



# NASSAU COUNTY LEGISLATURE

**Office of Legislative Budget Review**

## **The Economic Impact of the Increase in the Price of Crude Oil**



**Prepared by:  
Deirdre Calley, Economist**

**September 9, 2005**



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**Inter-Departmental Memo**

To: Hon. Lianne Altmann, Chairperson  
Budget Review Committee

From: Eric C. Naughton, Director  
Legislative Budget Review

Date: September 9, 2005

Re: Impact of Increase in the Price of Crude Oil

Attached please find a report prepared by the Office of Legislative Budget Review's economist, Deirdre Calley, regarding the economic impact of the increase in the price of crude oil.

If you should have any further questions, please let me know.

cc: Hon. Howard Weitzman, County Comptroller  
David Gugerty, Majority Counsel  
Mike Deegan, Minority Counsel  
Mark Young, Budget Director  
Richard Luke, Executive Director, NIFA  
Dan McCloy, Special Assistant Minority  
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Carol Trottere, Majority Press Secretary  
Marilyn Gottlieb, Director of Legislative Affairs  
Bill Geier, Clerk of the Legislature  
Fran Evans, Director of Policy  
Phil Ragusa, Deputy Director of Majority Finance  
Arnold Taubman, Economist

## **The Fiscal and Economic Impact of an Increase in the Price of Crude Oil**

On August 29, 2005 the price of crude oil reached a record high of \$70.80 on the New York Mercantile Exchange on intraday trading. Crude oil prices then retreated to close at \$67.20.<sup>1</sup> The record high was reached as a result of hurricane Katrina's impact on the Gulf of Mexico Refineries which account for a third of U.S. crude and a quarter of U.S. natural gas supplies. At least eight Gulf Coast refineries in the path of Hurricane Katrina shut down or reduced operations on August 29, 2005.<sup>2</sup> Analysts opined that crude oil prices could continue to escalate since the full extent of the damage inflicted by Katrina is still unknown.<sup>3</sup> An increase in the price of crude oil will affect the County's fiscal budget from both a revenue and expense perspective.

From a revenue perspective, if crude prices rise and consumer spending falls, County sales tax collections will be impacted. Since many variables impact County sales tax collection, it is difficult to estimate the impact of higher crude oil prices on County sales tax collections. Moreover, the impact of high oil prices can change monthly since strong job and income growth mitigates the impact of higher prices. Since County sales tax collections are directly related to the price paid, as crude oil prices rise so should our sales tax collections. However, if individuals make less discretionary purchases as the price of crude oil rises, then the quantity of taxable sales would decline. The net impact on total County sales tax collections is a function of the magnitude of the opposing forces. Historically, gasoline station sales have represented 3.2% of total Nassau County taxable sales and utility sales have represented 0.2% of total Nassau County taxable sales. Exhibit #1 details these percentages for the last six years for which the statistics are available.

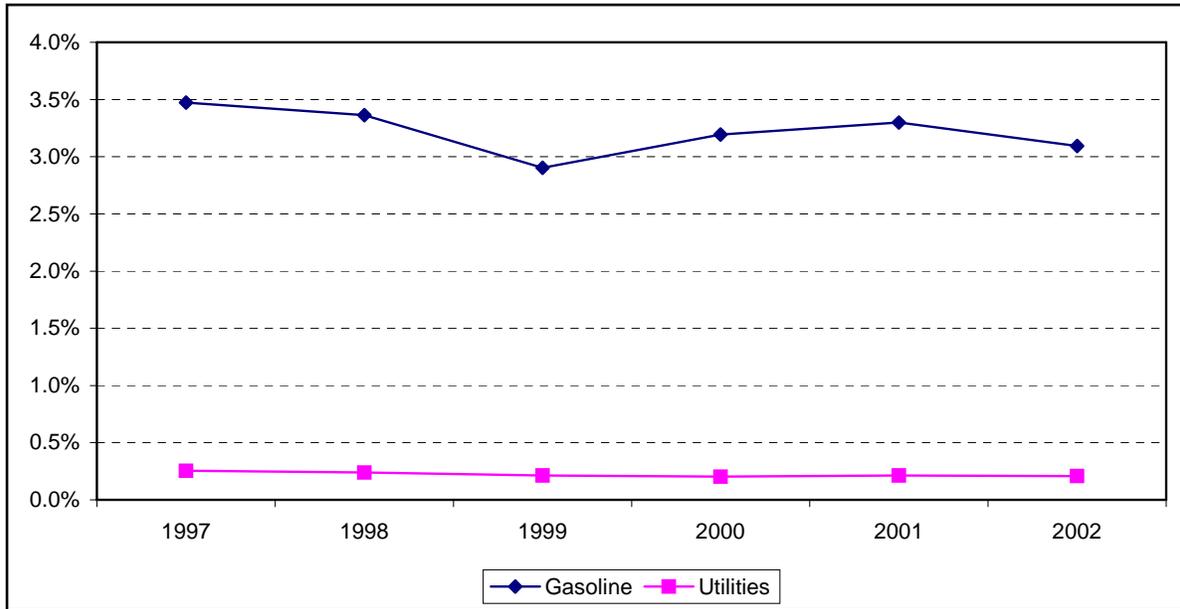
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<sup>1</sup> Gleeson, Jerry, "Storm Spins Up Heating Oil, Gas Prices", [TheJournalNews.com](http://TheJournalNews.com), August 30, 2005.

