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# **Economic Analysis of Incentives to Attract a Joint Light Tactical Vehicle Plant to Arkansas**

May 2015

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# Economic Analysis of Incentives to Attract a Joint Light Tactical Vehicle Plant to Arkansas: Preliminary executive summary

## Background and study purpose

Lockheed Martin (LM) is proposing to locate a manufacturing facility to assemble joint light tactical vehicles (JLTVs) adjacent to one of their existing plants in the Highland Industrial Park in Calhoun County in southcentral Arkansas. The Highland Industrial Park is located about six miles directly east of the City of Camden, the closest major population center, which is also the county seat of Ouachita County. The Camden site is located 95 miles west of Mississippi River, about 35 miles southeast of I-30, and a 2-hour one-way drive from the closest major airport in Little Rock. A main freight corridor of the Union Pacific, a class 1 railroad, passes just to the west of Camden so it has excellent rail access.

Ouachita and Calhoun Counties have small labor forces, 10,000 and 2,375 persons respectively in February 2015, with unemployment rates, not seasonally adjusted, of 7.5% and 6.2% that same month. IHS's current Arkansas county forecast estimates the average annual wage per job at \$45,320 in Calhoun County and \$35,250 in Ouachita. While Ouachita's total employment is higher at 7,641 jobs compared to only 2,832 jobs in Calhoun, the higher wage level in Calhoun is very likely due to the concentration of high-wage jobs in the Highland Industrial Park, a significant share of which are held by residents of Ouachita County.

LM is one of three companies that are currently competing for a contract from the US Department of Defense (DoD) to produce approximately 54,600 JLTVs between 2016 and 2040. The DoD expects to award the contract to one of the three competing firms by the end of the summer of 2015. The DoD has said that the maximum amount they would pay for each JLTV delivered to them would be \$250,000 vehicle (2011 constant \$). However, based on IHS's knowledge of the history of previous contracts for other military vehicles, such as Humvees, it is likely that the amount paid for each JLTV delivered to them could be substantially higher as additional features, technologies and enhanced sub-systems add are likely to be added.

## Total Investment and the economic incentive package

The total capital investment for the proposed JLTV facility will be \$147.313 million consisting of:

- \$98.313 million spent during 2016 and 2017 as follows: \$61.772 million to renovate and expand an existing building in the Highland Industrial Park that has been purchased by LM to house the new plant; \$27.858 million to purchase equipment; and \$8.683 million for research and development.
- \$49 million in expenditures between 2018 and 2040 comprised of \$35 million for construction and \$14 million to replace and repair machinery and equipment.

In order to attract the JLTV production facility, the State of Arkansas is proposing the following economic incentive package under Amendment 82 to the Arkansas Constitution which permits the State of Arkansas to issue general obligation bonds to finance infrastructure or other needs (e.g., land acquisition, site preparation, road improvements, utilities, etc.).

- A general obligation bond issue with a par value of \$87.145 million, whose net proceeds of \$84.645 million will be used to pay for infrastructure improvement and other items permitted by Amendment 82 during 2016 and 2017, including \$1.6 million for job training.

The State would issue a general obligation bond with a 20-year term and a 10-year call provision. Arkansas's current bond ratings are Aa1 for Moody's and AA for S&P. Based on information provided by the State's bond underwriter, the bond issue would have true interest cost of 3.38%, with level annual debt service of \$6.3 million.

The State of Arkansas will provide no other economic development incentives for the JLTV in the form of tax credits and deductions, grants, tax reductions, low interest loans, improvements, or in-kind services.

## Economic Analysis of the Incentive Package

IHS was retained by the Arkansas Bureau of Legislative Research to analyze the proposed economic incentive package. We were specifically asked to determine if the net present value (npv) of the additional major state-level tax revenues (e.g., personal income, corporate income, and sales and use) generated by the increased economic activity attributable to the construction and operation of the JLTV facility would exceed the npv of the costs incurred by Arkansas (i.e., the npv of the bond debt service). IHS conducted the analysis over a 25-year period from 2016 through the final year of scheduled production in 2040.

The first task in our analysis was to disaggregate the unit cost of the JLTV into the major types of goods and services that would be used to produce the vehicle. A senior member of the IHS Aerospace, Defense & Security (IHS ASD) group, who forecasts production levels of military vehicles like the JLTV, estimated the manufacturing input costs by major component and sub-system (e.g., armor, transmission, drive train, communication equipment, armaments, tires, etc.). IHS assessed whether the required components would be produced in Arkansas or in other states and shipped to the Camden facility for final assembly. One of the key determinants of the total increase in statewide economic activity- and tax revenues - generated by the JLTV facility will be the extent to which key components are produced and purchased from within Arkansas, or must be sourced from other states. Military vehicles like the JLTV have unique design characteristics because of their performance standards and purpose; in other words, their key components and sub-systems such as engines and transmission, are very different than those used in civilian passenger vehicles and often produced by only one or few suppliers.

