lead to the adoption of a capacity market, undoing the policies set by its predecessors that made market participants the primary arbiters of long-run reliability and resource adequacy.

All is not perfect in the electricity market—renewable energy subsidies and excessive regulation continue to negatively impact the reliability of the market. But by following along the path that has made the electricity market

in the Electric Reliability Council of Texas (ERCOT) region so successful—letting competitors compete and reducing intervention in the market—Texas can build on its strong foundation and ensure sufficient generation of electricity for years to come.

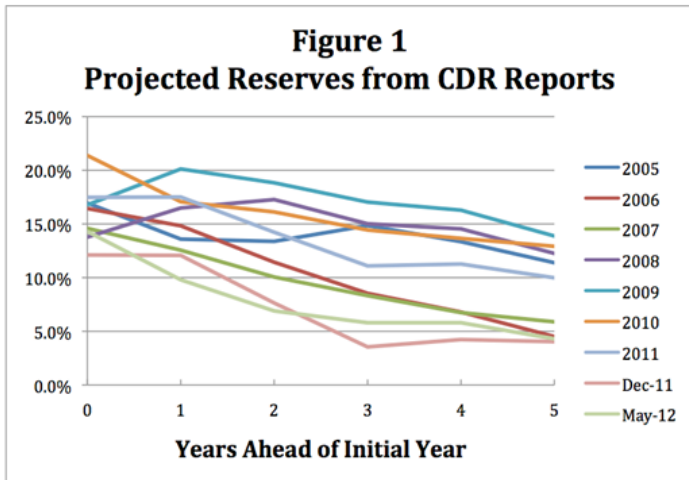
Reliability Concerns Need Closer Examination

Texas moved to a competitive electricity market over a period of about 12 years, from 1995 to 2007. The results have been astounding: billions of dollars of new investment in generation, lower prices, and a high level of reliability with robust reserves—all of which continue today. Texas today has the most successful and competitive electricity market in the United States, if not the world.

Though the market has been great success, some segments of industry have had a rocky time of it. That, however, isn't surprising. Consumers were in part paying higher prices in the regulated market to provide guaranteed returns for the industry. Without those returns, businesses must compete, and some are competing more successfully than others.

Additionally, the market has become much more efficient. Profits are harder to come by, and some fear this will translate into less investment in new generation and ultimately reduced reliability because of inadequate generation capacity. Indeed, recent official forecasts of resource adequacy have shown declining reserve margins in the not-too-distant future.

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Source: Kleit and Michaels (2013)

However, we should be cautious about overreaction to official reserve margin forecasts. For example, **Figure 1** shows that forecasts of future reserve margins *always* trend lower over time. **Table 1** shows two examples of previous forecasts of very low reserves—yet reserves were sufficient when the time came.

The truth is that in an energy-only market the forecast of future reserves *should* be lower. PUC Commissioner Kenneth Anderson put it well when he said, “An efficient, energy-only market should always show a capacity reserve margin shortfall 4-5 years out.” (Copelin 2012) This is because the market relies on price signals—rather than government mandates—to determine the need for new generation. And four to five years is an adequate amount of time for market participants to plan and build new generation.

Another reason for optimism about the future is how well the market performed in 2011. Texas’ growing population and economy combined with record high temperatures and drought that year to strain the electricity grid. But it didn’t break, despite the record load from a historic weather event. The market worked, supplying all the electricity Texans needed.

Though Texas made it through 2011, the close call has been put forward as one of the reasons we need to adopt a capacity market in Texas. Before rushing to end the most successful, competitive electricity market in the United States, however, a closer examination of the facts surrounding future reserves is required.

Should the Reserve Margin be Mandatory?

ERCOT, the grid operator for most of Texas, released a report last summer projecting that Texas could experience “potential electricity shortages within the coming decade as electricity use in Texas continues to hit new records.” (ERCOT 2012) The Capacity, Demand, and Reserves (CDR) report, along with the Brattle Groups release of its report, *ERCOT Investment Incentives and Resource Adequacy*, was responsible for much shift in momentum toward installing a capacity market in Texas.

The CDR is made up of two parts. First, is the forecast of load, or demand. The load forecast consists of the summer peak demand forecast adjusted for various means of reducing demand, which results in the Firm Load Forecast. Next is the forecast of resources, or supply. It consists of all generation capacity currently in operation (wind generation is heavily discounted from installed capacity since the wind doesn’t always blow) plus various resources that could be brought online with some advance notice. The difference between the two the Firm Load forecast and the Resource forecast, measured in megawatts (MW), is the forecast reserve margin.

