

# **TCEQ Staff Recommendations of Responses to Comments on the Proposed Houston-Galveston-Brazoria State Implementation Plan Economic Impact on Ozone Trends**

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# TCEQ Staff Recommendations

## Economic Impact on Ozone Trends

### Comments

EDF, the EPA, and GHASP commented that the WoE analysis did not account for the effects of the recent **economic downturn** on the 2007-2009 ozone design values being at or below 84 ppb for HGB area monitors. Specifically, the EPA noted that “***industry representatives have commented . . . that their emissions have been lower in the last few years (starting in 2007) due to economic influences and when demand improves it is likely their emissions will increase over the levels in 2007-2009.***”

The EPA further stated that “***after the economy gains strength and emissions likely increase . . . it seems unlikely that the area will continue to monitor attainment.***” The EPA emphasized that some of the monitors currently at or close to an 84 ppb design value are located within or downwind of industrial areas and would then likely register higher ozone levels when economic demand increases in the future. COH requested a quantification of the emission inventory changes and approximate ozone reductions that have occurred over the past few years due to the economic downturn. COH requested a list of actions necessary to make these emission changes permanent and enforceable.

# TCEQ Staff Recommendations

## Economic Impact on Ozone Trends

### Response

TCEQ staff examined available published data at the state, region, and industry levels to identify recent economic trends. This detailed analysis of economic data from Texas, the HGB area, and the refining industry along the Gulf Coast does not support these comments.

TCEQ staff's investigation found **no evidence** of an economic downturn in Texas, the HGB area, or the petrochemical industry specifically, prior to early 2009.