Once the cost components of the JLTV had been determined, IHS performed the following steps in analyzing the economic incentive package:

- Forecast production levels by year based on DoD's announced plans to purchase 55,000 JLTVs between 2016 and 2040
- Assigned the expenditures to their correct economic sectors or NAICS code for use in the IMPLAN input-output model for Arkansas.
- Used employment and wage figures provided by the Bureau of Legislative Research to estimate annual wage payments and personal income tax payments.
- Reviewed tax revenue history for Arkansas to derive effective income tax rates for all state level taxes, with a specific emphasis on the three major state level taxes: personal income, corporate net income, and sales and use. The effective state-level tax rates were expressed as percent shares of the variables produced by the IMPLAN model – gross output, value added or GDP, employment, and labor income.
- The IHS ASD group determined which key components of the JLTV would be purchased in other states, and which inputs could be obtained from within Arkansas. The purchasing relationships for some of the key components were adjusted to account for the likelihood that some of the suppliers would move their operations into Arkansas. According to IHS ASD, the size and duration of the JLTV contract is large enough and long enough such that that an increasing share of some components will be produced in Arkansas over time. However, other key components such as the engines will very likely be produced in states for the entire term of the contract, although skilled labor will be needed at the Camden plant to assemble and test the components.
- Reviewed data for aerospace companies to determine the percent share of LM sales revenues produced by the Camden JLTV plant that will be subject to the state's corporate net income tax.
- Reviewed Arkansas's tax revenue to identify JLTV components that would be subject to the sales and use tax. The federal government will not pay sales and use tax on the JLTVs produced by the Camden plant.
- Ran multiple simulations of the IMPLAN model for Arkansas to examine the purchasing relationships and to accurately model the economic impacts of a system integrator facility like the proposed JLTV plant.

IHS took a conservative approach to our economic analysis by making the following assumptions.

- There would be no purchases of several of the key components – iron and steel used in the chassis, armor, transmission, main engine – from within Arkansas over the 25-year analysis period.
- No direct sales taxes would be generated by the operations of the JLTV plant.
- We included the economic impacts of the two-year construction phase.
- Assumed that the composition of the expenditures would remain the same over the analysis period, but that the annual levels would vary based on the number of vehicles produced each year.

- Used a discount rate of 3.38%, which is the true interest cost of the proposed bond issue, and thus represents the State's cost of capital.

## Results

Our analysis determined that the proposed JLTV project would generate positive, significant, net economic benefits to the State of Arkansas over the 25-year analysis period if it provides \$84.165 million in infrastructure improvements and job training services for the JLTV project. Stated another way, the npv of the additional state-level tax revenues generated by the increase in statewide economic activity flowing from the JLTV facility will be higher than the npv of the bond debt service by approximately \$21.7 million. The net economic benefit is about 25% higher than the npv of the costs. The primary reasons for the positive net economic benefit are:

- The proposed JLTV facility will consist entirely of net new economic activity within the state; it is not displacing any existing economic activities, nor is it activity being lured from another state.
- Even though the JLTV facility is being referred to as an assembly operation, with many of the components and sub-systems produced in other states, a system integrator facility that assembles and tests complex vehicles like the JLTV requires highly-skilled, high-paid workers, and generates substantial increases in economic output through the activities performed at the site.
- The supply chain will gradually fill in over the analysis period as some suppliers chose to locate close the Camden facility.
- The net benefits are produced primarily during the last five years of the analysis period when the incremental tax revenues are at their peaks, and when the bond debt service is no longer being paid. Using an analysis period of 20 years yield a net benefit of \$2.2 million.

Finally, we note that based on our knowledge of previous, similar military vehicle contracts, it is probable that net economic benefits will exceed our estimate for several reasons:

- The price paid by DoD is likely to be higher than \$250,000 per JLTV as additional features are added, resulting in higher sales by the Camden plant.
- The number of vehicles produced by the Camden facility over the analysis period is likely to exceed the contract amount because of sales of JLTVs to other countries, and from higher domestic demand to replace aging Humvees.