Overlooked in the debate over resource adequacy, however, was the fact that recent CDRs actually forecast that Texas will have more than enough supplies to meet demand in the electricity market through 2021. In fact, according to the May 2013 CDR seen in **Table 2**, supplies are expected to exceed demand by at least 9.4 percent through 2018. At first, this seems counterintuitive. How can a report that projected “potential electricity shortages” also forecast adequate electricity supplies? The answer lies in the nature of the reserve margin.

Table 1: Forecast ERCOT Reserve Margins 2014-18							
	2006	2007	2008	2009	2010	2011	2012
June 2006 Forecast	16.4%	14.8%	11.4%	8.5%	6.8%	4.5%	
May 2007 Forecast		14.6%	12.6%	10.1%	8.3%	6.7%	5.8%

Table 2: Forecast ERCOT Reserve Margins 2014-18

	2014	2015	2016	2017	2018
May 2013 Forecast	13.8%	11.6%	10.4%	10.5%	9.4%

The reserve margin is an artificial construct designed to give policymakers comfort that Texas has *more than enough* electricity supplies to meet demands, and therefore will not suffer rolling blackouts during periods of peak demand. Currently, the reserve margin in ERCOT is set at 13.75 percent. This means that government planners think the state should have 13.75 percent more in projected supplies than in projected demand at any point in time in the future—especially during the summer peak season. According to current standards, the 13.75 reserve margin is supposed to translate into one loss of power event every 10 years.

The concerns over “potential electricity shortages” stem from the fact that future generation resources may not meet projected demand plus the administratively set 13.75 percent safety margin. It is quite possible, however, that the reserve margin is set higher than needed to meet the reliability expectations of customers. Past forecasts have usually shown projected supplies unable to keep up with forecast demand plus the reserve margin. However, to date, supply always been adequate to meet demand.

The reserve margin used to be 12.5 percent. Then in 2010, ERCOT increased the target to its current level in part due to the instability that wind has introduced into the system. More recently, ERCOT’s board considered a proposal that would have raised the reserve margin even higher, to 16.1 percent. The cost of making this change has been estimated to be more than \$3 billion in real dollars over the ten years. (Frayer 2013) Additionally, given the ongoing discussions over reliability at the PUC, some were concerned whether this was the appropriate time for the ERCOT to consider this. Texas state Sen. Troy Fraser weighed into the deliberations with a letter asking the board to postpone making a decision. He wrote, “An increase in the target reserve margin of this scale could not help but serve the interests of those advocating for a capacity market, a system which would subsidize existing generation.”

Along these lines, the PUC’s current deliberations of whether the state should make the reserve margin mandatory would certainly benefit advocates of a capacity market. A mandatory reserve margin would necessarily be followed by some

sort of a capacity market in which the PUC and/or ERCOT would attempt to ensure that enough generation be in place to maintain the reserve margin. It is likely that this would be carried out through capacity subsidies for electricity generators in Texas. Recent estimates have put the cost of capacity payments as high as \$4 billion a year.

Behind all the debate over the reserve margin, however, is a much more important question that is not getting the attention it deserves: why should the state of Texas be in the business of determining the level of reliability and resource adequacy in the electricity market?

In truth, this question has already been answered by Texas policymakers. When Texas adopted its current energy-only market, it made market participants the primary arbiters of long-run reliability and resource adequacy.

Now the PUC is considering reversing the decisions of its predecessors and abandon the market-based system in favor of one where the government determines how much capacity ERCOT should have, what level of reliability is best for consumers and how much they should pay for it.

At a time the nation is debating the implementation of Obama-Care, Texas policymakers should stop to consider the wisdom of the PUC’s current direction toward imposing Washington, DC-style government control of an entire industry. The federal intervention in both the health care and higher education markets has effectively created capacity markets. The result has been high levels of inefficiency, high costs, and low quality.

In contrast, laws and regulations in Texas under what has come to be known as the “Texas Model” have moved away from government control of a market place. This is in fact what has made the Texas electricity market so successful; it let competition work. “While the transformation of American electricity has been dominated by a largely political competition to design markets” (Michaels 2007b) in a way to control participants’ behavior, Texas for the most part set general rules for market participants and allowed them to compete within those rules.