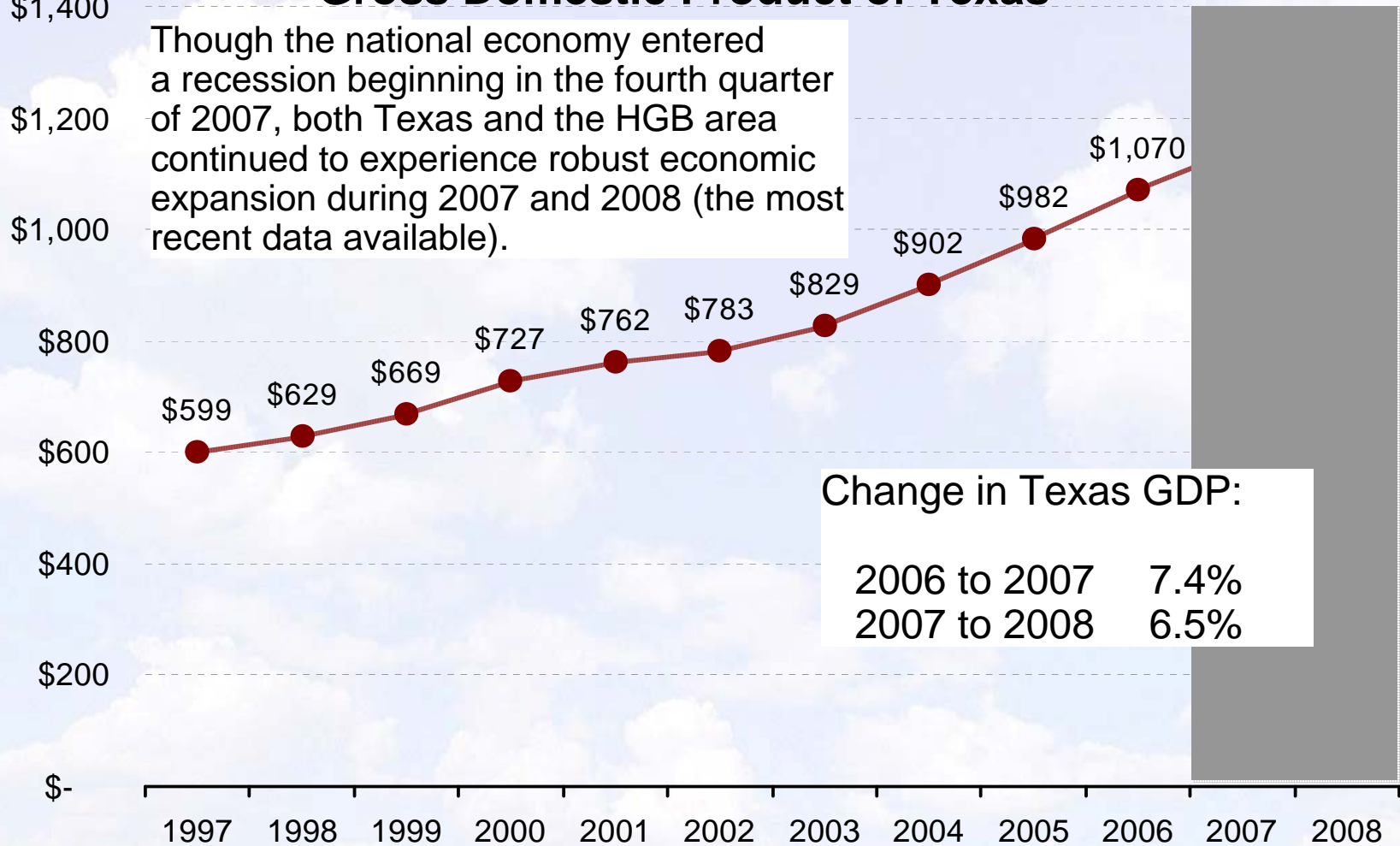
# TCEQ Staff Recommendations

## Economic Impact on Ozone Trends

\$ billions  
\$1,400

### Gross Domestic Product of Texas

Though the national economy entered a recession beginning in the fourth quarter of 2007, both Texas and the HGB area continued to experience robust economic expansion during 2007 and 2008 (the most recent data available).

