

**THE POTENTIAL ECONOMIC BENEFITS OF PROVIDING INCENTIVES TO  
DRILL IN THE MISSISSIPPI TUSCALOOSA MARINE SHALE**

**By**

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**September 2012**

## EXECUTIVE SUMMARY

The Tuscaloosa Marine Shale (“TMS”) is a potentially significant commercial oil reservoir underlying a large area of southwestern Mississippi and southern Louisiana. This report examines the potential economic impacts to the State of Mississippi if the play proves to be economic, and also explores how the State of Mississippi could encourage continued exploration of its commerciality by incentivizing continued drilling activity. Our findings can be summarized as follows:

- Technological advances within the oil and gas industry – namely the continued refinement of horizontal drilling and hydraulic fracturing – have unlocked recoverable oil and gas reserves in **numerous shale basins** across the United States that could not have been technically or economically obtained with earlier technologies. Some of these non-conventional basins include the Eagle Ford in Texas, the Bakken in North Dakota, the Marcellus in Pennsylvania, the Utica in Ohio, and the Niobrara in Colorado, just to name a few. Indeed, commercial production of oil and gas reserves has been going on for some time in each of these areas. In light of these alternative destinations for capital investment related to E&P activity, Mississippi must consider adopting incentives in line with those in place in other states.
- The reason that Mississippi should consider drilling incentives is due to the fact that the TMS is at a competitive disadvantage when it comes to the **cost of drilling a well**. In the plays mentioned above, the average cost of drilling and completing a well falls generally within a range of \$4 million and \$8.5 million. In contrast, drilling costs alone in the TMS are currently running over \$12.6 million. Consequently, Mississippi must consider incentives to encourage continued drilling in the TMS.
- Thirdly, in the areas where these other shale basins are located, state governments have either **offered special incentives** for drilling or **their severance tax rate is significantly lower** than Mississippi's.

We also used planned expenditure data provided by Encana Oil & Gas (USA) Inc. (“Encana”) to estimate economic benefits that could result in Mississippi should the TMS prove to be commercial and the Mississippi portion of the play is fully developed. Under these assumptions, we project the following potential impacts over the 10-year period of 2013-2022:

- Sales at businesses in Mississippi could rise by over **\$93 billion**;
- Household earnings of Mississippi citizens could increase by over **\$23 billion**;
- Employment in the state could jump from an additional 5,450 jobs in 2013 to a peak of **93,216 jobs** in 2022;

- State revenues could increase by over **\$1.8 billion**.

At present, Mississippi is at a competitive disadvantage vis-a'-vis other states where with proven oil and gas shale basins because the TMS has not yet proven to be commercial. Average well costs are significantly lower in many other shale plays located in states that currently offer drilling incentives. Thus, the State of Mississippi must do whatever it can to enhance the viability of the TMS as a commercial shale play, as the short-term costs of any incentives are substantially outweighed by the enormous potential benefits to the State and its residents.

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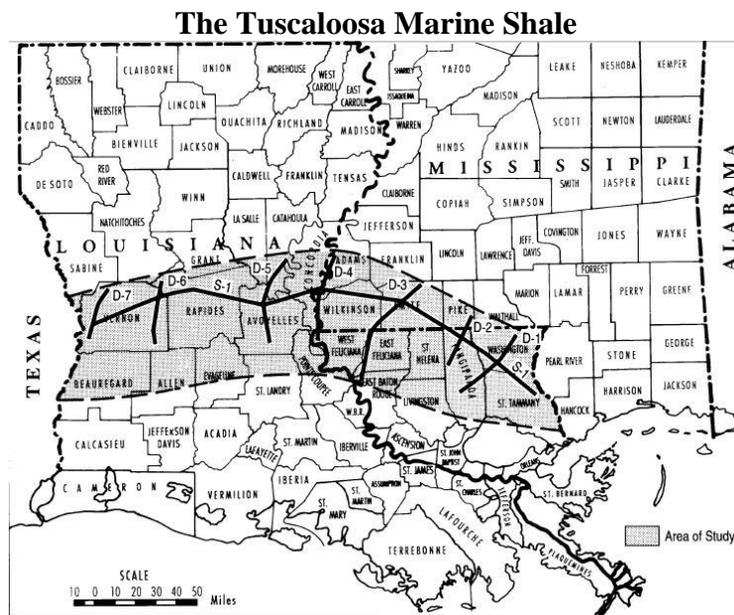
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## THE POTENTIAL ECONOMIC BENEFITS OF PROVIDING INCENTIVES TO DRILL IN THE MISSISSIPPI TUSCALOOSA MARINE SHALE

### I. Introduction

The Tuscaloosa Marine Shale (TMS) is a tight liquids play that runs across the lower middle portion of Louisiana and into a section of Southwest Mississippi (see Map 1). It is a sedimentary rock formation that consists of organic-rich, fine-grained materials that existed across the Gulf Coast region about 90 million years ago. Geologically, it is considered to be very similar to the Eagle Ford though it is thought to be a younger formation.