The state of Texas should not make the reserve margin mandatory. In fact, the state should not even be calculating a reserve margin. The current reserve margin is essentially meaningless from a market perspective; the private sector is much better at forecasting future supply and demand and determining whether new investment would be profitable. But it is not simply an expensive nuisance; the administratively determined reserve margin has been proven by recent events to be a harmful regulatory activity that significantly increases the regulatory risk in the market. It is unlikely the PUC would be moving toward a capacity market if it weren't for the inaccurate forecasts in the reserve margin. The next section examines some of the problems with forecasts of the reserve margin in ERCOT's CDR and challenges the conventional wisdom that reliability is a major problem.

The Reliable Texas Market: Reserve Margin Forecasts Do Not Accurately Portray Resource Adequacy

There is nothing in the historical record that suggests that there is a problem with reliability in ERCOT's electricity market. Instead, the entire debate over reliability has been fueled by projections of future shortages. Thus it is worth examining the accuracy of the reserve margin projections on which the push for capacity markets is based.

ERCOT's CDR is usually published twice per year. In 2012, however, there were three forecasts. The October 2012 CDR was issued in response to some obvious challenges in the May 2012 CDR. This means that there are four CDRs issued in the last year available for examination.

Table 3 shows the reserve margin forecast from the four CDRs for the period 2013 through 2018. As can be seen, there is a wide range in the forecast over this one-year period. For 2017, for example, there is a range of 81 percent between the high and low forecasts. Even for 2013, only months away from the first three forecasts, there is a 21 percent range.

Another notable trend in the four CDRs is that the forecast reserve margins are notably higher in the May 2013 CDR than in the May 2012 CDR. Whereas the reserve margin drops below 10 percent in 2014 according to the May 2012 CDR, this doesn't occur until 2018 in the May 2013 CDR. Yet many are still acting as if the inaccurate forecasts of the May 2012 CDR are what Texas should base its public policy decisions on.

In addition to the problem of the range of the reserve margin forecast, there are also problems with the computation of both load and reserves. When taken all together, these problems make the CDR an unreliable measurement of reserve upon which to base the decisions currently being contemplated at the PUC.

The load forecasts in the CDRs historically overestimate peak demand. Table 4 shows the differences between actual peak demand from 2008 through 2013 and the forecast of peak demand in the CDRs.

Perhaps the most relevant forecast for today's debate is the 2007 CDR. It is relative to today as the 2013 CDR is to 2019. The 2007 CDR significantly overestimates load for each of the following six years. It even overestimated the peak load for 2011, the year in which ERCOT sets its all-time record for demand due to the record heat and drought that summer. Table 5 shows that the 2007 CDR overestimates peak load by 4.73 percent on average. The 2007-2009 CDRs on average overestimate load by 2.82 percent.

Table 6 shows the average accuracy of the load projections based on the years in advance the projection was made. For instance, the one-year projections, e.g., the 2007 CDR's projection for 2008 and the 2012 CDR's projection for 2013, on average came within 0.2 percent of the actual load for that year. While this sounds like they hit the nail right on the head, the range of missed estimates shows that there was still quite a bit of uncertainty over load only one year from the season. Much of this short-term uncertainty can be attributed to the weather.

Table 3: ERCOT Reserve Margin Forecasts 2013-18

	2013	2014	2015	2016	2017	2018
May 2012 Forecast	14.3%	9.8%	6.9%	6.5%	5.8%	5.8%
Oct. 2012 Forecast	16.0%	12.1%	9.7%	9.9%	9.8%	10.4%
Dec. 2012 Forecast	13.2%	10.9%	10.5%	8.5%	8.4%	7.1%
May 2013 Forecast		13.8%	11.6%	10.4%	10.5%	9.4%
Range	21.21%	40.82%	68.12%	60.00%	81.03%	46.48%

Source: ERCOT

Peak Demand	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Actual	62,171	63,400	65,776	68,305	66,548	67,180	-	-	-	-	-	-
Forecast 2007	65,135	66,508	67,955	69,456	70,733	72,160	-	-	-	-	-	-
Forecast 2008	-	65,222	66,283	67,654	68,932	70,408	71,678	-	-	-	-	-
Forecast 2009	-	-	64,056	65,494	67,394	69,399	70,837	72,172	-	-	-	-
Forecast 2010	-	-	-	65,206	66,658	68,265	69,451	70,517	71,376	-	-	-
Forecast 2011	-	-	-	-	66,195	67,168	70,087	73,552	76,001	77,596	76,654	77,866
Forecast 2012	-	-	-	-	-	67,998	69,807	72,071	74,191	75,409	78,919	81,382
Forecast 2013	-	-	-	-	-	-	69,807	72,071	74,191	75,409	76,186	76,882