<sup>2</sup> Jahn, George, "Oil Prices Up, Traders Await Katrina Data", [1010Wins.com](http://1010Wins.com), August 30, 2005.

<sup>3</sup> "Oil Climbs Back Above \$68", [CNN/Money.com](http://CNN/Money.com), August 30, 2005.

**Exhibit # 1: Gasoline and Utilities Sales as a Percentage of Total Nassau Taxable Sales**



Source: New York State Department of Taxation and Finance

On the expense side, the County purchases several oil-based products to facilitate its daily operations. In order to accomplish its daily tasks Nassau County purchases gasoline, heating oil, electricity, motor-oil, asphalt, fertilizer and pesticides. Several County Departments use these products. The expenses are budgeted in eight sub-object codes. Exhibit #2 shown below details the amount budgeted for these purchases over the past three years. The chart must be viewed as a worst-case scenario for the amount which the County spends on oil-based products since some of the sub-object categories include purchases of non oil-based products. For example, the Highway Supplies sub-object code identifies the County's budget for the oil-based product asphalt; but is also where they budget for the paint needed to put lines on streets. As a rough approximation, 1% of the County's expense budget covers oil-based product purchases. This percentage could grow as the price of crude-oil increases.

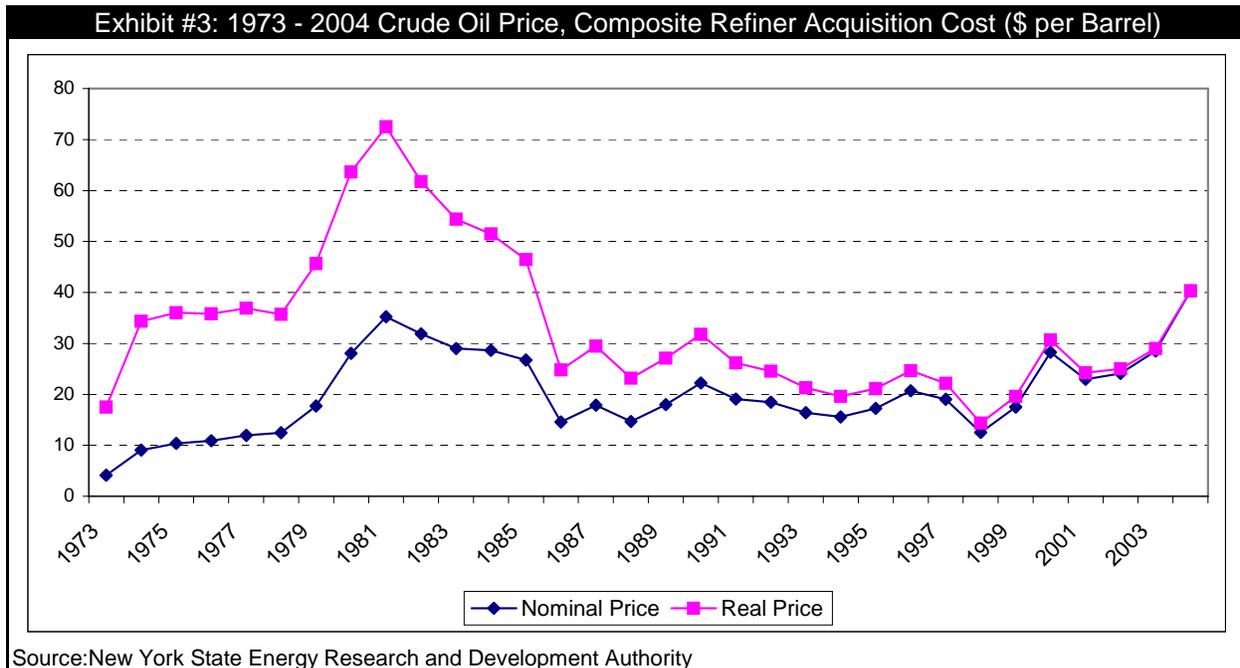
**Exhibit #2: Oil-Based County Expenditures\***