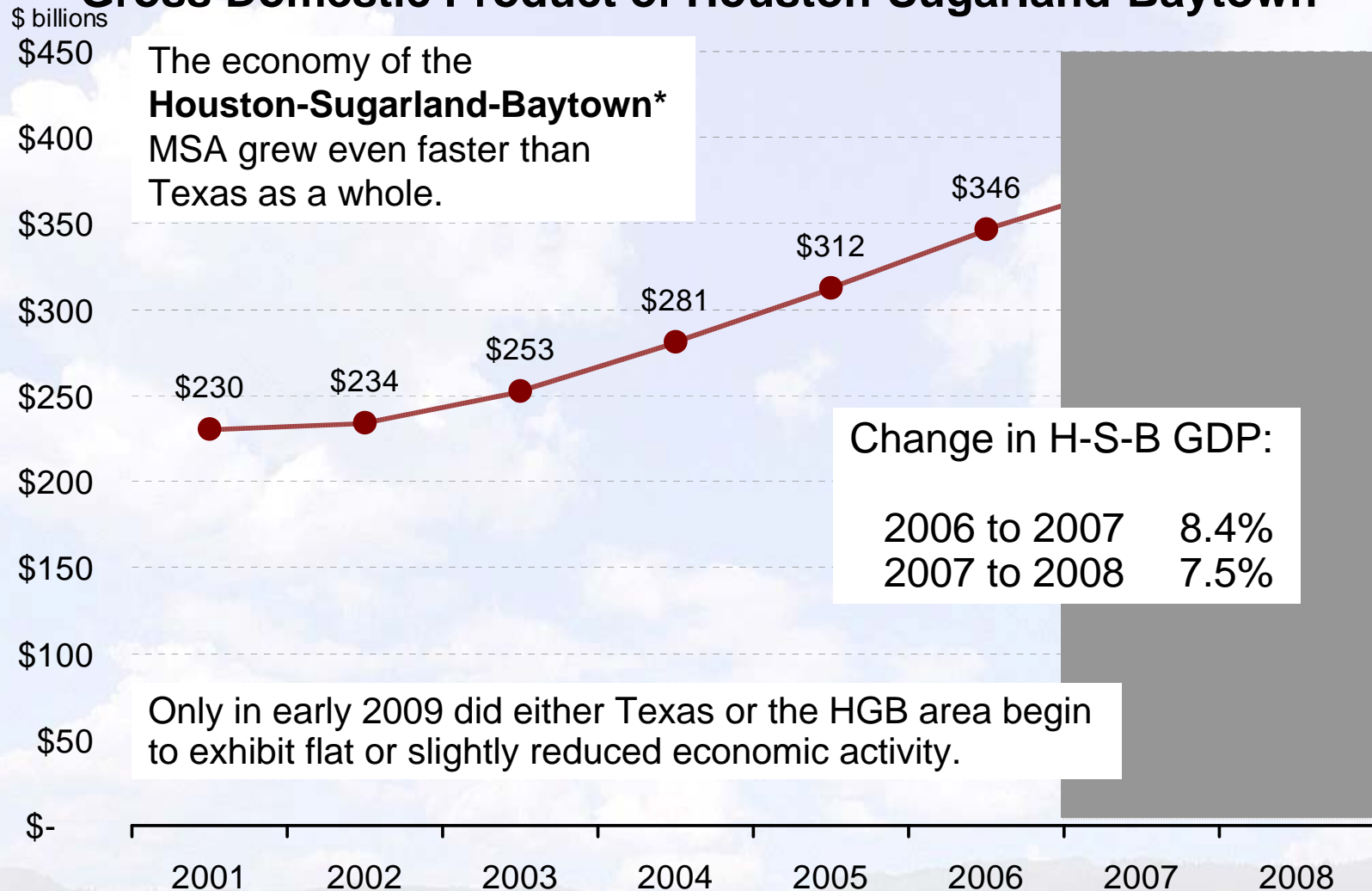


Source: Bureau of Economic Analysis, U.S. Department of Commerce <http://www.bea.gov/regional/gsp/>

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## Economic Impact on Ozone Trends

### Gross Domestic Product of Houston-Sugarland-Baytown\*