Source: ERCOT

CDR	2008	2009	2010	2011	2012	2013	Avg.
2007	4.77%	4.90%	3.31%	1.69%	6.29%	7.41%	4.73%
2007-09	4.77%	3.89%	0.49%	-1.13%	3.71%	5.17%	2.82%

	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year
Avg.	0.20%	0.86%	2.10%	2.79%	3.88%	4.04%
Avg. w/o 2011	1.14%	1.85%	2.71%	3.06%	4.28%	4.79%
Range	-4.54% 4.77%	-4.12% 4.90%	-0.95% 4.02%	1.69% 3.58%	0.65% 6.29%	7.41% ¹

¹ The six year average includes the five year projections.

Overall, **Table 6** and **Figure 2** show what appears to be an inherent bias toward overestimating load in the ERCOT CDR. The average forecast for years one through six all show this. Additionally, 79 percent of the CDR forecasts for 2008-13 overestimated the load. If the record peak load caused by the record heat and drought of 2011 is corrected for, the rate of overestimation rises to 87 percent.

The bias toward overestimation showed up particularly in the May 2013 CDR that made a very aggressive load forecast based on projections that nonfarm employment growth in Texas would increase each year by over 400,000; a level that was not reached even during the boom years of the middle of last decade.

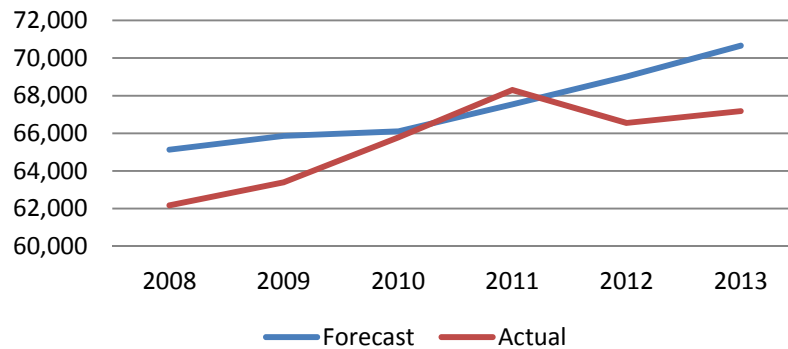
Part of this trend of overestimating load can be attributed to human nature. Regulators are far more concerned about the possibility of rolling blackouts due to underestimating load

than they are to the higher costs consumers might have to bear because of overestimating load; the higher costs are hidden, but the power outages are noticeable to everyone.

It appears that something else is going on, though, besides a bias towards overestimating long-term demand. Even the moderate December 2012 CDR overestimated 2013's peak demand, a few short months away. There appears to be quicker than anticipated progress being made in demand management within the market, both at the residential and commercial/industrial levels. Commissioner Anderson has questioned whether the cause of this is price-responsive demand response that is currently being underestimated in the near-term. (Anderson 2013a)

Whatever the cause may be, **Table 7** shows that adjusting for the overestimation of peak demand makes the reserve margins much more robust in the upcoming years.

Figure 2: Average Peak Load Forecast v. Actual Peak Load



	2014	2015	2016	2017	2018	2019
May 2013 Forecast	13.8%	11.6%	10.4%	10.5%	9.4%	7.4%
Adjusted	14.02%	12.64%	12.85%	13.81%	13.99%	12.14%
Adjusted w/o 2011	15.15%	13.83%	13.58%	14.14%	14.48%	13.06%

Whether or not the data from 2011 are included, reserve margins stay strong through 2019—within striking distance or above the 13.75 percent reserve margin target. It shows very little of the downward trend of the last four CDRs that was the catalyst for the push for a capacity market.

It’s not only on the load side of the equation where the CDRs fall short. The CDR resources estimates also contribute to understated reserve margins by not including all the generation that is likely to come online in the future. Commissioner Anderson has noted that “5,731 MW of new generation has been announced, or announced obtaining financing or otherwise moving forward in the trade press.” (Anderson 2013b) While 2,891 MW of that is in the May 2013 CDR, 2,840 MW was not included.

Last fall, the Center for Economic Freedom filed comments with the PUC examining the estimate of resources in the October 2013 CDR. By adding in potential resources not included in the ERCOT report, i.e., mothballed units and the remaining 50 percent of the non-synchronous ties, we estimated available resources could increase on average by 2400 MW through 2018. Taking this into account, **Table 8** shows our estimate of future reserve margins.

