BMW in South Carolina: The Economic Impact of a Leading Sustainable Enterprise

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Executive Summary

The Moore School of Business at the University of South Carolina conducted a study of the economic impact of BMW Manufacturing Co., LLC (BMW), on South Carolina during 2007-08. This report presents the results of that effort. The South Carolina operation is the company’s first and only manufacturing plant in North America.

Over the past sixteen years, BMW has evolved to become more than a manufacturing branch plant of the famous German automaker. Combining manufacturing, community, and educational activities, it now occupies a distinctive position in the South Carolina economy. It ranks among the state’s leading sustainable businesses.

In strictly economic terms, BMW has an unusually large statewide impact. This is because it is a high-volume, high-wage, final goods producer tied to an extensive network of local suppliers. In terms of the standard metrics for development, the impact is evident in capital investment, regional employment creation, income generation, and local business development through suppliers and other local linkages.

These activities produce measureable benefits for South Carolinians:

- BMW’s South Carolina complex supports 23,050 jobs and generates $1.2 billion in wages and salaries annually in the state (based on 2007 plant activity).
- The employment multiplier effect—the ratio of total employment supported throughout the state to direct employment at the factory—is 4.3. A typical employment multiplier for South Carolina’s industries or services is closer to two.
- The share of total South Carolina employment attributed to BMW is 1.2 percent. Direct employment at the plant accounts for 2.2 percent of the state’s manufacturing employment.
- BMW’s 2007 statewide value added was $1.9 billion. This is the net contribution to the state’s economy; value added is a measure similar to gross state product (or gross domestic product for the nation as a whole).
- Based on value added, BMW’s share of South Carolina’s gross state product for 2007 is 1.26 percent.
- The total economic output associated with BMW’s annual economic activities is more than $8.8 billion in South Carolina. This broad measure of economic impact includes sales of goods and services to BMW and its employees from in-state vendors.
- From 2007-2010, BMW will spend $750 million on construction to upgrade the factory and enhance its facilities. In 2008 alone, when the overall construction sector was sluggish across the United States, BMW will spend $298 million. Directly and indirectly, this construction activity will support approximately 5,000 jobs, contribute $256 million to value added, and add $200 million to the state’s labor income in 2008.
In 2007, BMW produced 157,530 units, of which approximately 60 percent were exported. By mid-2008, 65 percent of the plant’s output was shipped to foreign markets. The vast majority of the exports use the South Carolina port in Charleston.

The Upstate campus contributes to the South Carolina’s development in many ways. Importantly, as the complex has progressed, its impact reaches beyond capital investment and jobs—the traditional economic development metrics—to enhancing the state’s innovative capacity, notably through the Clemson University International Center for Automotive Research (CU-ICAR). BMW is a highly sophisticated and competitive enterprise, dedicated to engineering the highest performing premium automobiles available in world. To support that effort and help build innovative capacity in South Carolina, BMW has established an Information Technology Research Center.

BMW contributes to another crucial dimension of the state’s economic development profile: tourism and external exposure. The company runs a vehicle delivery center at the site. In 2007, the BMW Performance Driving School hosted more than 10,000 visitors, who came to the center to pick up their new vehicle or as driving school attendees. Beyond the typical South Carolina tourist attractions, the delivery center helps expose the state’s quality of life to some of the country’s more discerning consumers and tourists.

As the company continues to invest, generate employment opportunities for South Carolinians, and enhance the state’s image, it also demonstrates how successful businesses can simultaneously become more environmentally responsible—and address the serious ecological challenges facing all communities in the 21st century. Around the world, the Munich-based company is known as a leading sustainable enterprise. BMW is ranked as the “supersector” leader for Automobiles and Parts on the Dow Jones Sustainability Index. Accordingly, it serves as a model for the private sector in South Carolina and across the country, showing how the goals of higher profits and shareholder value can at the same time be compatible with a company-wide dedication to raising environmental standards.