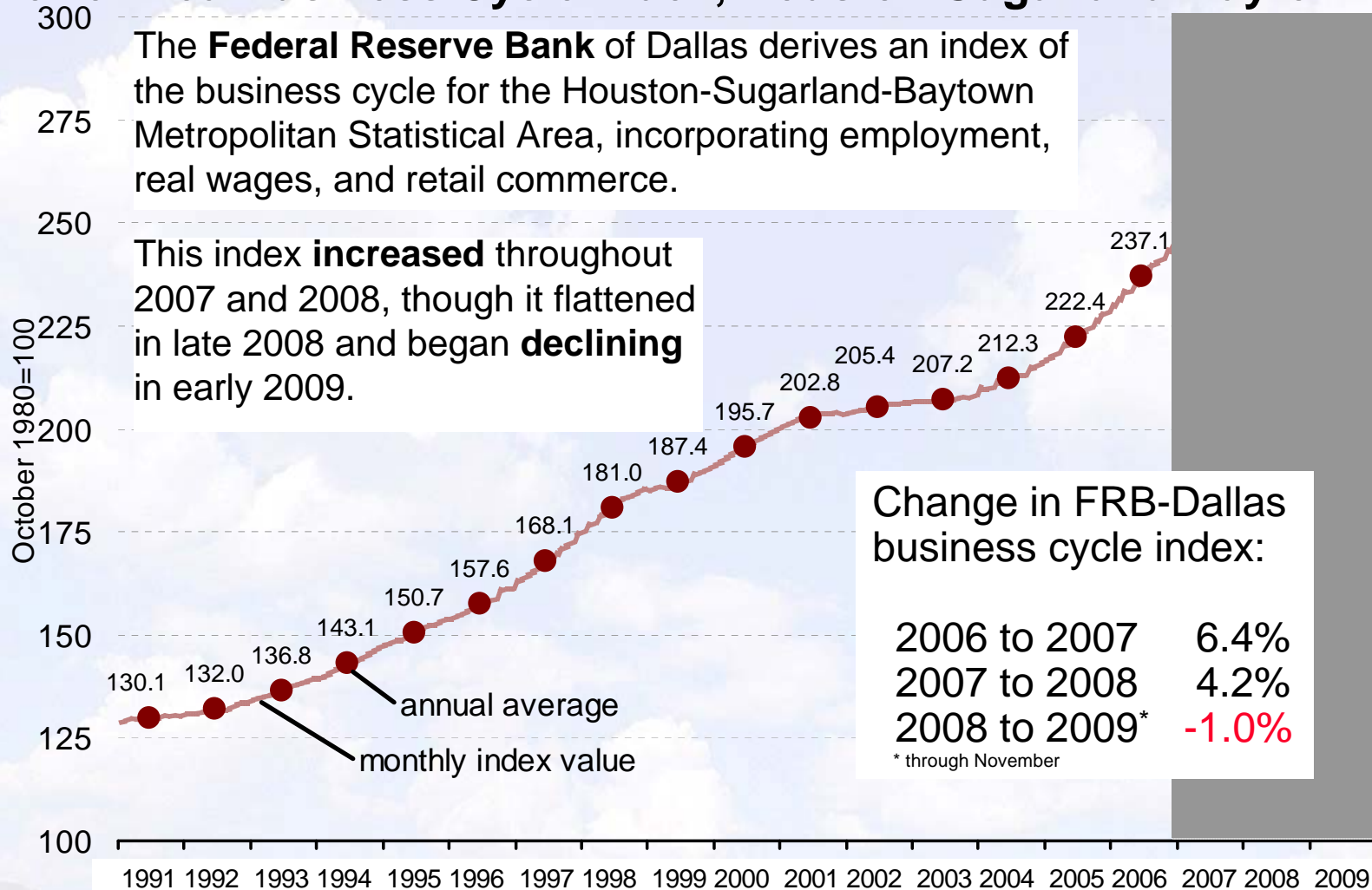
Source: Bureau of Economic Analysis, U.S. Department of Commerce <http://www.bea.gov/regional/gsp/>

\*Houston-Sugarland-Baytown Metropolitan Statistical Area (MSA) is the definition of the HGB area used by the U.S. Dept. of Commerce.