As we’ll discuss in a future paper, there are challenges that need to be addressed to increase resource adequacy and reliability in ERCOT. But there is no emergency. The data in this section shows that there are adequate resources to handle the load for at least the next four or five years once adjustments are made to projections of reserve margins on either the load and resources side of the equation.

Investment in New Generation is Adequate to Power Texas’ Future

Much has been made of the supposed lack of investment in new generation in ERCOT, which allegedly proves that a capacity market is needed. But that is simply not the case.

As mentioned above, there is 5,731 MW of recently announced new generation in the works in ERCOT. Much of this is in response to the PUC’s increase last year of the System-Wide Offer Cap (SWOC), the price cap on the wholesale market. This new investment shows that generators and financial markets believe that investment in the Texas market is still profitable.

Kleit and Michaels’ groundbreaking research in the area of generator profitability confirms this finding. They point out

	2014	2015	2016	2017	2018
Oct. 2012 Forecast	12.1%	9.7%	9.9%	9.8%	10.4%
Oct. 2012 Forecast Plus	17.77%	15.59%	16.06%	15.37%	14.29%

Source: ERCOT Resource Adequacy Update October 2012; calculations of the author

that “ERCOT’s monitor, however, is peculiarly constrained because the ground rules for its profitability calculation are embodied in regulations that do not allow the use of potentially relevant public data” and thus underestimate profitability in the market. (Kleit and Michaels 2013, 15) “By ERCOT’s calculations little if any new capacity should have been built over 2002-2011, but in reality fossil fuel capacity growth has kept pace with load.” (Kleit and Michaels 2013, 16) They later explain their findings showing the profitability of the market:

Computations that assume an ancillary services option and rational bidding behavior cast new light on the viability of ERCOT’s energy-only market. Peaker Net Margin is an administrative creation that does not fully reflect the economic opportunities open to generators. Our calculations show that adding the option of producing non-spin to that of the balancing market can raise a peaking generator’s net margin in ERCOT into the range of economic viability. (Kleit and Michaels 2013, 19)

While investment in new generation in Texas can be profitable, it could be that new investment has slowed from the breakneck pace of the first decade or so of competition. Yet this shouldn’t be surprising. The market has been responding to the adequate reserves in ERCOT, which is also reflected in the lower prices of the last year or two. The low prices have sent the signal to investors that expensive new generation is not needed because the load can be handled more efficiently through existing resources, even if this means bringing mothballed plants back online. For instance, Commissioner Anderson noted “903 MW of mothballed generation voluntarily returned to service for the summer of 2013.” (Anderson 2013b)

Yet today increasing prices may be sending signals to the market that will result in more new generation being built. Table 9 shows the price of residential electricity is increasing after a decrease in each of the last two years. The Energy Information Administration (EIA) shows an increase in prices across the state for the first seven months of 2013 over the same period last year. Residential price offers in ERCOT, according to

	2011	2012	2013	Change 2012-13
EIA	11.24	11.18	11.25	0.60%
PTC	10.03	9.79	10.40	6.13%

Source: EIA and AECT/Power to Choose.org

reports of prices from Power to Choose.org by the Association of Electric Companies of Texas, are experiencing an even steeper increase. The average 12 month fixed price offering is now 10.40 cents per kWh, up 6.13 percent from 2012 and above the 2011 price as well. EIA does show overall prices are down in Texas this year, but these numbers include prices outside of ERCOT.

Conclusion

The findings in this paper don’t guarantee that future reserves will exceed the current target or that there are no challenges in the ERCOT market; indeed, we believe that there are significant challenges to be met—especially challenges brought about by excessive government intervention into the market. These findings do, however, call into question claims that we need to abandon Texas’ world-class, energy-only electricity market and replace it with a capacity market that would bring Washington, DC-style regulation to Texas.

Moving to a capacity market would destroy the dynamic changes occurring in the market today that are maintaining adequate levels of reliability. In addition, as our next paper will show, a capacity market will do nothing to improve reliability in the Texas market. Instead, it will make electricity more expensive while harming reliability over the long run. ★

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Bill Peacock is the vice president of research and director of the Texas Public Policy Foundation's Center for Economic Freedom. He has been with the Foundation since February 2005. Peacock has extensive experience in Texas government and policy on a variety of issues including, economic and regulatory policy, natural resources, public finance, and public education. His work has focused on identifying and reducing the harmful effects of regulations on the economy, businesses, and consumers.

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