# PROJECTED STATE OIL AND GAS PRODUCTION AND PRICES, AND EFFECTS ON STATE MINERAL REVENUES

by
Manuel Lam

## Production Projection

Louisiana ranks among the top four states in oil and gas production and is second in per capita energy consumption. It has produced oil and gas for almost a century. The following section presents forecast data for oil and gas production from state regulated land and water bottoms.

The oil production average annual rate of decline over the past ten-year period was 4.8%, and the gas decline was 2%. The DNR Technology Assessment Division long-term model is projecting an average of 3.3 % decline per year for oil and a 3.2% decline per year for gas. Even though the long-term model is accurate over long periods (10 to 30 years), the short-term fluctuation (as shown in the following tables) illustrates the need of a short-term model. It is required to project production over periods of one to five years. The short-term model projections for oil and gas are shown in Tables 1 and 2.

Table 1. DNR's Short Term Crude Oil Production Projection

| | Date | Base Case (Barrels) | % Change | Low Case (Barrels) | High Case (Barrels) |
|---|---|---|---|---|---|
| Actual | FY2001/02 | 100,711,766 | -5.17% | N/A | N/A |
| Actual | FY2002/03 | 91,071,712 | -9.57% | N/A | N/A |
| Actual | FY2003/04 | 87,225,583 | -4.22% | N/A | N/A |
| Actual | FY2004/05 | 83,536,446 | -4.23% | N/A | N/A |
| Actual | FY2005/06 | 68,870,313 | -17.56% | N/A | N/A |
| Actual | FY2006/07 | 76,823,640 | 11.55% | N/A | N/A |
| Projected | FY2007/08 | 76,770,447 | -0.07% | 74,165,577 | 79,290,977 |
| Projected | FY2008/09 | 75,916,660 | -1.11% | 71,050,608 | 81,363,110 |
| Projected | FY2009/10 | 75,092,386 | -1.09% | 70,330,121 | 80,804,618 |
| Projected | FY2010/11 | 73,245,408 | -2.46% | 68,167,843 | 78,894,201 |
| Projected | FY2011/12 | 70,797,686 | -3.34% | 65,464,339 | 76,504,103 |
| Projected | FY2012/13 | 68,522,038 | -3.21% | 62,948,564 | 74,454,307 |

Factors contributing to the year-to-year deviations in oil and gas production are:

- Changes in wildcat drilling and development of marginal fields within the state
- Early capping of stripper wells by major producers
- Unstable prices of natural gas and crude oil
- Changes in environmental laws, especially those concerning salt water discharge and air quality
- World supply and demand, causing a glut or shortage depending on its growth rate
- The number of active rigs in the region
- Military conflicts or political instability in foreign producing countries
- Application of advanced technology such as 3-D and 4-D seismic
- Weather patterns