Description	2003	2004	2005
	Annual Actual	Annual Actual	Adopted Budget
Fuel	0.6	3.3	1.7
Ground & Farm Supplies	0.3	0.4	0.0
Highway Supplies	1.1	1.0	1.2
Vehicle Parts	1.0	1.6	1.5
Gas, Oil, Lubricants	0.2	0.3	0.1
Fuel	10.4	9.2	11.8
Light, Power, Water	16.4	22.9	22.0
<b>Grand Total</b>	<b>30.1</b>	<b>38.7</b>	<b>38.4</b>
<b>Oil Spending as a % of Total County Expenditures</b>	<b>1.1%</b>	<b>1.6%</b>	<b>1.5%</b>

\*The figures listed are what is reflected in the financial system. It is possible that some of the items included are miscoded and some may reflect purchases of non oil-based products.

## Factors Contributing to the Increase in the Price of Crude Oil

Since 2001, the price of crude oil has been steadily rising in both nominal and real terms. From a nominal perspective, the price of crude oil is currently at a thirty-one year high. From a real perspective, removing the effects of inflation by holding the price level constant, crude oil prices are still below the levels seen during the time period of the Iran-Iraq war, 1979 to 1985. Exhibit #3 depicts the annual price of crude oil on both a nominal and real basis.



Several factors are contributing to the increase seen in the price of crude oil. The crux of the problem is demand is outpacing supply.

On the demand side, world oil consumption is growing by more than had been anticipated. According to Guy Caruso, head of the U.S. Energy Information Administration, from 1991 to 1999 world oil demand grew annually by about 1 million barrels per day, or 1.2% of the current 84.38 million barrels daily world oil demand. In 2004, demand unexpectedly jumped 2.7 million barrels per day, or 3.2% of the current 84.38 million barrels daily world oil demand. One third of the unanticipated increase reflects greater oil demand from China.<sup>4</sup> Chinese oil consumption, currently at 6.4 million barrels per day, is expected to double by 2020.<sup>5</sup> Chinese oil consumption is rising as a result of increased resident purchasing power coupled with an inefficient and wasteful infrastructure. The increase in resident purchasing power may be seen in the auto boom currently underway. Experts estimate that by 2020 there will be 100 million vehicles on the road in China. That represents a 317% increase from their current vehicle estimate of 24 million.<sup>6</sup> In addition to the heightened auto demand, China has to contend with the fact that its current

<sup>4</sup> Samuelson, Robert J., "The Dawn of a New Oil Era?", *Newsweek*, April 4, 2005.

<sup>5</sup> "Wasteful Ways, Colossally Inefficient Use of Energy Penalizes China Twice: With High Costs and the Ravages of Pollution", *Business Week*, April 11, 2005.

<sup>6</sup> Same as above.

infrastructure is extremely inefficient. Chinese steelmakers on average use about twice as much energy as Japanese or Korean rivals per ton of output. As a result of this inefficiency, Chinese fuel consumption grew 1.5 times as fast as its economy in 2004. In most developed nations, that ratio is one-to-one or lower.<sup>7</sup>

Several factors are constraining world oil supply.

World oil supply is stymied by the lack of additional refining capacity. Any refinery currently in existence operates at full capacity and thus it is difficult for supply to rise to meet heightened demand. Outside the U.S. there is little spare capacity. According to John Kilduff, Senior Vice President of Energy Risk Management for Fimat USA, "OPEC has ended up marginalizing themselves. The increase in quotas only highlights their lack of spare capacity."<sup>8</sup> Additionally, Norway, the world's third-biggest crude oil exporter, has said that it also had limited capacity to boost output.<sup>9</sup> Inside the U.S., some refineries are operating at 99% capacity.<sup>10</sup> Refinery utilization is expected to average 95.4% this summer, up from 94.7% last summer.<sup>11</sup> Moreover, the number of domestic refiners has been falling. According to Energy Information Administration data, the number of refineries in the United States fell from 263 in 1982 to 159 in 2002. Thus, even if the world's crude oil supply could be increased, there would be no refining capacity domestically to refine the crude oil into a usable product.

