

Report #:DOE/EIA-0383(2006)  
 Release date full report: February 2006  
 Next release date full report: February 2007

**Table 9. Macroeconomic model estimates of economic impacts from oil price increases (percent change from baseline GDP for an increase of \$10 per barrel)**

<i>Estimate</i>	<i>Year 1</i>	<i>Year 2</i>
<b>Global Insight, Inc.</b>		
<i>Real GDP</i>	-0.3	-0.6
<i>GDP price deflator</i>	0.2	0.5
<i>Unemployment</i>	0.1	0.2
<b>U.S. Federal Reserve Bank</b>		
<i>Real GDP</i>	-0.2	-0.4
<i>GDP price deflator</i>	0.5	0.3
<i>Unemployment</i>	0.1	0.2
<b>National Institute of Economic and Social Research</b>		
<i>Real GDP</i>	-0.2	-0.5
<i>GDP price deflator</i>	0.3	0.5
<b>Average</b>		
<i>Real GDP</i>	-0.2	-0.5
<i>GDP price deflator</i>	0.3	0.4
<i>Unemployment</i>	0.1	0.2

Report #:DOE/EIA-0383(2006)  
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Next release date full report: February 2007

**Table 10. Time-series estimates of economic impacts from oil price increases (percent change from baseline GDP for an increase of \$10 per barrel)**

<b>Quarter</b>	<b>Asymmetric</b>		<b>Net price increase</b>
	<b>Price increase</b>	<b>Price decrease</b>	
4	-0.048	-0.014	-0.046
6	-0.051	0.002	-0.058
8	-0.046	0.011	-0.054
10	-0.044	0.010	-0.048
12	-0.042	0.010	-0.043

Report #:DOE/EIA-0383(2006)  
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*Table 11. Summary of U.S. oil price-GDP elasticities*

<i>Price effect</i>	<i>Year 1</i>	<i>Year 2</i>
<b><i>Higher oil price</i></b>		
<i>Real GDP</i>	-0.011	-0.021
<i>GDP price deflator</i>	0.007	0.017
<i>Unemployment rate</i>	0.004	0.007
<b><i>Oil price shock</i></b>		
<i>Real GDP</i>	-0.024	-0.050
<i>GDP price deflator</i>	0.019	0.034
<i>Unemployment rate</i>	0.009	0.020

Report #:DOE/EIA-0383(2006)  
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 Next release date full report: February 2007

**Table 12. Economic indicators in the reference, high price, and low price cases, 2005-2030 (percent)**

<i>Indicator</i>	<i>2005-2010</i>	<i>2010-2015</i>	<i>2015-2020</i>	<i>2020-2025</i>	<i>2025-2030</i>	<i>2005-2030</i>
<b>Reference case</b>						
<i>Average annual growth rates</i>						
<i>Oil price</i>	-2.3	-0.5	0.9	1.3	0.8	0.0
<i>Real GDP</i>	3.2	2.9	3.1	2.8	2.8	3.0
<i>Potential GDP</i>	3.3	2.4	2.6	2.8	2.8	2.8
<i>Consumer price index</i>	2.0	2.7	3.0	3.0	2.8	2.7
<i>5-year averages</i>						
<i>Federal funds rate</i>	4.6	5.4	5.4	5.1	5.0	5.1
<i>Unemployment rate</i>	4.8	4.7	4.4	4.6	4.9	4.7
<b>High price case</b>						
<i>Average annual growth rates</i>						
<i>Oil price</i>	3.6	4.1	2.1	1.2	1.2	2.4
<i>Real GDP</i>	3.0	2.9	3.2	2.8	2.8	2.9
<i>Potential GDP</i>	3.2	2.4	2.7	2.8	2.8	2.8
<i>Consumer price index</i>	2.3	2.9	2.8	2.7	2.7	2.7
<i>5-year averages</i>						
<i>Federal funds rate</i>	4.6	5.2	4.9	4.7	4.7	4.8
<i>Unemployment rate</i>	5.0	5.2	4.7	4.7	4.9	4.9
<b>Low price case</b>						
<i>Average annual growth rates</i>						
<i>Oil price</i>	-5.6	-4.8	-0.7	0.0	0.0	-2.3
<i>Real GDP</i>	3.3	3.0	3.0	2.8	2.8	3.0
<i>Potential GDP</i>	3.3	2.4	2.6	2.9	2.9	2.8
<i>Consumer price index</i>	1.9	2.6	3.1	3.0	2.9	2.7
<i>5-year averages</i>						
<i>Federal funds rate</i>	4.5	5.5	5.6	5.3	5.3	5.2
<i>Unemployment rate</i>	4.8	4.5	4.2	4.5	4.8	4.6

Report #:DOE/EIA-0383(2006)  
 Release date full report: February 2006  
 Next release date full report: February 2007

*Table 13. Technologies expected to have significant impacts on new light-duty vehicles*