BMW has taken significant steps to diminish its impact on the environment in South Carolina. In 1998, the automaker became one of the first manufacturers in the state (and one of the first automotive plants in the United States) to be awarded ISO 14001 environmental certification, meaning that the facility meets or exceeds international environmental standards. Almost all the BMW suppliers in South Carolina are ISO 14001-certified.

From an environmental perspective, it is also important to acknowledge that the Upstate BMW campus sources almost two-thirds of its energy needs from methane gas derived from a nearby landfill. The methane project has substantially reduced greenhouse gas emissions in South Carolina. Moreover, BMW has created the world’s first green automotive paint shop—which is powered by recycled methane gas from the landfill. It is the first automotive plant in the United States to use water-based instead of toxic, high-solvent paints. In short, South Carolina’s BMW complex has proven to be both economically successful and environmentally progressive.
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**Introduction**

BMW plays a vital role in the economic development of South Carolina. Since its 1992 groundbreaking in Spartanburg County, the company has established deep roots in the state. From the Upstate to the Low Country, the benefits of its investment extend to all of South Carolina’s regions.

In this age of often unsettling change, it is common to hear about plants shutting down and employment cutbacks, with firms leaving communities across the United States. In-sourcing, or inward investment, represents a potentially positive side of economic change that can boost employment and income, even in the areas vulnerable to outsourcing. The presence of advanced manufacturing by one of the world’s leading companies provides proof that South Carolina remains competitive in global business, despite the challenges posed by an increasingly integrated economy.

BMW’s commitment to South Carolina has progressively strengthened over the years. In 1992, when the new plant was announced, BMW promised 2,000 direct jobs and $500 million in capital investment. By early 2008, the company reported that it had 5,400 full-time jobs at the 1,150-acre site. More than $5.0 billion had been invested (in 2007 dollars), much more than originally promised. In March 2008, BMW announced it would invest $750 million more in South Carolina, taking production capacity to 240,000 units by 2012. The new investment will augment the plant size to four million square feet.

This study evaluates BMW’s impact, focusing on three key aspects of BMW’s investment.

- The total economic impact of investment, measuring the extent to which BMW provides employment and income for South Carolina residents, both directly and indirectly.
- BMW’s influence on upgrading the technological research capabilities of South Carolina.
- The leading role that BMW has taken as a sustainable enterprise, with a strong commitment to environmental stewardship and community involvement.
This study was financially supported by BMW. The research team at the Moore School of Business independently designed the methodology and assumes full responsibility for the integrity of the results. The study is based on an objective research design and widely-accepted economic modeling techniques, using conservative assumptions. The intention is to provide an accurate appraisal of BMW’s role in economic development.

The remainder of this report is structured as follows. The next section provides background on BMW and its history in South Carolina. Then, the narrative turns to the overall economic development context in which the investment has been made, followed by the BMW economic impact on South Carolina. Here the report takes a detailed look at the influence of BMW on the state’s economy. Beyond economic impacts, the final section examines BMW’s important role in environmental sustainability and community development.

**Background**

Based in Munich, Germany, BMW’s storied legacy commenced when Bavarian Motor Works was formed in 1916. The new company merged two small aircraft engine manufacturers. In 1923, BMW began to build motorcycles. A defining moment came in 1928 with the production of the first BMW car.

Today, BMW is the world’s only automaker with a consistent premium brand strategy across all product lines. Recalling the company’s origins as an aircraft engine manufacturer, BMW’s white-and-blue logo is recognized worldwide as a symbol of quality. The logo symbolizes a pilot’s view through a propeller as alternating white and blue segments.