**Map 1**



A 1997 study by LSU's Basin Research Institute scientists indicated the TMS held an estimated seven billion barrels of oil.<sup>1</sup> Recently, at least ten independent oil exploration companies – Encana, Anadarko, Devon, Indigo II, Denbury Onshore,

<sup>1</sup> Chacko, et al., "An unproven Unconventional Seven Billion Barrel Oil Resource: The Tuscaloosa Marine Shale", Basin Research Institute, 1997 Bulletin, Volume 7.

Exchange Exploration, Justiss Oil , EOG Resources, Halcyon Resources, and Goodrich Petroleum– have leased acreage in the TMS in Louisiana.<sup>2</sup>

Unlike in Louisiana, the State of Mississippi provides no incentives to encourage exploration firms to drill in the Mississippi portion of the TMS. This report can be broken into two broad sections. The first addresses the question of **why incentives would even be necessary**. We will make the case that Mississippi is in intense competition with other states for E&P investment, and the provision of incentives is necessary to attract drilling activity to the state. In the second section we address the question of **the potential economic impacts to the State should the play prove commercial. The enormous potential benefits to the State of full-scale development – including new business sales, household earnings, job creation, and state tax collections – justify any incentives the State might adopt to encourage continued exploration activity in Mississippi.**

## II. Why Are Incentives Necessary?

If the TMS was the only shale play in the U.S., and it was located entirely within the State of Mississippi, there would be no need for the state to provide any incentives. The state would have a monopoly on shale oil, and if firms wanted to drill for shale oil then they would have do so in Mississippi.

### **There Are A Number of Proven Shale Oil Basins Across the U.S.**

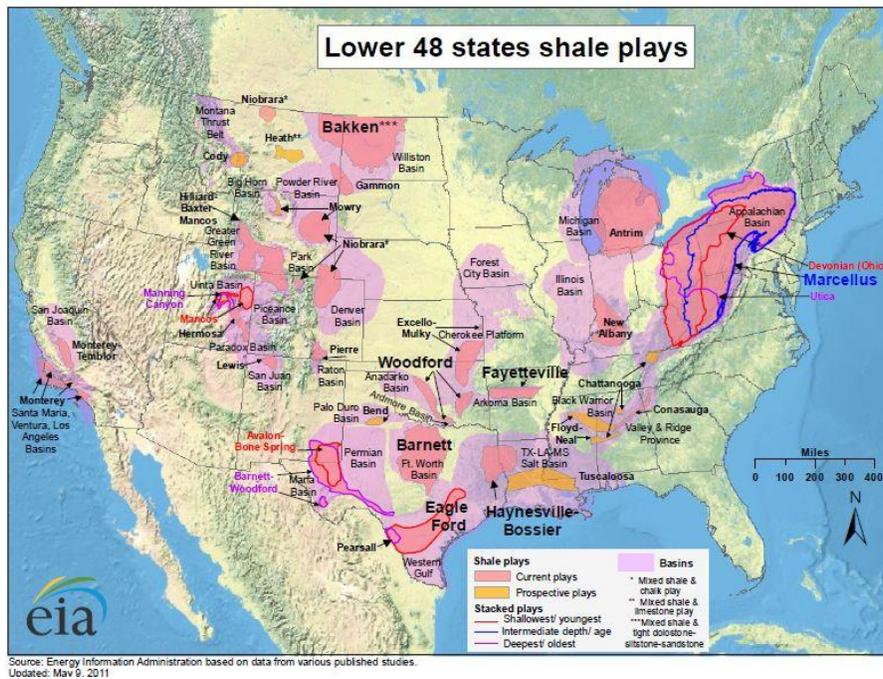
As it turns out, however, that is far from being the case. As seen in Map 2, shale oil basins exist all over the U.S. Currently, the two most prolific of these plays are the Bakken Shale, primarily located in North Dakota, and the Eagle Ford in South Texas. Others include the Niobrara in Colorado and Wyoming, the Utica that extends from New

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<sup>2</sup> <http://dnr.louisiana.gov>

York down to West Virginia, the Monterey-Santos in California, and the Avalon in West Texas. (Note that Map 2 shows the natural gas shale plays as well.)

**Map 2**



### The TMS Is a New Area of Exploration and Remains Unproven

Another factor that places Mississippi at a competitive disadvantage is that activity in some of these other plays has been going on for some time. For the most part, the technical and operational nuances inherent to each of these plays have been resolved and they have proven to be economic. The Bakken Shale, for example, was producing only 10,000 barrels per day (b/d) as recently as 2003. By July 2012, the production rate had increased by a factor of 66 to 660,000 b/d.<sup>3</sup> Indeed, in that same month the State of North Dakota surpassed Alaska and became the second largest producer of crude oil in the U.S., second only to Texas. There was speculation in the April 2012 Oil and Gas Journal that Bakken would surpass Prudhoe Bay as the largest field ever in the U.S.

<sup>3</sup> Geology.com, "Bakken Crude Production is Rising", August 17, 2012.