- Foreign imports
- State and local tax incentives

Table 2. DNR's Short Term Natural Gas Production Projection

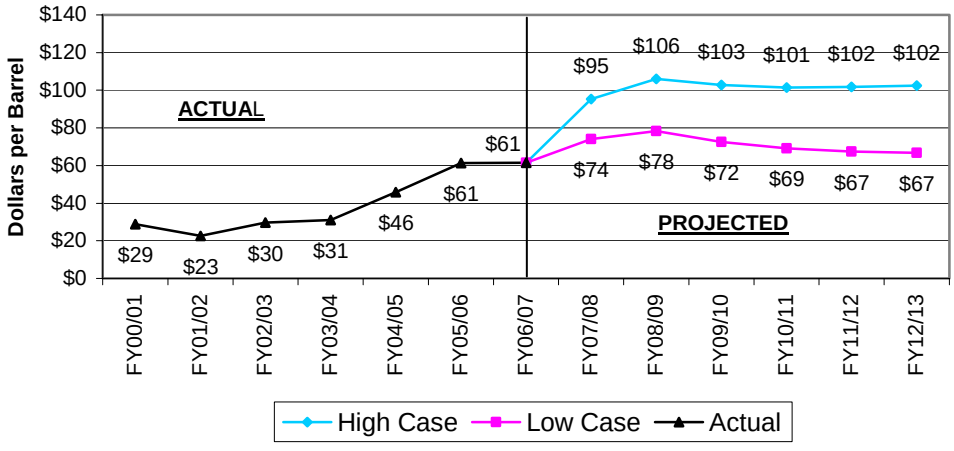
| | Date | Base Case (MCF) | % Change | Low Case (MCF) | High Case (MCF) |
|---|---|---|---|---|---|
| Actual | FY2001/02 | 1,438,954,284 | -3.67% | N/A | N/A |
| Actual | FY2002/03 | 1,345,284,191 | -6.51% | N/A | N/A |
| Actual | FY2003/04 | 1,334,038,708 | -0.84% | N/A | N/A |
| Actual | FY2004/05 | 1,355,404,766 | 1.60% | N/A | N/A |
| Actual | FY2005/06 | 1,282,002,890 | -5.42% | N/A | N/A |
| Actual | FY2006/07 | 1,352,396,057 | 5.49% | N/A | N/A |
| Projected | FY2007/08 | 1,346,995,209 | -0.40% | 1,313,766,095 | 1,372,410,923 |
| Projected | FY2008/09 | 1,308,505,554 | -2.86% | 1,240,918,575 | 1,385,771,417 |
| Projected | FY2009/10 | 1,274,981,241 | -2.56% | 1,192,074,943 | 1,366,465,942 |
| Projected | FY2010/11 | 1,237,771,654 | -2.92% | 1,152,454,593 | 1,330,338,381 |
| Projected | FY2011/12 | 1,199,439,462 | -3.10% | 1,112,271,928 | 1,292,992,623 |
| Projected | FY2012/13 | 1,160,837,489 | -3.22% | 1,073,144,600 | 1,256,294,728 |

The FY2005/06 deep decline was caused by Hurricanes Katrina and Rita, and FY2006/07 showed increases due to the recovery from the disaster rather than a reverse in production trend. In the short-term model, the following years projected volumes were lower than the long-term model projection, which can be attributed to the continued recovery and high prices for oil and gas.

## Price Projection

The following figure shows historical fiscal year crude oil prices and the projected price range from FY2007/08 to FY2012/13.

Figure 1. Louisiana Crude Oil Price Projections

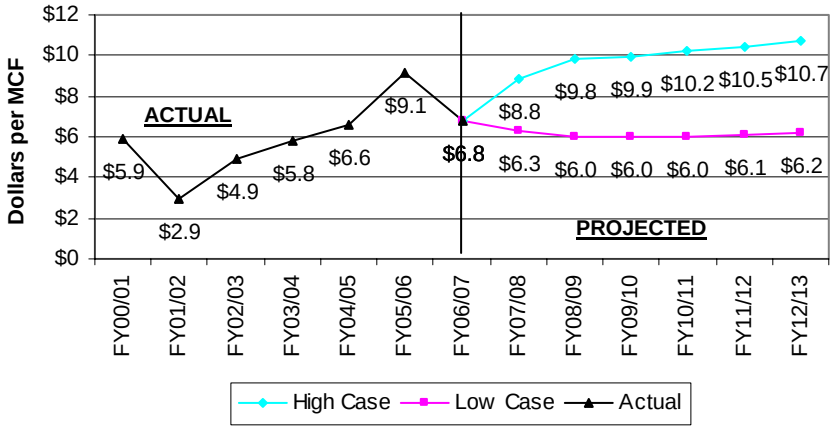



Oil prices are determined in the international markets and are difficult to project. As historical data shows great swings in the price of oil, there is also considerable uncertainty about future prices. The future price of oil is linked to the unpredictability of world oil supplies and world economics. Major factors affecting oil prices are: a) political stability of producing countries, b) world environmental issues,

c) industrialized countries conservation practices, d) weather related demand for petroleum products, e) production restraints by OPEC countries, f) economy changes in consumer nations, g) stability in labor forces, and h) wars in producing countries. If crude oil supply and demand for petroleum products are well balanced and refiners have the sufficient downstream capacity to process difficult crudes, the price of crude oil will seek a stable market condition.

The following figure shows historical fiscal year natural gas prices and the projected price range from FY2007/08 to FY2012/13.