As a global business, the BMW Group consists of three primary segments. The BMW Automobiles Segment develops, manufactures, assembles and sells automobiles worldwide. It includes off-road vehicles, spare parts and accessories. The BMW Motorcycle Segment develops, manufactures, assembles, and sells motorcycles, and also includes spare parts and accessories. The Financial Services Segment focuses on leasing automobiles and financing credit for customers and dealers. The 1-series, 3-

**History of BMW (continued)**

**2002**
April: 2nd Annual BMW Charity Pro-Am golf tournament raises $515,000 for local charities.

June:
- 42 robots and robot controllers donated to the South Carolina Department of Education, to be used in 16 vocational schools.
- BMW Manufacturing to recycle landfill methane gas for use as energy source.
- Last Z3 produced, number 297,087, replaced by Z4.

**September:** Announces $400 million additional investment in plant and 400 new jobs.

**2003**
April: 5% of energy needs being supplied by recycled methane gas from the Palmetto Landfill.

June: Charity Pro-Am makes largest donation from the Nationwide Tour since inception, $674,788.

November:
- BMW Manufacturing wins EPA’s Green Power Leadership Award in Chicago and is recognized at the Governor’s Pollution Prevention Awards Dinner in Myrtle Beach.
- BMW announces placement of Information Technology Research Center on Clemson’s new campus.

**2004**
April: Production of X5 4.8i high-performance model begins.

June: Charity Pro-Am donates $752,650 for local charities.

November:
- New service agreement with the Port of Charleston, shipping through the port to increase.
- 100,000th Z4 produced.
series, 5-series, and 7-series span the low-to-high ends of the luxury automobile market, respectively. With the help of the MINI and Rolls-Royce brands, BMW ranks as one of the ten largest car manufacturers. It is the leader in the premium segment.


The BMW Group in the United States has grown to include marketing, sales, and financial service organizations for the BMW brand, the MINI brand, and the Rolls-Royce brand of motor vehicles; DesignworksUSA, an industrial design firm in California; a technology office in Silicon Valley, California; and various other operations throughout the country. BMW (US) Holding Corp., the BMW Group’s sales headquarters for North America, Central America, and South America, is located in Woodcliff Lake, New Jersey.

South Carolina’s BMW operations are part of the BMW Group. The BMW Group Production Network includes 23 plants in 12 countries. The Spartanburg County manufacturing site is the only one for BMW in the United States. The plant produces the BMW X5 and X6 models for the North American market and exports to over 100 countries. The X6 is a unique “crossover” vehicle—a combination coupe and SUV. In addition, South Carolina was the sole BMW plant producing roadsters since it began production in 1995, although production will shift to Germany. Starting in 2010, the South Carolina plant will make the X3. Thus, the complex is evolving into an “X” manufacturer for the global market.

The South Carolina opening was announced in June 1992. With groundbreaking in September 1992, the United States was in the midst of an economic slowdown and rising concerns about the "deindustrialization of America.” States competed vigorously for the BMW plant. A strong, sustained effort by the late Governor Carroll Campbell, the South Carolina Ports Authority, the South Carolina Department of Commerce (formerly the State Development Board), and local leaders helped woo the investment to the Upstate region. At the time, it was not clear how much impact the plant would eventually have on economic development.
Actual construction started in April 1993. The first production employees (or associates) were hired in January 1994. A manufacturing presence in North America gave the company flexibility in its operations, including a diversified production platform that helped mitigate currency fluctuations that raise the prices of imports when the German currency is strong (which was true in the early 1990s and again at the time of this writing in 2008).

Fundamentally, the company was attracted to South Carolina for its trained work force—supported by the Technical College system—and the state’s infrastructure—including the port of Charleston, the airport in Greenville, which is actually next to the BMW campus, and direct access to the U.S. interstate highway system. The plant is strategically situated next to I-85, midway between Atlanta and Charlotte.

**Capital, Income and Economic Development**

Raising income in South Carolina is a paramount goal for policy makers and advocates for economic development. For example, New Carolina, whose mission is to advance the state’s competitiveness, asserts that “By playing to the strengths of our state’s core industry clusters, we can raise per capita income” ([http://www.newcarolina.org/](http://www.newcarolina.org/)).