While the Prudhoe Bay Field sustained a 1.5 million b/d rate for 9 years, it is estimated that the Bakken could sustain that rate for 25 years.<sup>4</sup> As of July 2012, almost 3,500 wells had been drilled in the Bakken Shale.<sup>5</sup>

Close on the heels of the Bakken Play is the liquids-rich area of the **Eagle Ford Shale** in South Texas. Exploration began there in 2008, and 1,700 wells were drilled there in 2011 alone.<sup>6</sup> Oil has been profitably produced from the Eagle Ford for some time now. In fact, a 2012 HIS study examined (1) typical well performance and (2) peak month production in the Eagle Ford as compared to the Bakken and concluded that production from the Eagle Ford will ultimately exceed that from the Bakken Shale.<sup>7</sup>

By February 2012, 138 wells had been drilled in just the Ohio portion of the **Utica Shale**, and drilling has been going on in the **Niobrara** since at least 2009. Significant amounts of oil have also been produced from the **Granite Wash** since the mid-2000s.

In short, there are a number of shale oil basins across the U.S. that have proven to be commercially productive. Drilling activity in the TMS, in contrast, has only recently begun, and while it is clear that there is oil and gas in the ground, its commercial viability has not been proven. Incentives are therefore necessary to enhance the viability of capital investment in the Mississippi TMS as well as to ensure that Mississippi remains competitive with the numerous other shale oil opportunities across the country.

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<sup>4</sup> James Mason, "Bakken's maximum Potential Oil Production Rate Explored", Oil & Gas Journal, April 2, 2012, p. 84.

<sup>5</sup> "Treasure Map Reveals Extent of Bakken Drilling Activity, Bismarck Tribune, July 25, 2012.

<sup>6</sup> Oil & Gas Financial Journal, August 2012, p. 46.

<sup>7</sup> [http://www.ogj.com/articles/2012/07/ihs-eagle-ford-shale-compared-favorably-with-bakken-formation.\\_printArticle.html](http://www.ogj.com/articles/2012/07/ihs-eagle-ford-shale-compared-favorably-with-bakken-formation._printArticle.html)

### **TMS Well Costs Are Significantly Higher Relative to Other Proven Shale Plays**

Another area where the Mississippi TMS faces a comparative disadvantage is in the **cost of drilling and completing a well** compared to other shale plays. In surveys the author conducted among exploration companies for another study, those companies reported well costs in the **Eagle Ford Shale** of approximately \$6 million. EOG recently reported that its average well cost in the Eagle Ford was \$5 million.<sup>8</sup> In the **Marcellus Shale**, costs were very comparable, ranging from \$5.8 million to \$6.4 million.<sup>9</sup>

In the **Niobrara**, Encana reported that it cost the company \$5.4 million to drill and complete a 7,300 foot deep well<sup>10</sup>, while it cost Noble Energy \$8 million to drill and complete a 9,000 foot well.<sup>11</sup> Anadarko Petroleum has drilled 11 wells in the Niobrara with an average cost per well of \$4 million to \$5 million.<sup>12</sup> Data indicate the average well cost in the **Granite Wash** ranges from \$5.5 million-\$6.5 million.<sup>13</sup> Due to rising labor costs, Occidental Energy reports that the cost of bringing a **Bakken** well into production has risen from \$6.5 million in 2011 to \$8.5 million in 2012.<sup>14</sup> Whiting Petroleum, on the other hand, has maintained an average well cost of \$6 million to \$7 million in the Bakken by reducing drilling times and by adopting a new "sliding sleeve" fracking technique.<sup>15</sup>

What this review tells us is that in those shale oil opportunities with which Mississippi has to compete for drilling activity, the cost of drilling and completing a well

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<sup>8</sup> "Insight: Peak, Pause, or Plummet? Shale Oil Costs at Crossroads", Business and Financial News, www.reuters.com, May 17, 2012.

<sup>9</sup> "The Economic Impact of the Horizontal Well Severance Tax Investment Incentive", Loren C. Scott & Associates, Inc., for the Louisiana Oil and Gas Association, March 2011, pp. 4-5.

<sup>10</sup> <http://nobarashale.typepad.com/niobrara-shale/well-cost/>, June 23, 2012.

<sup>11</sup> <http://shaleblog.com/2012/horizontal-wells-are-costly/>, May 24, 2012.

<sup>12</sup> <http://nobarashale.typepad.com/niobrara-shale/well-cost/>, November 14, 2011

<sup>13</sup> www.oilshalegas.com.

<sup>14</sup> "Insight: Peak, Pause, or Plummet? Shale Oil Costs at Crossroads", Business and Financial News, www.reuters.com, May 17, 2012.

<sup>15</sup> Ibid.

ranges from a low of \$4 million to a high of \$8.5 million, with most in the \$5-\$6 million range. By contrast, Encana reports that drilling costs are currently running in excess of \$12.6 million, a total that does not include the additional costs for completing the wells. After adding in the average costs of completions and facility construction, the average total well cost in the TMS is in the range of \$22 million. That is a pretty serious competitive disadvantage to overcome. One way for the state to narrow that gap is to provide incentives for continued efforts at proving the commerciality of the TMS.