Figure 2. Louisiana Natural Gas Price Projections




Natural gas prices recently started to behave similar to oil prices, but with a lag. The international gas market is showing its effect in the U.S. market. Natural gas is traded internationally in the form of liquid natural gas (LNG). LNG is harder to trade than oil because such trade needs a producer with large capabilities, special transport vessels, and proper receiving terminal infrastructure (regassification facilities, pipelines, compression stations, LNG tanks, etc.) and must overcome the NIMBY (not in my backyard) phenomenon from residents in areas of needed infrastructure on the receiving end. Gas prices are driven by factors such as: a) weather, b) demand for gas not satisfied by the pipeline system, c) availability of spot supplies, d) competing fuel prices, and e) worldwide LNG developments. The major cost components of natural gas prices are: • cost of infield production, • cost of transportation, • cost of marketing, and • investment rate of return. As the historical data shows, most components of natural gas prices are stable, with the exception of marketing cost. Marketing cost is the only cost that oscillates widely. Gas prices increased as regulations faded out in the early 1980's. With deregulation, natural gas started trading in the spot and commodity markets. Since 1985, this spot market for gas has grown in importance and, today, it is the major player in the determination of gas prices. In April 1990, natural gas futures contracts started trading in the New York Mercantile Exchange (NYMEX). A NYMEX gas future contract calls for delivery of 10,000 MCF of gas during a specific month, 1 to 12 months in the future. The contract delivery point of the gas is Sabine Pipe Line Company's Henry Hub terminal near Erath, Louisiana.

## Mineral Revenue Projection

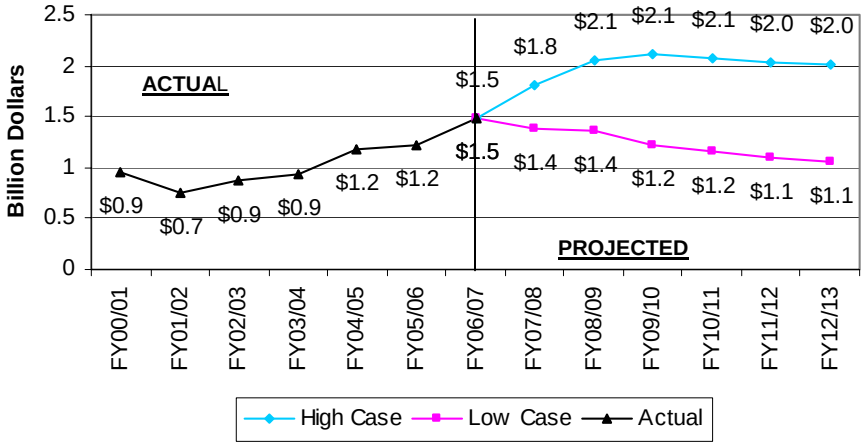
The State collects revenue in the form of severance taxes from oil and gas (O & G) production anywhere within the State's borders. If the minerals are produced from lands or water bottoms owned by the State,

the State receives additional revenue such as: bonuses before leasing the land, rentals after leasing if it is not in production or under active development, royalties and overrides if it is in production.

The sum of royalties, bonuses, rentals and override on State lands, and severance taxes will be called O&G Mineral Revenue. The O&G Mineral Revenue first peaked in FY1981/82 at $1.61 billion, the highest in history. In FY1981/82, average oil prices were around $35 per barrel, and average gas prices were around $2 per MCF. With recent oil prices above $110 per barrel and gas prices above $8 per MCF, this record might be broken despite the decline in oil and gas production from maturity in most Louisiana producing fields.

The following figure shows historical revenue from fiscal year FY2000/01 through FY2006/07, and the estimated revenue range from FY2007/08 through FY2012/13.

Figure 3. Louisiana Oil and Gas Mineral Revenue Projection




The forecasted state oil and gas prices, and O&G revenue for the next five years by the Revenue Estimating Committee are listed below.

Table 3. Forecasted State Oil and Gas Prices

| | FY2007/08 | FY2008/09 | FY2009/10 | FY2010/11 | FY2011/12 |
|---|---|---|---|---|---|
| Oil Price ($/Barrel) | 92.35 | 84.23 | 72.17 | 68.46 | 67.63 |
| Gas Price ($/MCF) | 7.85 | 8.72 | 8.36 | 7.85 | 7.91 |
| O&G Revenue ($Billion) | $1.6 | $1.7 | $1.5 | $1.5 | $1.4 |