For decades, South Carolina has lagged behind the nation in per capita income. In turn, attracting new capital investment remains a fundamental economic mission in South Carolina as a strategy to increase living standards. Targeted investment efforts are common in many regional and national efforts, and governments compete vigorously for domestic and foreign investment.

The Upstate region of South Carolina witnessed dramatic economic changes with the BMW investment. Traditionally a manufacturing-intensive region, the region’s shift into automotive production has created a stronger automotive cluster and a more diversified economy.

Undeniably, BMW in South Carolina can help the state prosper. The basis for its significant economic contribution comes primarily through large-scale investment, with cascading effects on many other industries,
from manufacturing to services and distribution. More than most investments, automotive plants have outsized employment and income effects. This is because they are final product producers (rather than intermediate producers in a value chain) linked to a long sequence of economic activity.

On former farm land, the BMW investment added a significant new dimension to industrial development. Since the Anderson Motor plant closed in the 1920s, there had been no automotive assembly activity in South Carolina. In effect, the BMW investment in the early 1990s formed the basis for a new regional business cluster anchored around automotive assembly. Ongoing capital investment through the first decade of the 21st century solidified the physical infrastructure of the South Carolina complex.

Figure 1 shows BMW’s capital investment since 1993, measured in 2007 dollars. The company has invested every year, with a noticeable expansion in 2006 and 2007. The uptick in 2005 and 2006 is related to a major transformation of the assembly operations. This investment will continue, with $750 million more expected from 2007-2010. By the end of 2007, the cumulative investment (in 2007 dollars) reached more than $5.0 billion, as depicted in Figure 1.

The continual flow of capital into the BMW location is the major reason South Carolina remains a top state in attracting inward foreign direct investment. Among all states, South Carolina has the second highest share of the workforce employed by affiliates of foreign companies.

Situated along the I-85 corridor, the South Carolina campus now comprises four million square feet. BMW’s sizeable investment at the site provides the foundation for one of the country’s most efficient plants. The operations are highly automated. Four-fifths of
vehicles are customized for individual customers. The campus also hosts a Testing Facility that checks vehicle performance on a 2.4-mile track with the capability to simulate a vehicle’s performance over a wide range of driving conditions.

The investment that built this complex provides growing employment opportunities, ultimately raising living standards for the surrounding region. Income is arguably the most important metric through which we can gauge BMW’s economic effects. With 5,400 full-time jobs, BMW clearly lifts local earning power.

Figure 2 displays the annual and total compensation pumped into the South Carolina economy. By the end of 2007, cumulative direct compensation totaled $4.2 billion when measured in 2007 dollars. Thus, it is certain that BMW direct payroll has significantly raised per capita income for South Carolina over the course of its history. The compensation figures are adjusted for inflation and calculated in 2007 dollars.

As noted earlier, in 2008 BMW declared that it planned to invest $750 million and add 1.5 million square feet to the factory site. This capital expansion will augment production capacity to 240,000 units by 2012. In fact, the investment is the largest ever announced for the Spartanburg County factory, which will increase total investment by the BMW Group in its South Carolina operations to $4.2 billion. The three-year construction project includes a new 1.2 million-square-foot assembly facility north of the existing factory to accommodate the next generation BMW X3 Sports Activity Vehicle. In addition, the Paint Shop will expand by about 80 percent, or 300,000 square feet. The existing Body Shops will be renovated. The additional
investment will prepare the factory to increase production from 160,000 units to 240,000 units. The expansion of the Spartanburg plant also means a bigger purchase and export volume in and from the NAFTA region, which will contribute to the company’s strategic geographical positioning.

**BMW’s Economic Impact**

This section explains how BMW’s operations in Spartanburg County spread economic benefits by means of the multiplier effect. The multiplier is an accepted and widely practiced technique used to assess the total impact of investment and payroll. It should be noted that the impacts calculated in this study provide a snapshot of BMW’s impact across the state during 2007. In 2007, BMW’s South Carolina plant produced 157,530 units. In a complicated and dynamic business that is growing over time, as production increases in future years, the economic impacts will be augmented as well.