### **Other States Provide Incentives**

The data in Table 1 suggests that other states have tried to stay ahead of the game when it comes to encouraging activity in the oil shale play. We surveyed fiscal officers in key states where shale oil activity is ongoing: Pennsylvania (Marcellus); Ohio (Utica); Texas (Eagle Ford); Oklahoma (Granite Wash); California (Monterey Santos); Colorado (Niobrara); and Louisiana (Tuscaloosa Marine Shale).

**Table 1**  
**Severance Tax Rates & Special Incentives Across States**

<b>State</b>	<b>Oil Severance Tax Rate: Shale</b>	<b>Special Incentives</b>
PA	0	No natural resource taxes
OH	\$0.10 per bbl	None
TX	4.6%	None
OK	7% if oil price above \$17	Horizontal wells exempt from 6/7ths of tax for earlier of well cost payback or 48 months
CA	\$0.1266 per bbl	None
CO	4%	On gross proceeds in excess of 10,000 bbl day
LA	12.5%	Tax exempt on lesser of cost of well or 24 months
MS	6%	None

Source: 2012 State Tax Handbook, Commerce Clearing House; State Revenue Department websites and publications; communications with personnel in respective revenue departments

Note that aside from Mississippi, there are four states in Table 1 that have no special incentives for horizontal drilling. However, three of these states do not really

require any incentives since their severance tax rate is so low. In Ohio, the severance tax rate is only 10 cents a barrel, in California it is just under 13 cents a barrel, and Pennsylvania has no severance tax at all. Texas has no incentive for operating in the Eagle Ford but its severance tax of 4.6% is below that of Mississippi by 23%. In Oklahoma, oil from horizontally drilled wells is exempt from 6/7ths of the state's 7% severance tax for the earlier of either the well cost payback or 48 months. Colorado charges a 4% severance tax rate but exempts the tax on oil shale until output exceeds 10,000 barrels per day. Louisiana has one of the highest oil severance tax rates in the country at 12.5%, but severance taxes is suspended for horizontally drilled wells for 24 months or the well pays out.

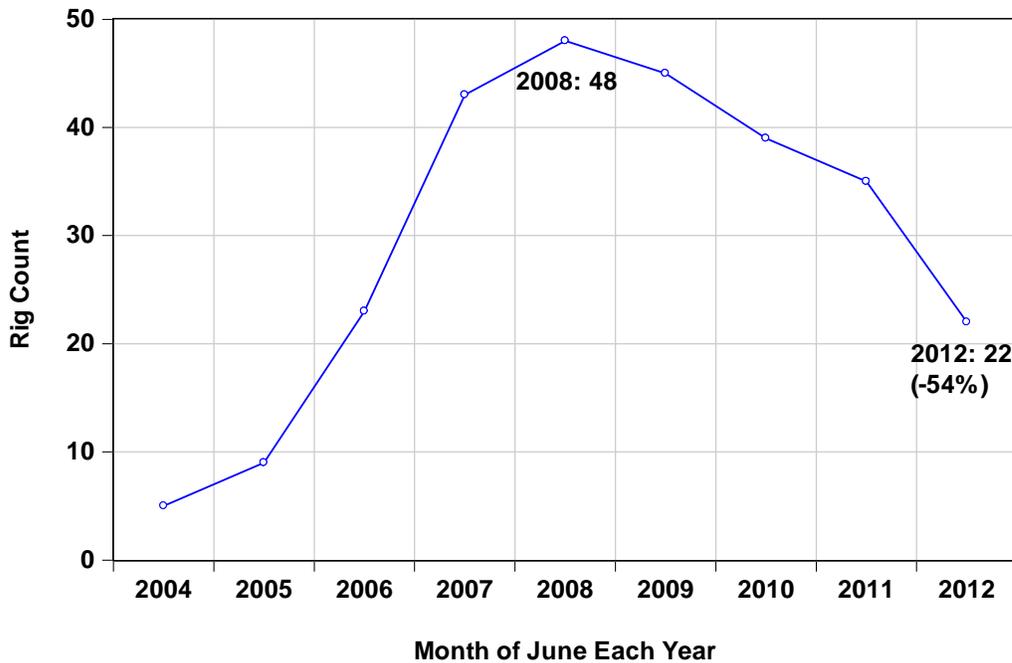
These other seven states have obviously taken into account (1) the higher costs associated with drilling in shale plays and (2) the fact that now a state must either have a relatively low severance tax rate or provide incentives to keep the activity in their state rather than losing the business to another, less costly, state. It should be apparent from comparing rate regimes across the eight states listed in Table 1 that Mississippi is at a competitive disadvantage when it comes to this metric.

### **Rigs Are Very Mobile**

There is one other final point to drive home about the competitive nature between states for drilling activity. Decision makers must understand that drilling rigs are not fixed in space and very immobile. In fact, they are **highly mobile** and will move very quickly to wherever the best opportunities exist.

This is clearly illustrated in Figures 1 and 2 which illustrate what happened to the rig count in the Fayetteville Shale and the Haynesville Shale when competitive conditions moved against these two plays.