Experts posit that fears of a terrorist attack on an oil refinery add a terrorism premium to the per-barrel price of crude oil. Estimates of the terrorism premium fall in the \$2.45<sup>12</sup> to \$10.00<sup>13</sup> range.

At a local level, environmental requirements, high gasoline taxes, and a lack of storage capacity cause the price of oil-related products to be high.

New York State has mandated that special additives be utilized during the summer months. Since refiners have to make special reformulations for our region, gasoline in our area costs more.<sup>14</sup>

According to the Automobile Association of America (AAA), gasoline prices change from state to state due to different fuel taxes and proximity to oil refineries and pipelines. Due to these factors, until April 2005, New Jersey was the only state in the U.S. to have an average retail gasoline price below \$2 a gallon. New Jersey has three gasoline-making oil refineries and is near four more in Pennsylvania and Delaware. Additionally, it is home to most of the petroleum storage in the New York harbor, with major distribution pipelines crossing the state.<sup>15</sup>

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<sup>7</sup> Same as above.

<sup>8</sup> Shenk, Mark, "Oil Surges to a Record on Concern Demand is Outpacing Supply", [TheJournalNews.com](http://TheJournalNews.com), March 17, 2005.

<sup>9</sup> "Oil Tops \$57 for 1<sup>st</sup> Time", [CNN/Money.com](http://CNN/Money.com), March 17, 2005.

<sup>10</sup> Lynch, David J., "Refinery Mishaps Hamper Oil Output", [USAToday.com](http://USAToday.com), August 14, 2005.

<sup>11</sup> Cohen, Stephanie I., "DOE Sees \$50-a-Barrel Oil through 2006", [CBSMarketWatch.com](http://CBSMarketWatch.com), April 7, 2005.

<sup>12</sup> Hagenbaugh, Barbara, "Attacks in Saudi Arabia Raise Oil Prices 6%", [USAToday.com](http://USAToday.com), June 1, 2004.

<sup>13</sup> Leuffer, Frederick, "A Terrorist Premium on Oil", [NationalReview.com](http://NationalReview.com), June 22, 2004.

<sup>14</sup> "Gas Soars 13 Cents a Gallon", [CNN/Money.com](http://CNN/Money.com), March 20, 2005.

<sup>15</sup> "N.J. Joins the \$2-a-Gallon Club", [CNN/Money.com](http://CNN/Money.com), April 6, 2005.

Since most of the above detailed causal factors are long-term in nature, some experts have warned that we have entered into a new realm where high oil prices are the rule and not the exception. Recently, a report by Goldman Sachs stated that, “The strength in oil demand and economic growth, especially in the United States and China ... has surprised us.”<sup>16</sup> They went on to claim that a “super spike” period is beginning in which oil prices will move towards \$105 a barrel in 2007.<sup>17</sup> Others contend that \$105 is an extreme estimate. They state that high crude oil prices decrease oil demand by encouraging conservation and alternative forms of energy.<sup>18</sup> In any case, crude oil prices seem to be on an upward trend. The U.S. Department of Energy is currently expecting crude oil prices to remain above \$50 a barrel through 2005 and 2006.<sup>19</sup> Moreover, prices should continue to rise since we have not yet reached the end of the summer driving season.

### **Economic Impact on the National Economy**

Oil-based products are essential inputs for every business and household in the nation. Every commodity produced must be transported somewhere and stored, therefore necessitating the use of gasoline, electricity and in some regions heating oil. Currently, the U.S. Department of Agriculture is forecasting crop-production income to drop by more than 15% in 2005. The decline is a result of an estimated 21% increase in the cost of petroleum products purchased by farmers. In order to run a farm, a farmer must buy fertilizers and pesticides, which are derived from petroleum and natural gas products, as well as electricity and gasoline.<sup>20</sup> Cab companies, limousine companies and food companies are further examples of other industries that have either raised prices or instituted a fuel surcharge to make up for the increased price of oil.<sup>21</sup> Exhibit #4 shows the annual appreciation rates of local home heating oil and gasoline prices over the past five years.

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<sup>16</sup> Incantalupo, Tom, “Rocketing Oil Price Predicted”, [Newsday.com](#), April 1, 2005.

<sup>17</sup> Same as above.