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## Economic Impact on Ozone Trends

### Metro Area Business Cycle Index, Houston-Sugarland-Baytown\*



Source: Federal Reserve Bank of Dallas, <http://dallasfed.org/data/data/metro9.tab.htm>

\*Houston-Sugarland-Baytown Metropolitan Statistical Area (MSA) is the definition of the HGB area used by the U.S. Dept. of Commerce.

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### Metro Area Business Cycle Index, Houston-Sugarland-Baytown\*

Even though the Business Cycle Index began to decline in 2009, it is noteworthy that during each of the three years 2007, 2008, and 2009 (through November), the HSB\* area generated **greater economic activity** than in any previous year on record:

<u>year</u>	<u>average index value</u>
2000	195.8
2001	202.8
2002	205.4
2003	207.2
2004	212.3
2005	222.4
<u>2006</u>	<u>237.1</u>
<b>2007</b>	<b>252.2</b>
<b>2008</b>	<b>262.8</b>
<b>2009*</b>	<b>260.1</b>

\* through November

Despite this burgeoning economic activity, the HSB\* area continued to exhibit **reductions** in both precursor emissions and resultant ozone over those 3 years.

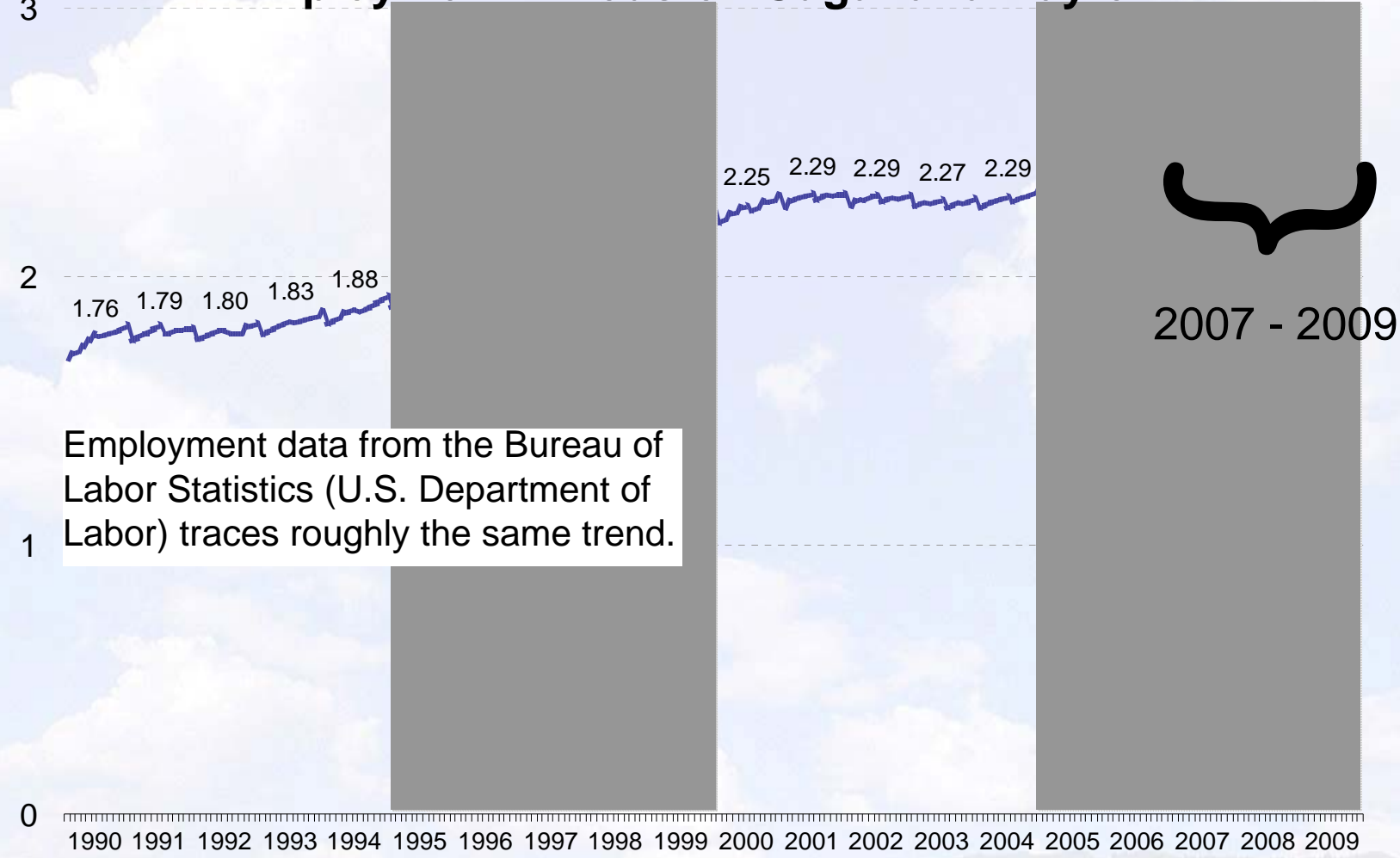
\*Houston-Sugarland-Baytown Metropolitan Statistical Area (MSA) is the definition of the HGB area used by the U.S. Dept. of Commerce.