**Fig. 1: Arkansas Rig Count:**

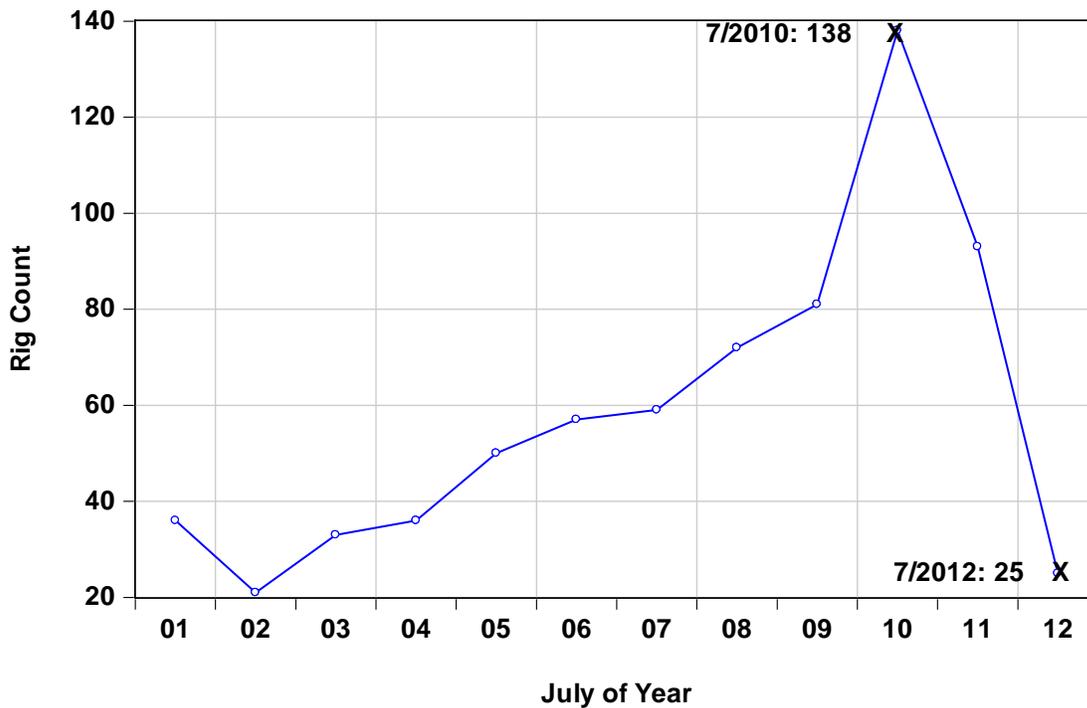


Note in Figure 1 that when the price of natural gas was relatively high (it rose from \$3.17 per mcf in 2003 to \$8.81 in 2008), the rig count in Arkansas jumped from 5 in 2004 to 48 in 2008. Two factors reversed the upward trend. First, the price of natural gas plummeted by almost 75% to an average of \$2.25 for 2012. Secondly, the Fayetteville Shale is a "dry" play, i.e., it only produces natural gas. As the price of oil has remained relatively high, rigs quickly began leaving the Fayetteville Shale when natural gas prices fell in search of better returns on capital. By June 2012, the Arkansas rig count had dropped 54% to only 22 operating rigs.

Note in Figure 2 that the experience has been much the same in the Haynesville Shale. After peaking at 138 rigs in July 2010, the rig count in North Louisiana has since

dropped by 82%, or 113 rigs, in just 24 months as rigs fled the area for other opportunities.<sup>16</sup>

**Fig. 2: Rig Count - North Louisiana**



**In summary, the State of Mississippi is at a competitive disadvantage vis-a'-vis other states that have proven shale deposits for several reasons: (1) because the Mississippi TMS is newer and as yet unproven; (2) drilling and completion costs are comparatively lower in other shale oil basins; and (3) the existence of incentives to drill in states that are competing with Mississippi for E&P investment dollars. One way for Mississippi to narrow its comparative disadvantage with these other states is to follow their example and offer special incentives to drill in the Mississippi TMS.**

<sup>16</sup> Rig count data in Figures 1-2 are from the Baker-Hughes website [http://investor.shareholder.com/bhi/rig\\_counts/rc\\_index.cfm](http://investor.shareholder.com/bhi/rig_counts/rc_index.cfm).