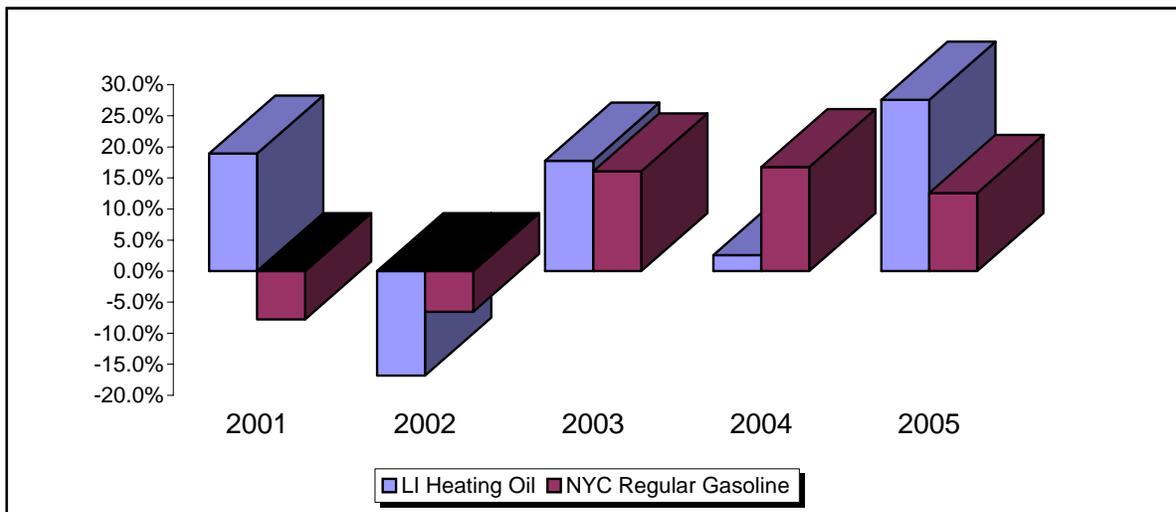
<sup>18</sup> Sivy, Michael, “High-Energy Investing”, [CNN/Money.com](#), April 4, 2005.

<sup>19</sup> Cohen, Stephanie L., “DOE Sees \$50-a-barrel oil through 2006”, [CBSMarketwatch.com](#), April 7, 2005.

<sup>20</sup> Hagenbaugh, Barbara, “Rising Fuel Costs put Strapped Farmers Over a Barrel”, [USAToday.com](#), April 3, 2005.

<sup>21</sup> Ginsburg, Janet, “The Pain of Fuel Surcharge Shock”, [Businessweek.com](#), April 28, 2005.

Exhibit #4: Annual Percentage Change in the Average Price of Heating Oil and Gasoline



Sources: NYSDERDA, "New York Home Heating Oil Price Monitoring Program", April 27, 2005. and U.S. Department of Energy, Energy Information Administration, New York City Retail Survey, August 22, 2005.

As individuals are forced to allocate more of their monthly budget towards oil-related purchases, what impact does this have on consumer spending? Consumer spending is a major driver of the nation's economy. It accounts for roughly three-quarters of economic activity.<sup>22</sup> Any decline in consumer spending would therefore negatively impact the national economy. When it comes to analyzing the effect of high energy prices on consumer spending, two schools of thought have developed.

One school of thought holds that a majority of consumer spending is a function of habit rather than need. Milton Friedman's permanent income hypothesis - that once consumers begin to believe that their incomes will increase, they think it is perpetual - is used to support this viewpoint. Spending habits are then based on the notion that consumer incomes will continue to rise.<sup>23</sup> In this scenario, higher crude oil prices will not impact consumer spending since consumers believe that in the long-run their incomes will expand to cover the additional cost.

At the other extreme, consumers are considered to enter the marketplace with well-defined preferences. They take prices as given and attempt to allocate their income to best serve their preferences.<sup>24</sup> In this scenario, as crude oil prices rise consumers must re-evaluate their preferences. Such a re-evaluation would result in less consumer spending since more of a consumer's fixed budget must go to cover energy related expenses.

In practice, the marketplace is diverse, comprised of individuals whose actions correspond to both schools of thought. The marketplace may be viewed as one where a segment operates under the perpetual income school of thought and another segment operates under the defined preferences/fixed budget model. To estimate the impact of higher crude oil prices on the

<sup>22</sup> "Spending, Income Up", [CNN/Money.com](http://CNN/Money.com), March 31, 2005.

<sup>23</sup> Waters, Jennifer, "Consumers Keep Spending Despite Gas-Price Hike", [CBSMarketWatch.com](http://CBSMarketWatch.com), March 27, 2005.