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## Economic Impact on Ozone Trends

millions  
3

### Employment -- Houston-Sugarland-Baytown\*



Source: Bureau of Labor Statistics, <http://data.bls.gov/cgi-bin/survey/most?r6>

\*Houston-Sugarland-Baytown Metropolitan Statistical Area (MSA) is the definition of the HGB area used by the U.S. Dept. of Commerce.



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## Economic Impact on Ozone Trends

### What about the petroleum refining industry, specifically?

While the overall economies of Texas and the HGB area were not impacted by the economic downturn until early 2009, industries linked to petrochemicals and refining, which are key to HGB area air quality, also failed to exhibit a downward trend.

value of production

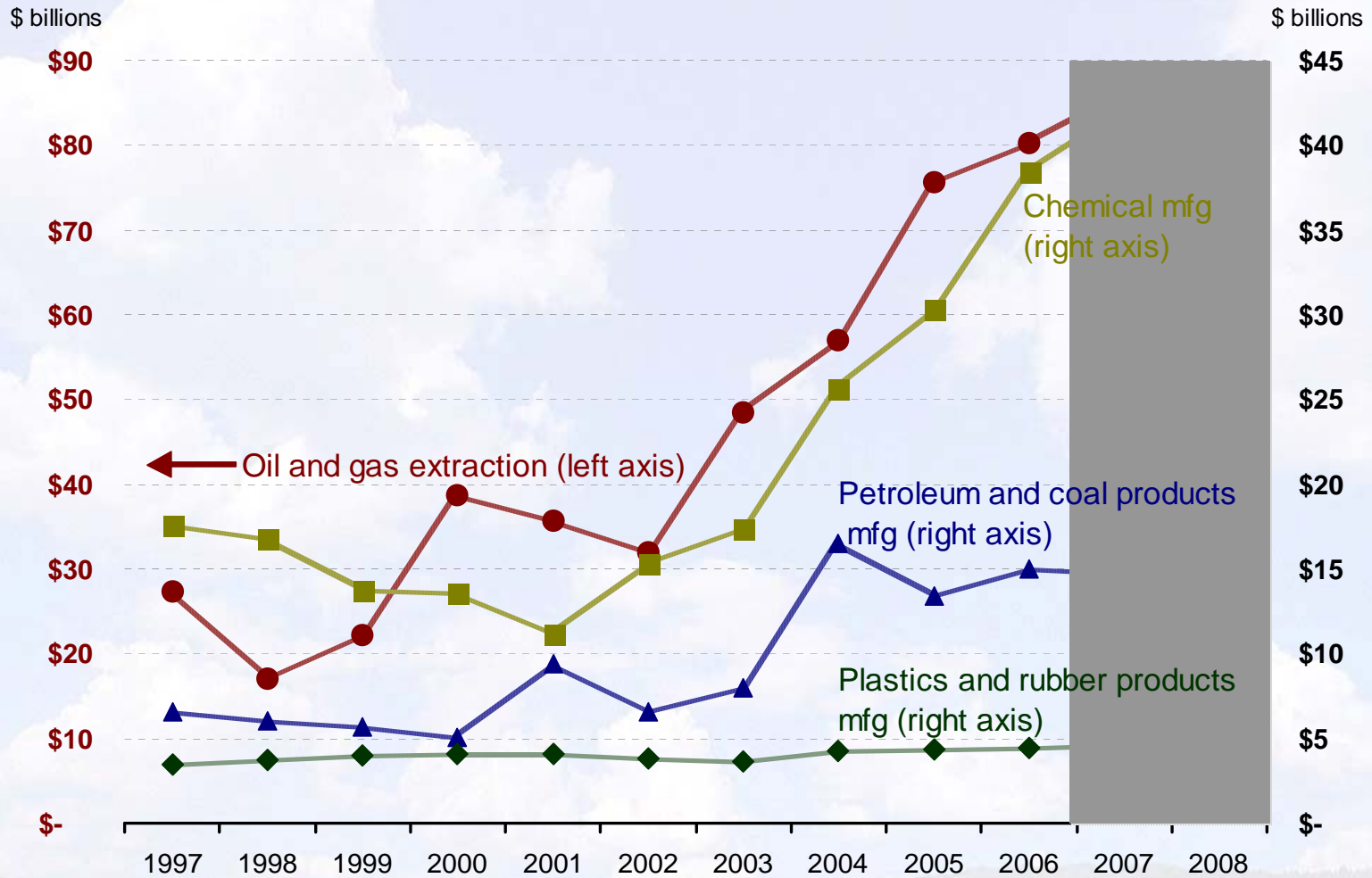
	2006	2007	increase/ decrease
	\$ million	% million	%
Oil and gas extraction	80.3	86.4	7.6
Chemical manufacturing	38.4	42.2	9.9
Plastics and rubber products manufacturing	4.5	4.6	2.7
Petroleum and coal products manufacturing	15.0	14.7	-1.9