<i>Vehicle component and technology</i>	<i>Technology description</i>	<i>Expected efficiency improvement (percent)</i>	<i>Initial incremental cost (2000 dollars)</i>
<b>Engine</b>			
<i>Advanced valve train</i>	<i>Four valves per cylinder; variable valve timing and lift; camless valve actuation</i>	<i>2.5-8.0</i>	<i>45-750</i>
<i>Friction reduction</i>	<i>Low-mass pistons and valves; reduced piston ring and valve spring tension; improved surface coatings and tolerances</i>	<i>2.0-6.5</i>	<i>25-177</i>
<i>Cylinder deactivation</i>	<i>Reduced cylinder operation at light load, lowering displacement and reducing pumping losses</i>	<i>4.5</i>	<i>250</i>
<i>Lean burn</i>	<i>Direct injection fuel system, enabling very lean air-fuel ratios</i>	<i>5.0</i>	<i>250</i>
<b>Transmission</b>			
<i>Control system</i>	<i>Electronic controls, improving efficiency through shift logic and torque converter lockup</i>	<i>0.5-2.0</i>	<i>8-60</i>
<i>Transmission</i>	<i>5-speed and 6-speed automatics; continuously variable transmissions</i>	<i>6.5-10.0</i>	<i>435-615</i>
<b>Accessory load</b>			
<i>Improved pumps</i>	<i>Reduced engine load from oil, water, and power steering pumps</i>	<i>0.3-0.5</i>	<i>10-15</i>
<i>Electric pumps</i>	<i>Electrically powered pumps, replacing mechanical pumps</i>	<i>1.0-2.0</i>	<i>50-150</i>
<b>Body</b>			
<i>Improved materials</i>	<i>High-strength alloy steel; aluminum castings; lightweight interiors; aluminum body and closures</i>	<i>3.3-13.2</i>	<i>0.4-1.2 dollars per pound of vehicle weight reduction</i>
<i>Unit body construction</i>	<i>Elimination of body-on-chassis structure</i>	<i>4.0</i>	<i>100</i>
<i>Improved aerodynamics</i>	<i>Reduction in drag coefficient, with improvements specific to body type</i>	<i>2.3-8.0</i>	<i>40-225</i>
<b>Drive train</b>			
<i>Advanced tires</i>	<i>Reduced rolling resistance</i>	<i>2.0-6.0</i>	<i>30-135</i>
<i>Improved 4-wheel drive</i>	<i>Reduced weight; improved electronic controls</i>	<i>2.0</i>	<i>100</i>
<b>Independent</b>			
<i>Safety and emissions</i>	<i>Improved safety and emission systems</i>	<i>-3.0</i>	<i>200</i>

Report #:DOE/EIA-0383(2006)  
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*Table 14. Nonconventional liquid fuels production in the AEO2006 reference and high price cases, 2030 (million barrels per day)*

<i>Total production</i>	<i>Synthetic crude oils</i>			<i>Synthetic fuels</i>			<i>Renewable fuels</i>		<i>Total</i>
	<i>Oil sands</i>	<i>Extra-heavy oil</i>	<i>Shale oil</i>	<i>CTL</i>	<i>GTL</i>	<i>BTL</i>	<i>Biodiesel</i>	<i>Ethanol</i>	
<b><i>Reference case</i></b>									
<i>United States</i>	—	—	—	0.8	—	—	0.02	0.7	1.5
<i>World</i>	2.9	2.3	0.05	1.8	1.1	—	—	1.7 <sup>a</sup>	9.9
<b><i>High price case</i></b>									
<i>United States</i>	—	—	0.4	1.7	0.2	—	0.03	0.9	3.2
<i>World</i>	4.9	3.1	0.5	2.3	2.6	—	—	3.0 <sup>a</sup>	16.4

<sup>a</sup>Includes biodiesel.

Report #:DOE/EIA-0383(2006)  
 Release date full report: February 2006  
 Next release date full report: February 2007

**Table 15. Projected changes in U.S. greenhouse gas emissions, gross domestic product, and greenhouse gas intensity, 2002-2020**

<i>Measure</i>	<i>Projection</i>			<i>Percent Change</i>	
	<i>2002</i>	<i>2012</i>	<i>2020</i>	<i>2002-2012</i>	<i>2002-2020</i>
<i>Greenhouse gas emissions (million metric tons carbon dioxide equivalent)</i>					
<i>Energy-related carbon dioxide</i>	5,746	6,536	7,119	13.7	23.9
<i>Methane</i>	626	686	739	9.5	18.0
<i>Nitrous oxide</i>	335	351	366	4.9	9.3
<i>Gases with high global warming potential</i>	143	245	339	71.2	136.6
<i>Other carbon dioxide and adjustments for military and international bunker fuel</i>	62	79	86	26.7	37.2
<b><i>Total greenhouse gases</i></b>	<b>6,913</b>	<b>7,897</b>	<b>8,649</b>	<b>14.2</b>	<b>25.1</b>
<i>Gross domestic product (billion 2000 dollars)</i>	10,049	13,793	17,541	37.3	74.6
<i>Greenhouse gas intensity (thousand metric tons carbon dioxide equivalent per billion 2000 dollars of gross domestic product)</i>	688	573	493	-16.8	-28.3