<sup>24</sup> Frank, Robert H. 2003. *Microeconomics and Behavior*. New York, McGraw-Hill Companies, Inc.

economy, one would have to quantify the relative sizes of both segments. According to a recent consumer gasoline-price-impact survey, conducted in August 2005, 58% of households are now reducing their discretionary spending.<sup>25</sup>

In interpreting the above listed estimation, one must remember that household and business oil consumption are more elastic over the long-term when individuals can replace out-dated, inefficient machines, change jobs and move residences. Some analysts have stated that the above referenced decline in consumer spending may be exaggerated since consumers faced \$2 a gallon gas price last spring/fall and have had time to adjust their budgets. Assuming that some adjustments were made, consumers may be more inured to high gasoline prices.<sup>26</sup>

### **Economic Impact on the Regional Economy**

High crude oil prices affect the regional economy in the same fashion as they do the national economy, namely through changes in consumer spending. However, the economic impact of higher crude oil prices is greater on a regional level than that experienced throughout the nation due to a colder climate and greater dependence on oil-based products.

Our regional economy is more susceptible to changes in the price of crude oil than the nation's economy since our economy is more heavily dependent on foreign oil. Foreign oil is more expensive than domestically refined oil. According to New York State Energy Research and Development Authority information, in 2002 New York State's reliance on foreign oil as a proportion of total petroleum was 85%. Throughout the nation, only 60% of total petroleum use is derived from foreign oil.

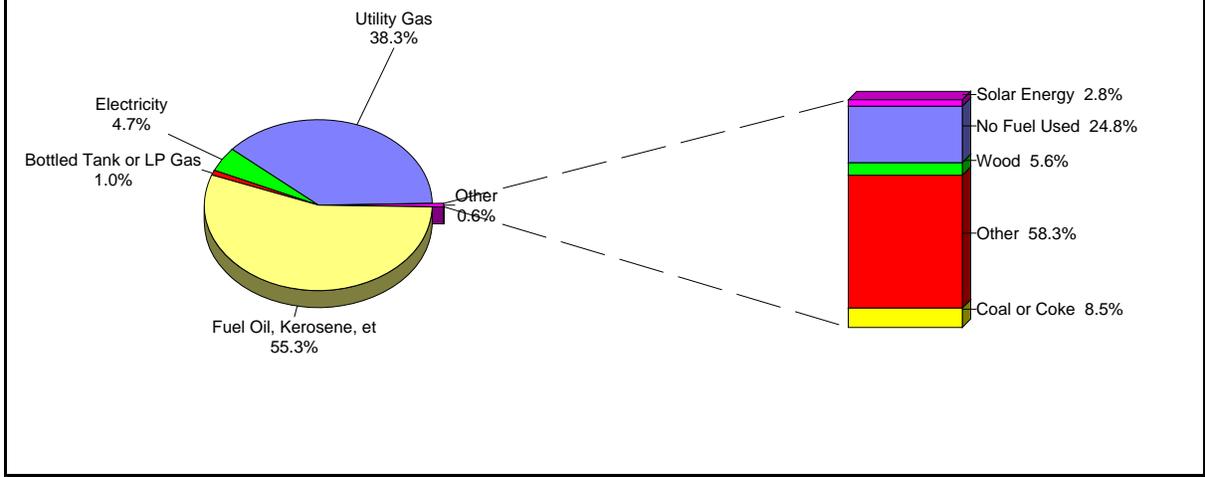
The cold winter climate makes our region more vulnerable to changes in the price of crude oil. Places with milder climates have lower oil consumption. Exhibit #5 on the next page details Nassau County households according to type of space heating in 2000.

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<sup>25</sup> "Chain store sales fall again", [CNN/Money.com](http://CNN/Money.com), August 23, 2005

<sup>26</sup> Cooper, James C. and Kathleen Madigan, "Consumers May Just Keep Flexing Their Muscles", [Business Week](http://Business Week), April 11, 2005.