Source: Bureau of Economic Analysis, U.S. Department of Commerce, <http://www.bea.gov/regional/gsp/>

# TCEQ Staff Recommendations

## Economic Impact on Ozone Trends

### Gross Domestic Product of Key Petroleum Related Industries



Source: Bureau of Economic Analysis, U.S. Department of Commerce <http://www.bea.gov/regional/gsp/>

# TCEQ Staff Recommendations

## Economic Impact on Ozone Trends

### Inputs to refineries corroborates these findings from the petroleum refining industry

annual averages of weekly averages

	all weeks		excl. hurricanes	
	thous bbl	% change	thous bbl	% change
2000	7154		7154	
2001	7307	2.1	7307	2.1
2002	7095	-2.9	7095	-2.9
2003	7284	2.7	7284	2.7
2004	7371	1.2	7371	1.2
2005	7044	-4.4	7407	0.5
2006	7250	2.9	7250	-2.1
2007	7352	1.4	7352	1.4
2008	6910	-6.0	7131	-3.0
2009	7090	2.6	7090	-0.6

According to data from the EIA, inputs to PADD 3\* refineries have been declining, on average, since peaking the week of July 1, 2005 at just over 8 million barrels.

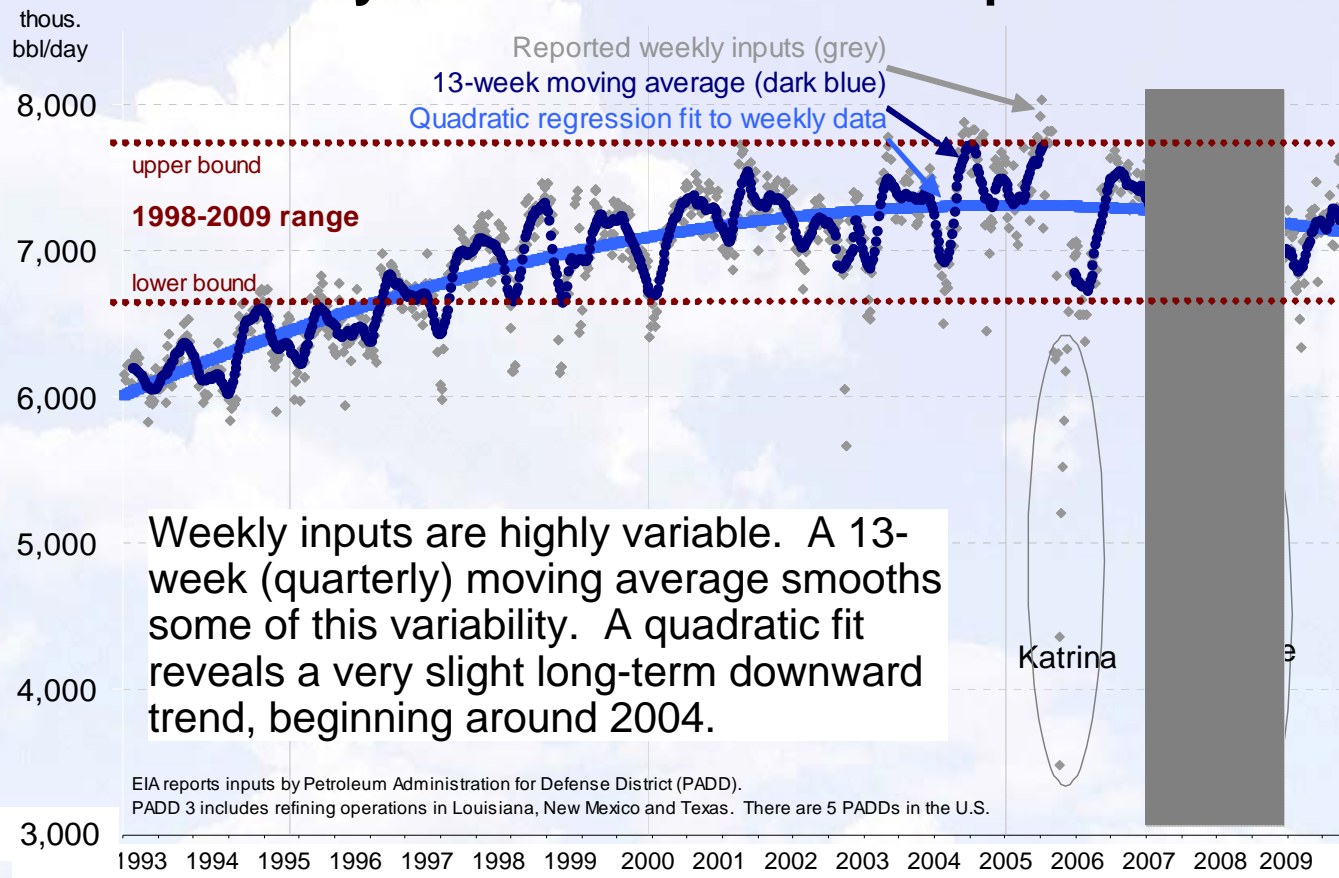
Since 2005, PADD 3 inputs to refineries have generally dropped, at a rate of about **-0.8%** per year, even when hurricane-affected periods in 2005 (Katrina, Rita—11 weeks) and 2008 (Ike—6 weeks) are excluded.

\*The Energy Information Admin. of the U.S. Dept. of Energy reports weekly refining activity along the Gulf Coast (termed Petroleum Administration for Defense District (PADD) 3), which includes the HGB area.

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### Weekly Gulf Coast Crude Oil Inputs to Refineries (PADD 3)



Weekly inputs are highly variable. A 13-week (quarterly) moving average smooths some of this variability. A quadratic fit reveals a very slight long-term downward trend, beginning around 2004.

EIA reports inputs by Petroleum Administration for Defense District (PADD). PADD 3 includes refining operations in Louisiana, New Mexico and Texas. There are 5 PADDs in the U.S.

Source: U.S. Dept. of Energy, Energy Information Admin., <http://tonto.eia.doe.gov/dnav/pet/hist/w/crip32w.htm>

The moving average reveals seasonal cycles as refineries ramp up production for periods of high product demand.

Although inputs to refineries appear to be on a slight downward trend since 2007, they have actually been increasing since early 2009, though this is likely a cyclical phenomenon.

In fact, neither high nor low values of the quarterly average since 2007 have strayed beyond the highest or lowest values observed over the previous decade suggesting the industry as a whole has neither grown nor shrunk markedly.

# TCEQ Staff Recommendations

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### Capacity utilization corroborates these findings from the petroleum refining industry

annual average of weekly averages

	utilization rate <hr/> %	change <hr/> %
2000	92.3	
2001	92.2	-0.2
2002	89.9	-2.5
2003	91.8	2.1
2004	92.3	0.5
2005	90.4	-2.1
2006	89.4	-1.1
2007	88.7	-0.7
2008	84.9	-4.3
2009	84.0	-1.1