The basis for calculating economic impacts is an inter-industry, or input-output, model. Impact analysis entails calculating the extent to which direct activities at the BMW plant stimulate further economic effects, spreading employment and income, so accounting for linkages among industries is essential. Based on a state input-output model, the results quantify the full effects of the cluster of business activities that have developed around the lead manufacturing operations.

Given direct information available from the BMW Manufacturing Co., the IMPLAN input-output model was used to calculate the multiplier impacts. IMPLAN’s input-output model accounts for the linkages—including intermediate inputs and final consumer demand—that characterize the inner working of the South Carolina economy. IMPLAN has information for 508 industrial sectors (industries) that comprise the South Carolina economy. A set of equations account for all industry purchases of commodities, services, employee compensation, value added, and imports, which are, in turn, set equal to the value of the commodities produced in the state.

While input-output impact analysis requires advanced economic training to be understood fully, the elements can be stated in straightforward terms. To arrive at total economic impacts, economists must first assess the initial effects of local payroll and purchases. The economic impacts are called **direct**. Subsequently, **indirect** and **induced** effects stem from the payroll and local purchases.

In this case, the impacts begin with the direct effects of the local purchases and payroll at the automobile plant. Recall that direct employment in the plant reached 5,400 full-time equivalents, with $437 million in payroll.
To model the total effects of spending and income circulating through the economy, the estimates from input-output analysis are the result of interactions between all industries and services linked to the plant. In multiplier analysis, the cascading impact of local spending and payroll starts with first-tier suppliers and local businesses catering to BMW employees. These businesses also spend this income that they garner from BMW. This continues as spending becomes income for additional businesses in the state. In each round of the spending and income cycle, some of the income’s impact is dampened as the money is taxed, saved, or used to buy goods and services outside of the community and the state. Hence, there is an extensive multiplier effect from BMW’s direct spending and payroll, but it grows smaller as the spending tapers off, turning into less income, which is then spent as a smaller amount.

BMW has an especially large multiplier effect for two fundamental reasons: (1) its extensive regional supplier network and (2) its relatively large direct payroll, which is largely spent at local businesses. Consider first the major indirect impact emanating from the supplier network. Automotive plants typically have strong local linkages inducing multiplier effects not seen in many other industries. BMW purchases materials, supplies, and services from local businesses, which create indirect jobs and income. BMW’s North American supplier network is composed of companies throughout the United States, Canada, and Mexico. South Carolina has more than 50 suppliers. The income gained by suppliers through BMW contracts is then re-spent. Consequently, suppliers lead to additional indirect employment and earnings as their purchases spread into the wider economy.

Employment shows the size of the indirect effects. In this case, 1.87 jobs are supported indirectly for every direct job at the BMW plant: 10,124 compared with 5,400.

The second major effect stems from spending related to the direct payroll. This is called the induced effect. The induced effect begins with BMW’s $437 million in direct personal income paid to employees; subsequently, the employee income is spent at local retail establishments, on various services, and at other businesses, leading to further rounds of spending and income.

The employment sustained by the induced effect of the BMW payroll amounts to 7,526. This is a smaller job tally than the indirect effect, but nevertheless significant for a single plant.

The total impact—summing the direct, indirect, and induced effects—accounts for all measurable economic activity that stems from the BMW plant. Impacts were calculated for four categories that reflect the contribution of BMW to the state and local economy. In addition to employment effects already discussed, the most common metrics for evaluating economic impacts are labor income, value added, and output. In simple terms, these are defined as the following:

- Labor Income (or Earnings). This is the contribution to wages and salaries.
- Value Added: This is the overall contribution to the state’s economy.
- Total Impact (or Output). This is the contribution to overall economic activity.
The results of the economic impact analysis reveal powerful effects of a major automotive plant on local employment, income, and economic output. These total economic impacts are displayed in Figures 3 through 6. Each chart shows the direct and combined indirect and induced effects that make up this total impact.