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## CONSULTING STUDY

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**Brendan O'Neil**  
Senior Director, ECR Consulting

**Phil Hopkins**  
Director, ECR Consulting

**Nelson Fisk**  
Principal Analyst, MGV

**Vardan Genanyan**  
Analyst, Industry Consulting



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## Economic Analysis of Incentives to Attract a Joint Light Tactical Vehicle Plant to Arkansas

### Background and Study Purpose

Lockheed Martin (LM) is proposing to locate a facility to assemble joint light tactical vehicles (JLTVs) adjacent to one of their existing plants in the Highland Industrial Park in Calhoun County in southcentral Arkansas. According to the Congressional Research Service, the JLTV is “an Army-led initiative to develop a family of future light tactical vehicles to replace many of the High Mobility, Multi-Wheeled Vehicles (HMMWV or humvees)”<sup>1</sup>. The Highland Industrial Park is located about six miles directly east of the City of Camden, the closest major population center, which is also the county seat of Ouachita County. Lockheed Martin has had a plant in the Highland Industrial Park for many years that produces missile components and launch system components; it currently employs 556 highly skilled workers. LM is proposing to acquire an existing building in the Highland Industrial Park and renovate and expand it to assemble the JLTVs.

LM is one of three companies that are currently competing for a contract from the US Department of Defense (DoD) to produce approximately 54,600 JLTVs between 2016 and 2040. The DoD expects to award the contract to one of the three competing firms, the others being Oshkosh and AM General, by the end of the summer of 2015. The DoD has said that the maximum amount they would pay for each JLTV delivered to them would be \$250,000 per vehicle (2011 constant \$). However, based on IHS knowledge of the history of previous contracts for other military vehicles, such as Humvees, it is likely that the amount paid for each JLTV delivered to them could be substantially higher as additional features, technologies and enhanced sub-systems add are likely to be added.

In order to attract the JLTV production facility, the State of Arkansas is proposing an economic incentive package under Amendment 82 to the Arkansas Constitution which permits it to issue general obligation bonds to finance infrastructure improvements or other needs to attract large industrial projects. Arkansas would provide \$84.645 million in infrastructure improvement and job training, paid for by proceeds from a bond issue. The details of the incentive package are described below.

IHS was retained by the Arkansas Bureau of Legislative Research to analyze the proposed economic incentive package. We were specifically asked to determine if the net present value (npv) of the additional major state-level tax revenues (e.g., personal income, corporate income, and sales and use) generated by the increased economic activity attributable to the construction and operation of the JLTV facility would exceed the npv of the costs incurred by Arkansas (i.e., the npv of the bond debt service). IHS conducted the analysis over a 25-year period from 2016 through the final year of scheduled production in 2040.

### Study Area

The Camden site is located 95 miles west of the Mississippi River, about 35 miles southeast of I-30, and a 2-hour one-way drive from the closest major airport in Little Rock. A main freight corridor of the Union Pacific, a class 1 railroad, passes just to the west of Camden so it has excellent rail access.

Ouachita and Calhoun Counties have small labor forces, 10,000 and 2,375 persons respectively in February 2015, with unemployment rates, not seasonally adjusted, of 7.5% and 6.2% that same month. IHS's current Arkansas county forecast estimates the average annual wage per job at \$45,320 in Calhoun County and \$35,250 in Ouachita. While Ouachita's total employment is higher at 7,641 jobs compared to only 2,832 jobs in Calhoun, the higher wage level in Calhoun is very likely due to the concentration of high-wage jobs in the Highland Industrial Park, a significant share of

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<sup>1</sup> Congressional Research Service, March 9, 2015. Joint Light Tactical Vehicle (JLTV): Background and Issues for Congress. RS22942

which are held by residents of Ouachita County. The small size of the local labor force is a concern, so as noted below \$1.645 million in job training will be provided during the first two year of operation.

The Highland Industrial Park currently has 2,500 employees, provides over 5 million square feet of manufacturing and warehousing space, and covers a total area of 15,000 acres. It is center of defense production activities as companies there, in addition to Lockheed Martin, include Aerojet General Corporation, Amtec Defense Product, Day & Zimmerman, General Dynamics, Raytheon Missile Systems, Rheinmetall Defence, and Spectra Technologies. The cluster of defense-related companies is significant because it shows that the local labor market is capable of meeting the demand for skilled, technical workers.