Exhibit #5: Nassau Households by Space Heating Fuel in 2000

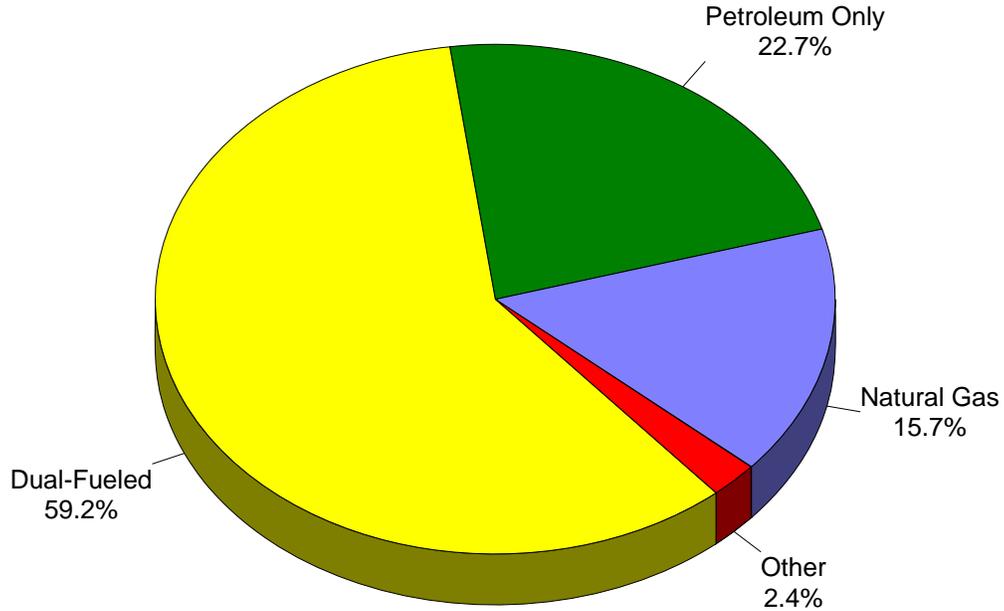


The above chart reveals that 94% of Nassau County housing units use an oil-based product to heat their house, including utility gas, bottled tank or LP gas, and fuel oil, kerosene, etc. categories. This increases our dependence on oil and leaves the region more vulnerable to swings in energy prices.

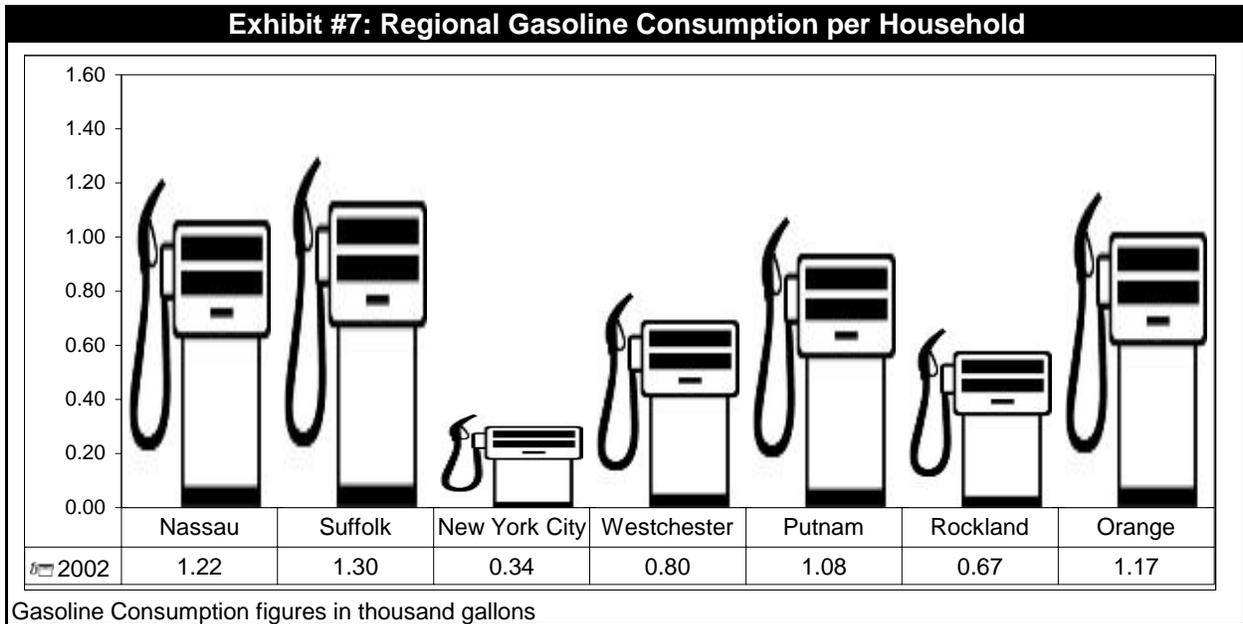
The previous chart also shows that 5% of Nassau County housing units are heated electrically. These units are also dependent on oil since New York State Energy Research and Development Authority information shows that our regional electric capacity is heavily dependent on oil. Exhibit #6 illustrates Long Island Electric capacity by fuel type. On Long Island, 98% of electric capacity is fueled by either natural gas, petroleum, or is dual-fueled. Long Island does not produce any hydro-electricity or nuclear-electricity. In other areas of New York State, hydro-electricity provides 50% or more of the existent electric capacity. An analysis of Long Island electric usage shows that the region is becoming more dependent on oil since our demand for electricity has been rising sharply. According to Long Island Power Authority figures, Long Island's population rose by 5.7% since 1998. However, compared to 1997, Long Island's electric consumption has increased 20.4%<sup>27</sup>