Figure 3 reveals that, through the multiplier effect, BMW’s South Carolina investment supports 23,050 total jobs in South Carolina. Given that 5,400 jobs are directly employed at the plant, this total job impact yields a multiplier of 4.3. A typical employment multiplier for South Carolina industries and services is closer to two. While many of the direct and indirect jobs are in the manufacturing sector, the multiplier effects support other sectors of the state’s economy, especially through the induced effect.

Next observe Figure 4, which shows that the BMW plant generates $1.2 billion in total labor income for South Carolina. For many economic development analysts and observers, this is the crucial component of the impact since income generated for state residents raises living standards. The plant itself accounts for $513 million in income directly, while indirect and induced effects cause the rest. Note that the induced effect is smaller than the indirect effect because most of the induced employment (caused by spending by direct employees) supports jobs in the retail and service sectors, while the indirect labor income comes through the higher-paying manufacturing sector.
Next, consider Figure 5, which depicts the value-added effect; that is, the net contribution to the state’s economy. This measure is similar to gross state product or often-reported gross domestic product (GDP) for the nation as a whole. Most value added is generated directly by the plant, followed by the indirect and induced effects. This again shows the crucial importance of manufacturing (reflected in the direct and indirect components). The total value added to the state’s economy in 2007 amounted to $1.9 billion.

Finally, consider the output effect (see Figure 6). This broad measure of economic impact includes sales of goods and services to BMW from in-state vendors. It does not necessarily imply that these goods and services are produced in South Carolina, as is the case with value added.
The input-output analysis yields a total economic output associated with BMW’s annual economic activities (2007) in South Carolina of more than $8.8 billion. The plant itself accounts for $6.3 billion in annual economic output, with the remainder determined though indirect and induced linkages with the economy at large. This broad measure of economic impact includes sales of goods and services from in-state vendors. This gross output is often cited as the “economic impact” that results from input-output analysis. Yet value added, labor income, and employment are arguably better metrics of state and local activity because gross output is not the incremental contribution to the economy (like value added).

Thus, from a variety of perspectives, it can be seen that BMW has an immense economic effect in South Carolina. Yet this is a conservative estimate. The statewide impact would be even greater if the employment and income effects at the port in Charleston were included, where the company is a major importer and exporter. Further, this study did not include economic multiplier effects from income generated by contingency employment offered at the plant. These jobs fluctuate depending on demand conditions.

**BMW’s Supplier Network**

BMW’s impact in South Carolina is much larger than most other businesses in large part because it serves as the anchor for a vast supplier network. Over the years, the BMW plant has contributed to the formation of a regional automotive cluster in the state through its supplier network. The South Carolina campus includes a Process Development Center to coordinate an automotive input network, with the task of managing the logistics for the thousands of parts delivered from 187 suppliers spread across North America.

Where possible, BMW has encouraged suppliers to locate plants and facilities close to Spartanburg County to limit the cost of transporting parts and materials. Currently, the number of suppliers located in the state has grown to 49. The map below illustrates the suppliers’ geographical spread throughout the state. This would indicate that the BMW plant is important to all of South Carolina, not just the Upstate region.
Like regions across the world, South Carolina faces daunting ecological and social challenges. Indeed, development is now recast more broadly around the long-run goals of sustainability, which includes supporting a healthy economy, but also maintaining the integrity of the natural environment and meeting fundamental social needs like health and education. Sustainability is defined by the World Commission on Environment and Development (the Brundtland Commission) as “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

In particular, while development efforts must continue to promote economic goals—employment, capital investment, innovation, and entrepreneurial activity—they also should recognize the importance of encouraging environmentally sustainable enterprises. A sustainable enterprise is an enlightened management approach that addresses ecological challenges with business solutions.