## Lockheed Martin's Proposed Camden Facility

### Activities to be performed in Camden

LM will purchase an existing building located near its current manufacturing facility in the Highland Industrial Park and then expand and renovate it to accommodate the production/assembly line for the JLTV. At a minimum the Camden plant will install an assembly line in the short run. While it is possible that manufacturing of subsystems could eventually occur at the Camden plant; it is unlikely this would happen in the early years of production. BAE Systems, LM's partner in the JLTV application, may have the expertise and equipment that can be moved from their other manufacturing facilities and built up as production increases. BAE's Sealy Texas facility has been closed and equipment at other BAE facilities where production has decreased could be used in Camden. In the Low-Rate Initial Production (LRIP) years assembly capacity shouldn't be an issue. Production of the major subsystems (e.g., engines, transmissions, suspensions) near Camden is unlikely in LRIP years. However, if Arkansas eventually gets major suppliers to the JLTV, subsystem suppliers would consider having production done locally. The benefit to being a local subsystem supplier would be cheaper labor rates and reduced shipping costs. A positive for LM would be the ability to get lower unit prices on subsystems due to the high unit production levels and economies of scale. The extent to which there is an economic incentive for major and subsystem suppliers to move operations to Camden will depend on the length of time and quantity of units produced. LM would act as systems integrator bringing all the vehicle components together and ensuring they work to meet the vehicle's performance requirements. Systems engineers are needed as modern military vehicles have more complex demands than historically has been the case. Energy and power needs are higher due to increases in Command, Control, Communications & Computers as well as the power and suspension demands for the increased armor protection.

LM has a policy that suppliers of integral components be located within 125 miles of one of their production or assembly facilities. This requirement will certainly cause these suppliers to locate facilities in or close to the Highland Industrial Park, but they will not necessarily be production sites, although they would enable suppliers to manage their contracts with LM. It will still make economic sense for suppliers of key components such as engines and transmissions to continue to produce their components at existing plants in other states to take advantage of economies of scale, sunk costs, and lower unit production costs. From a military point of view, the requirement to have suppliers of integral components be located within 125 miles would not be significant. From a manufacturing point of view, if suppliers are present within 125 miles of the Camden facility, it would reduce shipping costs and rely on a local workforce. The reduction in shipping costs could potentially reduce the costs for LM slightly, but that would depend on the degree to which the savings were passed on in the form of lower delivered costs. Using the local workforce would be a positive for Arkansas in terms of increases in both tax revenues (e.g., personal income, sales and use) and economic activity derived from the direct and induced multiplier effects.

### Production schedule and unit cost

The production schedule that IHS was able to by reviewing publicly available documents is presented below. It shows the number of vehicles that will be purchased annually by DoD for the Army and Marine Corps, including the years when production for each service branch begins and ends.



	<u>Service Ave Annual Units</u>	<u>Prod Start</u>	<u>Prod End</u>	<u>Minimum Units</u>	<u>Maximum Units</u>
US Army	1,964	2016	2040	49,099	*110,000
US Marines	688	2016	2023	5,500	*17,000

*\*Figures are estimates of the ultimate ending inventories for light utility vehicles for the services (i.e. HMMWV replacement-JLTV). The HMMWVs will remain in service until 2030 (USMC) and 2040 (USA). There are no contracts or proposals for any quantities above 49,099 and 5,500. Initial orders are approximately 1/3rd of the services' long-term light vehicle fleets.*

We note that more than 250,000 HMMWVs have been produced and delivered to US Armed Force and its military allies since 1985.

Foreign sales would increase annual production at the Camden plant, however the market is crowded and the unit price much of the world is willing to pay for a light tactical vehicle is lower than the price offered by the US and western nations. If the JLTV proves successful it would translate into a larger export market, the extent of foreign demand and sales will depend on the JLTV's unit price. Even at the long-term target price the services and program manager say will be \$250,000USD, it will be difficult for many countries to afford the JLTV in large quantities. For special operations or low quantity procurement like internal security, it is possible that the JLTV could fill the role even at \$250,000USD. If the Presidential Budget Request figures of roughly double the \$250,000USD price tag are the reality, most countries will not procure the JLTV, even in small numbers. For example, the MRAP-ATV costs approximately \$400,000USD and has had very little demand other than the UAE which procured 800. A more likely factor that would increase annual production would be in the aftermarket. This would include upgraded vehicles, resetting vehicles to factory or zero-mile condition and recapitalizing vehicles - a combination of reset with enhanced capabilities. The only factor that might inhibit this opportunity for any supplier is if the government seeks an alternate supplier. If the government keeps the rights to the technical data package (e.g., design/blueprints/specs etc.) they are free to select another supplier when a contract is up. A vehicle manufacturer with the data would be able to step in and produce the vehicle at a different location.

## Vehicle costs and components

According to IHS review of the 2016 Presidential Budget Request, the services are estimating the cost for a JLTV will be closer to \$499,000USD, double the price DoD has said it is willing to pay for JLTVs that would be produced at the Camden plant if LM is awarded the contract. This figure is an average; the Army's average price is estimated at \$553,000, the Marines at \$473,000. The often quoted figure of \$250,000 was the base vehicle cost in 2011 and does not include inflation, or more importantly, the inclusion of any additional systems.