### III. Potential Benefits From Offering Incentives

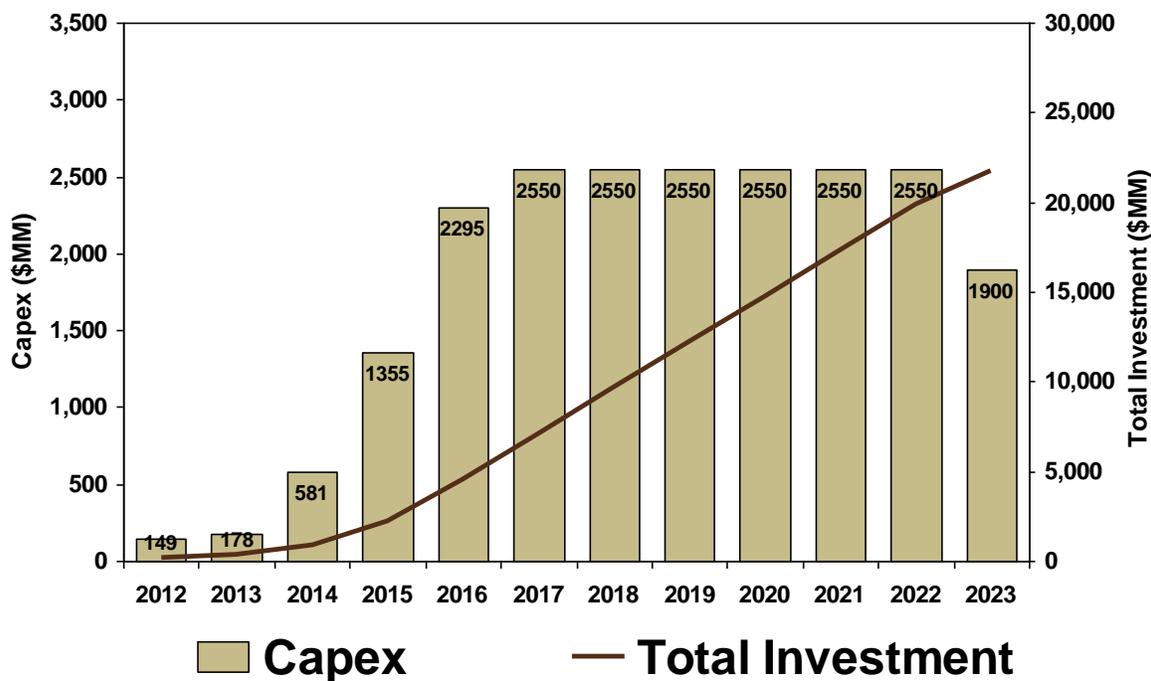
Suppose the State of Mississippi responded were to provide special incentives to drill in the TMS. What potential benefits might result for the state and its residents? The benefits will come from two main sources. First, there are the **direct benefits**. This refers to the spending that Encana and other E&P companies will undertake in the state as they attempt to harvest oil from the shale.

Secondly, there are the indirect or **multiplier effects** of the direct spending by the exploration companies. If one thinks of the State of Mississippi as one big economic pond, a rock is going to be dropped into that pond that represents all the spending by the exploration companies (the direct effects). But when that rock hits the pond, it will send ripple effects to the edge of the pond. When employees of these companies spend their paychecks in department stores, movies theaters, car dealerships, etc., that will create new sales and earnings in those firms, which will in turn be spent at department stores, movies theaters, car dealerships, and so on. When the exploration companies spend money on services and supplies in Mississippi that creates new sales and earnings in those firms, which will in turn be spent, creating even more sales and earnings, etc. This is the well-known "multiplier effect."

#### Measuring the Direct Effects

How much might exploration companies spend in the Mississippi TMS if the play is proven to be economic? We estimate these potential direct expenditures in a series of steps. First, Encana has provided us with data on their capital **expenditure** plan for the TMS. That plan is illustrated in Figure 3.

**Figure 3**  
**Encana Capital Expenditure plan for the TMS**



Note that Encana's current development schedule calls for \$149 million in capital expenditures in the TMS for 2013, and this amount could potentially rise to a whopping \$2.55 billion in 2017 before leveling off for the next five years. This is obviously a huge amount of money being injected into the TMS play.

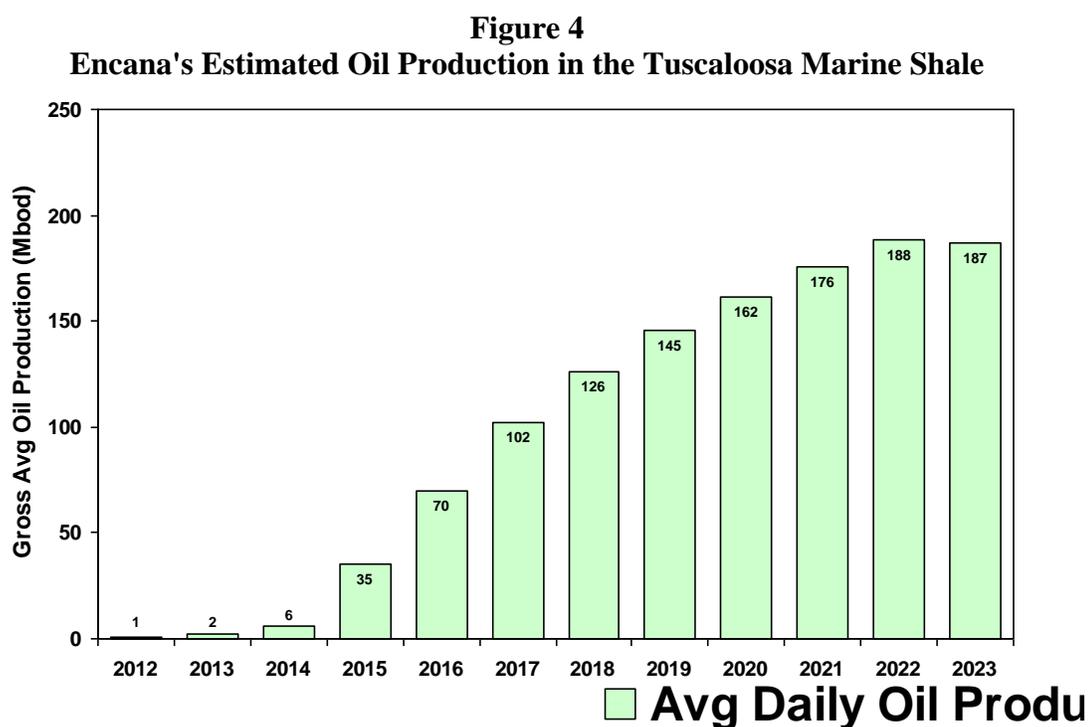
However, the monies in Figure 3 are Encana's plans to spend in the entire TMS – both Louisiana and Mississippi. For this study, we are interested only in how much is injected into the Mississippi economy. Our second step is to assume that Encana's spending in each state will be proportionate to the company's lease holdings in each state. As it turns out, approximately 80% of Encana's lease holdings are in Mississippi. So in