<sup>27</sup> Bonilla, Denise M., "Electric Use Surges: LIPA Population Survey Says LI Growth is Moderate, but Residents Using Power Heavily", [Newsday.com](http://www.newsday.com), March 23, 2005.

Exhibit #6: 2002 Long Island Electric Capacity by Type



Lastly, households on Long Island use more gasoline than housing units located in other counties located in the metropolitan area. For the seven counties in the metropolitan area, annual gasoline consumption per housing unit was calculated for this report using Census Bureau and New York State Energy Research and Development Authority data. Exhibit #7 shows that households located in Nassau and Suffolk Counties had the highest gasoline consumption.



## **Implemented Conservation Measures**

Cognizant of the County's dependence on oil-based products both the Legislature and Administration have implemented measures to conserve oil and thereby make the County's finances less susceptible to swings in the price of crude oil.

In 2005, the Legislature adopted a resolution directing Nassau County to change its purchase of electric energy to include a growing proportion of non-polluting "green" power with a goal of no less than 25% by 2010. By purchasing electricity from renewable resources, the County is simultaneously insulating itself from future changes in the price of crude oil.

Likewise, the Administration has taken steps in its procurement of oil-based products to ensure that the County decreases its oil usage, pays the lowest possible price and avoids late fees. LIPA also worked out a procedure with the County whereby LIPA can shut down our systems during off-peak hours to decrease our usage. To decrease heating oil costs, DPW has been instructed to ensure that the tanks are filled in the summer, during the off-season to ensure heating oil procurement at the lowest price. An additional benefit from the Administration moving forward on its renovation of the Old Courthouse is that the renovated building will be more efficient, resulting in lower recurring electric and heating costs.

## **Conclusion**

Hurricane Katrina stunted the growth of the U.S. economy. The entire country will experience decreased consumer spending as a result of higher oil prices and increased joblessness. Since the storm knocked eight refineries offline, prices for oil based products rose and consumers modified their spending habits. The Congressional Budget Office estimates the job loss in September 2005 to range from 150,000 to as many as a half a million. Some of that impact will be offset in coming months due to rebuilding. The Congressional Budget Office is currently predicting employment growth over the final four months of this year to be 400,000. That is down from their 600,000 to 800,000 pre-Katrina estimate.<sup>28</sup>

The long-term impact on consumer spending depends on the full extent of the damage done to U.S. refining capacity. According to Nariman Behraves of Global Insight, under a worst-case scenario, the average price of regular unleaded gasoline will be \$3.50 a gallon for the next four to six months. This would dramatically cut consumer spending and result in a 0% increase in real national GDP in the fourth quarter 2005.<sup>29</sup> However, recent reports detailing the refineries' physical loss due to Katrina have shown that the damage was less than expected. According to Bloomberg News, for example, as of September 6, 2005, five of the eight refineries shut down by the storm were back online, and two major pipelines running from the Gulf to the Northeast were back in full operation. In this regard, not only was the storm's damage less than anticipated, the Federal Government released oil from the Strategic Petroleum Reserve to help

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<sup>28</sup> Crutsinger, Martin, "Congressional Budget Office Predicts Increased Joblessness", [TheJournalNews.com](http://TheJournalNews.com), September 8, 2005.

<sup>29</sup> Wong, Grace, "Experts: \$4 a Gallon Gas Coming Soon", [CNN/Money.com](http://CNN/Money.com), August 31, 2005.

replace the shortfalls from the Gulf.<sup>30</sup> Based on these developments, it seems that the worst-case scenario will not be realized.

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<sup>30</sup> Incantalupo, Tom, “Gasoline Prices Reach Plateau”, [Newsday.com](http://www.newsday.com), September 7, 2005.