The \$250,000 cost per vehicle, expressed in 2011 constant dollars, includes the base vehicle only, with 2/3rds of the price for the frame/chassis, cab, suspension, engine, transmission, vetronics etc. Other items that comprise the remaining 1/3<sup>rd</sup> of the price include: contractor logistic support, system technical support, testing, program management, publications and technical data and fielding. The base price does not include government-furnished equipment that goes on the truck (radios, guns, blue force tracking, sensors, etc.) as well as B-kit armor. These items are most likely not produced by the platform supplier.

The JLTV is the largest, current US ground vehicle program. It is a long-term, high volume program nearing the LRIP phase. In our judgment, subsystem suppliers could relocate production to be near the Camden plant due to the size and duration of the program, or if production relocation is prohibitive, could move all but manufacturing operation into the State (i.e., quality control, subsystem assembly, testing, integration etc.).

Enhancements to vehicle that could increase amount paid to LM for each vehicle, a prime example being B-kit armor (\$65,000USD per vehicle). Most likely, only 1/3<sup>rd</sup> of the vehicles will require B-kit armor because it can be shared between vehicles that require it. While not included in the initial base price, upgrades are expected to the JLTV, or possibly the production of different variants over time, these would logically be done in Arkansas if possible. All vehicles that are held in the US fleets will undergo upgrades to engines or other subsystem to allow for the changes in mission or environment. The JLTV will be no different than previous contracts for military vehicles and it will probably go through of few upgrades over its life-cycle.

The JLTV will experience wear and tear, so that at some point the vehicles will be rebuilt to some degree, referred to in the military vehicle industry as “Reset” typically. Vehicles are reset to original factory condition. As they are taken apart and rebuilt effectively setting them back to zero miles. A reset cost of \$100,000/vehicle would not be out of the ordinary.

## Project investment

The total capital investment for the proposed JLTV facility will be \$147.313 million consisting of:

- Construction of the JLTV assembly facility: \$98.313 million to be spent during 2016 and 2017 as follows:
  - \$61.772 million to renovate and expand an existing building in the Highland Industrial Park that LM purchased for the new plant
  - \$27.858 million to purchase equipment
  - \$8.683 million for research and development.
- Maintenance and replacement outlays during operations: \$49 million in expenditures between 2018 and 2040 comprised of:
  - \$35 million for construction
  - \$14 million to replace and repair machinery and equipment.

## Proposed Economic Incentive Package

The State is proposing to issue general obligation bonds with a par value of \$87.145 million, whose net proceeds of \$84.645 million will be used to pay for infrastructure improvements and other items permitted by Amendment 82. When Amendment 82 was first passed, it was limited to providing infrastructure for projects with a minimum capital investment of \$500 million that also created at least 500 permanent jobs with an average annual salary of at least \$70,000. The Amendment was modified several years ago to permit the State to issue general obligation bonds to finance infrastructure improvements for smaller economic development projects on a case-by-case basis. Under Amendment 82, the maximum amount of general obligation bonds that can be issued in a single year is limited to 5% of the State’s general fund.

The State would issue a general obligation bond with a 20-year term and a 10-year call provision. Arkansas’s current bond ratings are Aa1 for Moody’s and AA for S&P. According to a proposed bond payment schedule prepared by FirstSouthwest for the State, the bond issue would have true interest cost of 3.38%, with level annual debt service of about \$6.3 million. The State of Arkansas would use general fund revenues to pay the bond issue’s annual debt service.

The bond proceeds will be placed into a construction fund and used as follows:

- \$83 million for eligible improvements under Amendment 82. Eligible improvements include: land acquisition, site preparation, road and highway improvements, rail spur construction, water service, wastewater treatment, employee training and purchase of the required equipment, environmental mitigation, and training and research facilities and the necessary equipment.
- \$1.645 million for job training

The proceeds will be spent during calendar years 2016 and 2017 while the JLTV plant is being constructed and the production capacity scaled up. Because LM will be able to move an existing production line from its former Sealy, TX facility to the Camden site, it will start producing JLTVs in 2016. One condition of the incentive package is that LM has committed to maintaining its current employment of 556 jobs at the Camden plant for a period of 25 years. Employment at the JLTV facility will increase over time as the level of annual production rises, from 100 jobs in the first year of operation (2016) to 589 jobs by year 10 (2025), where it will remain through 2040. The average wage paid per job in 2016 will be \$46,720, above the average annual wage level in Calhoun County as noted above, which is much higher than the wage level in Ouachita County because of the high-paying jobs located in Highland Industrial Park which has a number of high tech and defense tenants in addition to LM.