determining the impact on Mississippi, we begin with using only 80% of the numbers in Figure 3.

The third and final step in estimating the overall play impact is to proportionately increase the development spend estimated for current Encana acreage holdings to account for the remaining TMS acreage in Mississippi that is not held by Encana. Industry wide, a significant portion of the acreage within the highest prospective area of the play has been leased. Once the play is demonstrated to be commercially viable, the remaining un-leased, developable acreage will quickly become leased by Encana or other companies competing in the play. Encana has provided the author of this report with acreage estimates for the overall play based upon their subsurface mapping of the highest prospective areas. Encana's current leasehold is estimated to cover approximately 1/3 of the highest prospective area of the TMS play within the state of Mississippi. The assumption is made that under a TMS success scenario, expenditure timing and levels in the currently non-Encana held acreage would be similar to that estimated within the Encana held acreage. This means that the full play impact within Mississippi would be 3 times that of the Encana only development estimates. In addition, if planned delineation activity outside of the highest prospective play area is successful, Encana has indicated to the author that this could easily increase the overall impact to 4 times that of the Encana only development estimates. In effect, Encana's development plan forecast is treated as a "sample" that is proportionately increased according to the additional acreage within the play that is not currently leased by Encana.

There is a last factor that we added to the direct impacts – **royalty payments** made to landowners in Mississippi based on estimated production in the MS TMS. To

estimate the volume of these royalty payments we went through a series of steps. We start with Encana's estimate of expected production from the TMS. This estimate over 2013-2023 is shown in Figure 4. We then took 80% of this number as an estimate of Encana's production solely in the Mississippi TMS. We then assumed that Encana's production in the MS TMS would be representative of what other lease holders in the MS TMS might expect. That is, just as in the case of the capital expenditures in Figure 3, we used Encana's production as our sample of what the "full play" impact would produce in the MS TMS (i.e., three times the Encana estimate).



Our next two steps in generating the royalty payment estimate involved far more judgment so we tried to take as conservative a position as possible. We first had to make an assumption about what the **price of oil** might be by year over 2013-2022. This is especially tricky since oil prices are arguably the most difficult item in our economy to

forecast. At this writing the price of oil is close to \$100 a barrel. For projecting royalty payments we used what we believe is a conservative estimate of only \$80 a barrel. Secondly, we had to judge what the **royalty rate** would be on the oil production. Again, we used what we believe to be a conservative rate of 12.5%. We are aware of royalty rates as high as 18.5%, but chose a lower rate in order to generate conservative estimates.

### **Measuring the Multiplier Effect**

Fortunately, there is a handy tool available for measuring the multiplier effect – an **input/output (I/O) table**. An I/O table for the Mississippi Economy has been constructed by the Bureau of Economic Analysis (BEA) within the U.S. Department of Commerce. The BEA is the same governmental agency responsible for measuring the nation's gross domestic product each quarter.

This I/O table can be used to estimate three separate impacts of the exploration companies' direct spending – the impact on (1) **sales** at firms in the state, (2) **household earnings** of citizens of Mississippi, and (3) **jobs** in the state. We will also be able to estimate the impacts on state tax revenues.

### **Potential Impacts of Exploration Company Spending**

Our estimates of the total impact of potential activity in the MS TMS are shown in Table 2. Clearly, the encouragement of exploration activity in the MS TMS could have a very high payoff to the state.

**Business Sales Impacts.** As seen in Table 2, we estimate that activity in the MS TMS will boost business sales in Mississippi by over \$766 million in 2013, with this number rising to a peak of over \$12.5 billion in 2022. Over the entire 10-year period, we estimate Mississippi firms will see their sales increase by almost **\$93.1 billion**.