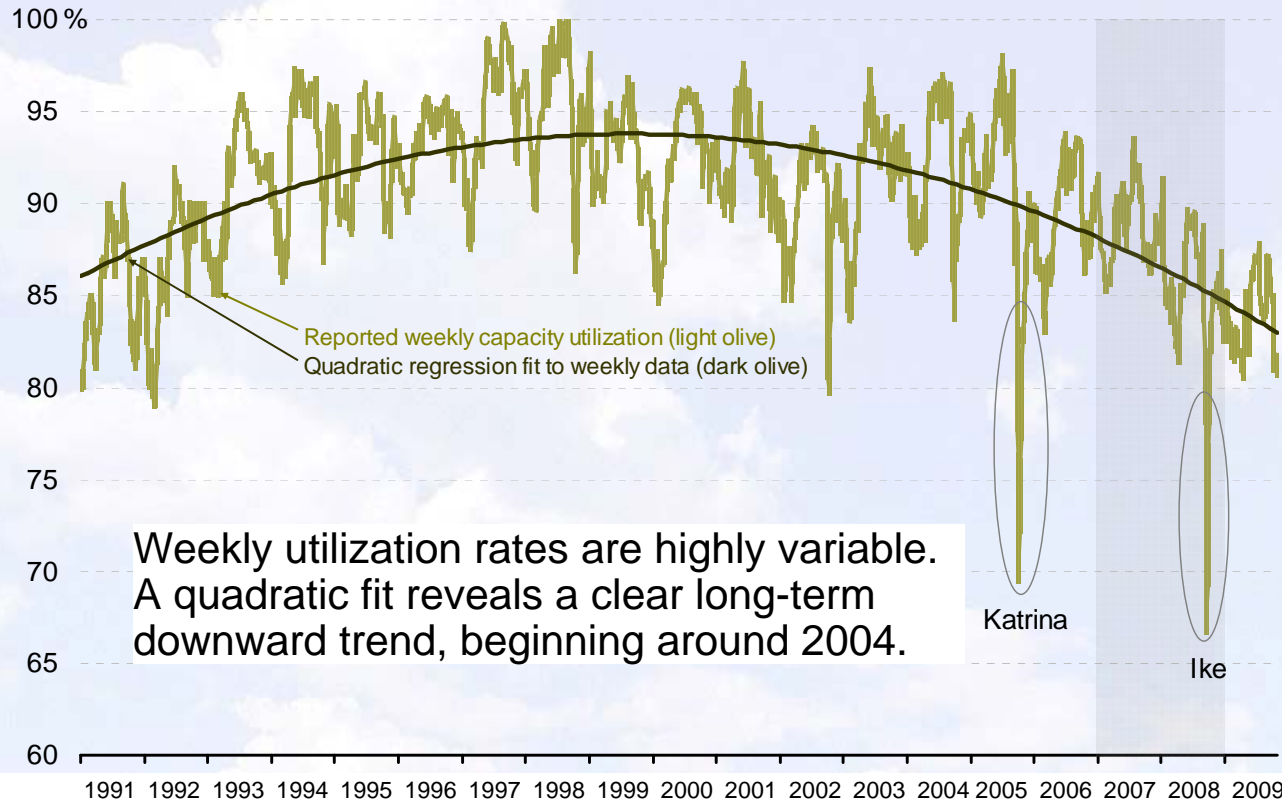
When considered on an annualized basis to smooth out short-term fluctuations, average capacity utilization decreased **-0.7%** from 2006 to 2007, **-4.3%** from 2007 to 2008, and **-1.1%** from 2008 to 2009.

Since 2000, capacity utilization has decreased -8.3 percentage points, from 92.3% to 84.0%, or about **-9%**.

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### Weekly Percent Utilization of Refinery Operable Capacity (PADD3)



Capacity utilization peaked in 1998 at 100.5% of operable capacity. Since then, despite considerable seasonal variation, it has fallen to about 84%, on average. The quadratic regression fit shows a downward trend since about 1999.

The decade-long duration of this downward trend corroborates the earlier conclusion that the refining industry may be experiencing phenomena **unrelated** to the national recession that began in 2007. The recession, though severe in many areas of the country, is not apparent in the refining industry and is likely not the primary determinant of PADD3 activity.

Source: U.S. Dept. of Energy, Energy Information Admin.

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## Economic Impact on Ozone Trends

### Conclusions

While Texas and the HGB area avoided the worst of the economic downturn in 2007 and 2008, there has been a noticeable effect beginning in 2009. Gross domestic product (GDP), employment and retail activity continued to grow throughout 2007 and 2008, but began declining in 2009.

The petrochemical industry has exhibited long-term declining trends in inputs to refineries and capacity utilization. However, these trends began long before 2007 and are likely the result of larger scale factors in the industry. Increases in the value of production in the industry may be due to concomittant increases in prices of crude oil and refined products.

While the impacts of these phenomena on air quality in the HGB area are unclear, there is no evidence that ozone and precursor emissions could have been impacted by economic factors as early as 2007 or 2008.