The State of Arkansas will not provide any other economic development incentives for the JLTV in the form of tax credits and deductions, grants, tax reductions, low interest loans, improvements, or in-kind services. Some of the primary economic incentives that can potentially be applied under Amendment 82, depending on the characteristics of the major industrial project, are listed below. 1

- Advantage Arkansas Program
- Recycling Equipment Tax Credit
- Tax Back Program
- Customized Training Incentives
- Sales and Use Tax Exemptions
- Purchases of Machinery and Equipment
- Purchase of Utilities

## Direct Economic Effects

### Construction phase: 2016 and 2017

The total capital investment for the proposed JLTV facility will be \$147.313 million consisting of:

- \$98.313 million spent during 2016 and 2017 as follows: \$61.772 million to renovate and expand an existing building in the Highland Industrial Park that has been purchased by LM to house the new plant; \$27.858 million to purchase equipment; and \$8.683 million for research and development.
- \$49 million in expenditures between 2018 and 2035 comprised of \$35 million for construction and \$14 million to replace and repair machinery and equipment.

These expenditures are in \$2015 dollars. When breaking the expenditures down into the years that they would actually occur, we converted them to nominal dollars so we could compare them against the debt service payments, which are also expressed in nominal dollars. In nominal dollars, the total direct spending during the construction phase will be nearly \$76 million in 2016 and just over \$26 million in 2017. As noted above, JLTVs will be produced in calendar years 2016 and 2017.

### Operation phase 2018 through 2040

The total direct spending by year from 2018 through 2040 will be a function of the price paid per vehicle by the DoD to LM for the JLTVs produced at the Camden plant, and the annual level of production which is presented above. In addition, there will be average spending on construction between 2018 and 2035 of about \$2.6 million per year while expenditures on machinery and equipment replacement over the same time period will average about \$1.35 million per year.

IHS used the employment and wages during operation provided by LM after determining that they were reasonable. The number of employees hired by LM for production of JLTVs is tied to the production schedule. During the initial low rate production phase, which lasts for three years, the number of new jobs would rise from 100 in 2016 to 178 in 2018. After that, employment would rise steadily to 589 jobs by 2025 (year 10 of production), and remain at that level thereafter. LM estimates that salaries for those workers will average \$46,657 during the first 10 years of operations. LM also assumes a terminal wage growth rate of three percent starting 2026, when the average wage is \$52,457. As noted above, LM's current level of employment at its existing Camden plant will not change over the life of the JLTV facility, so no existing jobs will be displaced.

## Affected State Taxes

The most important part of the analysis was to determine the specific state taxes that would be affected by the increases in statewide economic activity produced by the JLTV facility. The increases in economic activity would result in higher state tax revenues, which in turn would offset the annual costs incurred by the State to pay the bond debt service. The primary taxes that are affected by this project are general sales and use, personal income, and corporate net

income. These three taxes have accounted for about 69% of Arkansas total tax revenues over the past three years. In order to take a conservative approach, IHS estimated the increases in these three taxes that would be generated by the JLTV facility, although it should be noted that the high level of statewide economic activity, especially spending by the total increase in employment, would produce increase in other types of taxes such as selective sales and use (e.g., motor fuels, utilities, alcohol and tobacco, pari-mutual, etc.) and licensing taxes.

Although the Federal Government will not pay sales tax on the JLTVs purchased, Arkansas will collect sales tax from the indirect and induced economic activity that occurs because of LM producing JLTVs in Camden. According to Arkansas code §26, manufacturing and industrial equipment purchased for direct use in the production process are exempt from sales tax. In order to keep our estimates conservative, we assume no direct sales tax impacts from this project, during both the construction phase and operations phase, but do account for the sales tax revenues from indirect and induced economic activity.

The increase in direct employment, during both the construction and operation phase of the project, and the increase in employment due to the indirect and induced impacts will lead to higher income tax revenue for the state as those people will pay income tax.

Finally, the project affects corporate net income tax revenue for the state. The sources for this tax are again from the direct increase in LM's profits, but also from indirect and induced economic activity.

## Economic Analysis of the Incentive Package

IHS was retained by the Arkansas Bureau of Legislative Research to analyze the proposed economic incentive package. We were specifically asked to determine if the net present value (npv) of the additional major state-level tax revenues (e.g., personal income, corporate income, and sales and use) generated by the increased economic activity attributable to the construction and operation of the JLTV facility would exceed the npv of the costs incurred by Arkansas (i.e., the npv of the bond debt service). IHS conducted the analysis over a 25-year period from 2016 through the final year of scheduled production in 2040.