**Household Earnings Impacts.** Of course the metric that would interest most Mississippians is the impact on their pocketbooks. The impact on household earnings is shown in the third column of Table 2. In 2013, state citizens would see their earnings jump by over \$193 million and then rise to a peak of nearly \$3.2 billion in 2022. Over the entire 10-year period, we estimate Mississippi citizens will see their household earnings increase by almost **\$12.4 billion**.

**Job Impacts.** An equally important metric to Mississippians is the potential impact on jobs for citizens in the state. Note in Table 2 that in 2013 this number is 5,450 – a number which is quite impressive on its own. However, note that by 2022 activity in the MS TMS could support **93,216 jobs** in the state. To put this number in perspective, 93,216 jobs would be about an 8.5% increase in Mississippi's total employment of 1,090,000 in 2011.

**Table 2**  
**Potential Economic Impact of Exploration Activity**  
**In the Mississippi Tuscaloosa Marine Shale**

<b>Year</b>	<b>Total New Business Sales*</b>	<b>Total New Earnings*</b>	<b>Total New Jobs</b>	<b>Indirect Tax Revenues*</b>
2013	\$766.2	\$193.1	5,450	\$15.1
2014	\$2,523.9	\$635.9	17,938	\$49.6
2015	\$6,079.6	\$1,535.8	43,716	\$119.8
2016	\$10,396.0	\$2,628.1	75,004	\$205.0
2017	\$11,774.2	\$2,981.0	85,509	\$232.5
2018	\$11,995.2	\$3,041.4	87,660	\$237.2
2019	\$12,170.2	\$3,089.1	89,362	\$241.0
2020	\$12,326.8	\$3,131.9	90,886	\$244.3
2021	\$12,455.8	\$3,167.1	92,140	\$247.0
2022	\$12,566.3	\$3,197.3	93,216	\$249.4
<b>Cumulative</b>	<b>\$93,054.3</b>	<b>\$23,600.6</b>	<b>NA</b>	<b>\$1,840.8</b>

\*Millions of dollars

**Indirect Tax Impacts.** The data that we have discussed to this point in Table 2 also enable us to estimate the impact of all this new economic activity on the state treasury. Officials with the Mississippi Institution for Higher Learning have estimated that for every dollar of new earnings generated in the state, the Mississippi state treasury grows by about 7.8% as income taxes, sales taxes, gasoline taxes, etc., are collected when those earnings are spent. By taking the estimated new earnings in Column 3 of Table 4 and multiplying them by 7.8%, we arrive at an estimate of how much the state treasury will grow due to the potential activity in the MS TMS. This number starts out modestly in 2013 at \$15,100,000 but by 2012 it reaches over \$249 million. We estimate that over the entire 10-year period, the Mississippi treasury will collect over **\$1.8 billion**.

It is important to note that the tax column is labeled "Indirect" tax revenues. That column does not include any **direct** taxes – such as corporate income taxes or sales taxes – that these companies will pay over this 10-year period. Thus, our estimates of the impact on the state treasury should be considered very conservative.

#### **IV. Summary & Conclusions**

The Tuscaloosa Marine Shale is a tight liquids play that runs across central Louisiana into Southwestern Mississippi. This report examines why the State of Mississippi should consider to providing special incentives for exploration firms to drill in the Mississippi section of the TMS. Our findings can be summarized as follows:

- There are a number of shale oil shale plays in the U.S. where exploration companies can drill, including the Eagle Ford in Texas, the Bakken in North Dakota, the Marcellus in Pennsylvania, the Utica in Ohio, and the Niobrara in Colorado to name a few. For the most part, the technical and operational nuances inherent to each of these plays have been resolved and they have proven

to be economic. To be competitive with these plays for drilling activity, Mississippi must offer special incentives.

- The reason that Mississippi should consider drilling incentives is due to the fact that the TMS is at a competitive disadvantage when it comes to the **cost of drilling a well**. In the plays mentioned above, the average cost of drilling and completing a well falls generally within a range of \$4 million and \$8.5 million. In contrast, drilling costs alone in the TMS are currently running over \$12.6 million. Consequently, Mississippi must consider incentives to encourage continued drilling in the TMS.
- Thirdly, in the areas where these other shale basins are located, state governments have either **offered special incentives** for drilling or **their severance tax rate is significantly lower** than Mississippi's.

We also used planned expenditure data provided by Encana to estimate the

potential economic benefits to Mississippi if the MS TMS is fully harvested. We estimate that over the 10-year period from 2013-2022:

- Sales at businesses in Mississippi could rise by over \$93 billion;
- Household earnings of Mississippi citizens could increase by over \$23 billion;
- Employment in the state could jump from an additional 5,450 jobs in 2013 to a peak of 93,216 jobs in 2022;
- State tax revenues could increase by over \$1.8 billion.

Mississippi is at a competitive disadvantage vis-a'-vis other states that with proven shale deposits. That is because the Mississippi TMS is newer and unproven, drilling and completion costs are considerably lower in other shale opportunities, and a number of other states where these alternative shale opportunities are located have incentivized exploration activity within their borders. Given the potential economic benefits that could result from full development of the TMS, Mississippi must take steps to enhance its commercial viability and encourage continued exploration activity by incentivizing drilling activity.