Based on our experience in performing similar studies for other states, including our 2013 analysis of the proposed Big River Steel plant, the primary determinant of whether a state will benefit over the long run from providing significant economic incentives in whatever form (e.g., direct payment for infrastructure as being proposed for this project, grants, tax credits and deductions, low interest loans, tax abatements, provision of in-kind services, etc.) is the net increase in total statewide economic activity that a project will generate over an appropriate analysis period. By net increase, we mean economic activity that: 1) would not otherwise have occurred in state, 2) is not simply the spatial redistribution of economic activity from one part of the state to another; 3) preferably is not project that is being lured away from another state (i.e., the destination state would benefit, the original host state would lose and there would be little or no increase in net economic activity at the US level; and 4) is not displacing existing economic activity at the proposed site. A project being moved from one state to another could produce net increases in state-level and US economic activity if it can be performed more efficiently in the new state (i.e., lower production costs, more efficient operation, higher profits), or if the activity's production capacity could be expanded in the new state while it could not be in the initial host state. Based on these criteria, the proposed JLTV facility would generate a significant net increase in economic activity in the State of Arkansas over time, especially if the backward linkages become more complete over time as suppliers move in.

The first task in our analysis was to disaggregate the unit cost of the JLTV into the major types of goods and services that would be used to produce the vehicle. A senior member of the IHS Aerospace, Defense & Security (IHS ASD) group, who forecasts production levels of military vehicles like the JLTV, estimated the manufacturing input costs by major component and sub-system (e.g., armor, transmission, drive train, communication equipment, armaments, tires, etc.). IHS assessed whether the required components would be produced in Arkansas or in other states and shipped to the Camden facility for final assembly. One the key determinants of the total increase in statewide economic activity - and tax revenues - generated by the JLTV facility will be the extent to which key components are produced and purchased from within Arkansas, or must be sourced from other states. Military vehicles like the JLTV have unique design characteristics because of their performance standards and purpose; in other words, their key

components and sub-systems such as engines and transmission, are very different than those used in civilian passenger vehicles and often produced by only one or few suppliers.

Once the cost components of the JTLV had been determined, IHS performed the following steps in analyzing the economic incentive package:

- Forecast production levels by year based on DoD's announced plans to purchase approximately 55,000 JLTVs between 2016 and 2040. The production forecast is presented above.
- Assigned the expenditures to their correct economic sectors or NAICS code for use in the IMPLAN input-output model for Arkansas.
- Used employment and wage figures provided by the Bureau of Legislative Research to estimate annual wage payments and personal income tax payments.
- Reviewed tax revenue history for Arkansas to derive effective income tax rates for all state level taxes, with a specific emphasis on the three major state level taxes: personal income, corporate net income, and sales and use. The effective state-level tax rates were expressed as percent shares of the variables produced by the IMPLAN model – gross output, value added or GDP, employment, and labor income.
- Determined which key components of the JTLV would be purchased in other states, and which inputs could be obtained from within Arkansas. The purchasing relationships for some of the key components were adjusted to account for the probability that some of the suppliers would move their operations into Arkansas over the analysis period as discussed above. According to IHS ASD, the size and duration of the JTLV contract is large enough and long enough such that that an increasing share of some components will produced in Arkansas over time. However, other key components such as the engines will very likely be produced in other states for the entire term of the contract, although skilled labor will be needed at the Camden plant to assemble and test the components.
- Reviewed data for aerospace companies to determine the percent share of LM sales revenues produced by the Camden JTLV plant that will be subject to the state's corporate net income tax.
- Reviewed Arkansas's recent tax revenue collections to identify JTLV components that would be subject to the sales and use tax. The federal government will not pay sales and use tax on the JLTVs produced by the Camden plant.
- Ran multiple simulations of the IMPLAN model for Arkansas to examine the purchasing relationships and to accurately model the economic impacts of a system integrator facility like the proposed JTLV plant.

IHS took a conservative approach to our economic analysis by making the following assumptions.

- There would be no purchases of several of the key components – iron and steel used in the chassis, armor, transmission, main engine – from within Arkansas over the 25-year analysis period.
- No direct general sales and use taxes would be generated by the operations of the JTLV plant (i.e., by the purchase of inputs from either in-state or out-of-state vendors) or through sales to the federal government. However, we did assume that general sales and use taxes would be produced by the indirect and induced economic multiplier effects.
- We included the economic impacts of the two-year construction phase.
- Assumed that the composition of the expenditures would remain the same over the analysis period, but that the annual levels would vary based on the number of vehicles produced each year.

In estimating the net economic benefits, we used a discount rate of 3.38%, which is the true interest cost of the proposed bond issue, and thus represents the State's cost of capital.

## Results

Our principal finding is that the proposed JLTV project would generate positive, net economic benefits to the State of Arkansas over the 25-year analysis period if it provides \$84.165 million in infrastructure improvements and job training services for the JLTV project. Stated another way, the net present value of the additional state-level tax revenues generated by the increase in statewide economic activity flowing from the JLTV facility will be higher than the net present value of the bond debt service. We estimate that the net, positive economic benefit would be:

- The net economic benefits would be a positive \$16.3 million using a discount rate of 3.38%, or the true interest cost of the proposed bond issue. The net economic benefit would be 19% than the npv of the costs, or the annual bond debt service

The net benefits are produced primarily during the last five years of the analysis period when the incremental tax revenues are at their peaks, and when the bond debt service has been paid. Using an analysis period of 20 years yields a net economic cost of -\$1.6 million using the 3.38% discount rate.

The primary reasons for the positive net economic benefit are:

- The proposed JLTV facility will consist entirely of net new economic activity within the state; it is not displacing any existing economic activities, nor is it activity being lured from another state.
- Even though the JLTV facility is described an assembly operation, with many of the components and sub-systems produced in other states, a system integrator facility that assembles and tests complex vehicles like the JLTV requires highly-skilled, high-paid workers from a number of different occupations, and generates substantial increases in economic output through the activities performed at the site.
- The supply chain will gradually fill in over the analysis period as some suppliers chose to locate close the Camden facility, drawn by LM's policy of having major suppliers located within a 125 miles, and by the size and length of the contract which will make it economical for some production activities to move into the State.

We conclude that this estimate is conservatively low for several reasons:

- There are no general sales and use taxes generated by purchase of inputs (e.g., manufactured components, supplies, raw materials) used in production of the JLTVs from either in-state or out-of-state suppliers. The only direct general sales and use taxes are generated by the purchase of inputs used in the construction of the building, excluding equipment used directly in the manufacturing process, during 2016 and 2017, and the construction maintenance and replacement outlays from 2017 through 2035.
- We considered only the increased tax revenues from three sources: personal income, corporate income, and general sales and use. There would be a small amount of additional revenues generated by the selective sales and use taxes, and to a lesser extent, by license taxes.
- We assumed that there would be no purchases of several of the key components – iron and steel used in the chassis, armor, transmission, and the main engine – from within Arkansas over the 25-year analysis period. If some of the smaller engine and transmission components start to be produced within the State in the later years of the contract, the net economic benefit would be higher.

In our judgement, there is a minimal downside risk to Arkansas several reasons:

- The nature of contract under which the DoD will commit to purchasing almost 55,000 JLTVs at an agreed upon price reduces market uncertainty about the level of activity at the Camden plant.
- Arkansas plans to protect taxpayers by including appropriate claw back provisions in the incentive package if LM does not meet the specified levels of production and employment.

By contrast, we find that there is a lot potential upside such that the net economic benefits are more likely to exceed our estimate than be smaller because:

- It is likely that prices paid by DoD per JLTV will be higher than the base figure for the reasons discussed above.

- The number of vehicles produced by the Camden facility over the analysis period is likely to exceed the contract amount because of sales of JLTVs to other countries, and from higher domestic demand to replace aging Humvees.
- Additional activities will be performed at the Camden plant such as the reset work noted above, which in turn would increase the level of direct purchases, and possibly employment generated by the plant.

While there is always some risk when a state makes a long-term commitment to provide up-front economic incentives that are repaid indirectly over time by the hoped for increases in statewide economic activity, IHS' conclusion is the proposed economic incentive package makes economic sense for the State of Arkansas, and that it is a prudent, responsible use of taxpayer resources. Finally, we note that a key part of the Arkansas's ability to maximize the potential economic benefits of the JLTV facility will be its ability to provide targeted job training programs to ensure that supply of skilled workers in Calhoun and Ouachita counties is large enough to meet the projected demand. The challenge of meeting the demand for qualified technical workers in a rural part of the state would be much greater if LM had not already been successfully operating its Camden plant for many years.

## Contacts

**Phil Hopkins**  
Director, ECR Consulting  
1650 Arch Street, Suite 2000  
Philadelphia, PA 19103  
215-789-7468  
[phil.hopkins@ihs.com](mailto:phil.hopkins@ihs.com)



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**IHS Customer Care:**

Americas: +1 800 IHS CARE (+1 800 447 2273); [CustomerCare@ihs.com](mailto:CustomerCare@ihs.com)  
Europe, Middle East, and Africa: +44 (0) 1344 328 300; [Customer.Support@ihs.com](mailto:Customer.Support@ihs.com)  
Asia and the Pacific Rim: +604 291 3600; [SupportAPAC@ihs.com](mailto:SupportAPAC@ihs.com)