For South Carolina, BMW serves as an exemplar of sustainable enterprise, revealing how the private sector, while driven primarily by the profit motive and increasing shareholder value, can at the same time prosper as a responsible steward of the environment. BMW is a global leader as a sustainable enterprise. The company has been a member of the Dow Jones Sustainability Index and the European Dow Jones Sustainability
Index since their establishment in 1999. These indices follow the financial performance of leading sustainability companies and inclusion in the index is a testament to company’s leadership (only 300 companies on the Dow Jones Sustainability Index are included out of 2,500 companies on the Dow Jones World Index). BMW has also been consistently named as the “supersector” leader on the index (there are 18 supersectors). The 2008 Dow Jones report noted that “The well-balanced capabilities of BMW in mitigating the challenges in the economic, environmental, and social dimension, position the company as the leader of its industry for the third consecutive year” (Dow Jones Sustainability Indexes, 2008, http://www.sustainability-indexes.com/djsi_pdf/Bios08/BMW_08.pdf).

The corporate practices put in place in South Carolina reflect this drive for sustainability. In 1998, BMW became one of the first manufacturers in South Carolina (and one of the first automotive plants in the United States) to be awarded ISO 14001 environmental certification. This means that the facility meets or exceeds international environmental standards determined by an independent audit. ISO 14001 is the international specification for an environmental management system. The motivation for 14001 is to establish a systematic approach to environmental sustainability. For a firm, it identifies the requirements for an environmental policy. It also entails the setting of environmental goals and targets, along with managerial execution to meet these goals and targets. BMW recommends that its in South Carolina follow BMW’s progressive environmental practices. More than 90 percent of the suppliers are ISO 14001-certified.

In its Upstate facility, BMW has taken significant steps to diminish its impact on the local environment. The South Carolina plant also has implemented a solid waste recycling program that eases landfill needs in the local area. The company reports that it recycles 75 percent of its waste. Recently the company announced that it became the first automotive plant in the United States to replace food waste garbage dumpsters with solar-powered trash compactors. The trash compactors reduce the number of times garbage trucks must haul away the trash.

The recent efforts build on previous environmental initiatives. Particularly significant is BMW’s Landfill Gas-to-Energy Project, which turns landfill gas into clean, usable energy. The project is aligned with the Environmental Protection Agency’s (EPA) Landfill Methane Outreach Program (LMOP).

The methane project is especially noteworthy because it uses a locally produced greenhouse gas and converts it to clean energy. Methane is produced at landfills as organic material decomposes. In fact, landfills represent the largest man-made source of methane gas. In April 2003, BMW announced that 25 percent of its energy needs were coming from
electricity generated by methane gas. In 2008, 63 percent of the plant’s energy needs are supplied by methane. This alternative energy source takes the pressurized gas and transports it to the Energy Center at the BMW complex in Spartanburg County. Then, the methane gas is used to turn four turbines at the plant’s power station, generating electricity and hot water, a dual purpose that makes it highly efficient. As a major energy-consuming operation, the Paint Shop has switched from natural gas to methane. In sourcing energy from methane at the landfill, there are two environmental and natural resource benefits. First, this diminishes the need for fossil fuels like gas and oil. Second, it reduces carbon dioxide emissions (greenhouse gases) in the local area. Since inception, the project has helped reduce carbon dioxide emissions by approximately 216,000 tons. Annually, the gas-to-energy project’s emission reduction (about 17,000 tons) is comparable to lowering automotive driving (a major source of greenhouse gas emissions) by 105 million miles.

In South Carolina, BMW has created one of the world’s most advanced, environmentally sensitive automotive paint shop—a state-of-the art, seven-story facility with 4.5 miles of conveyor—powered by energy generated by methane from the Palmetto Landfill. At the same time, BMW is the first automotive plant in the United States to use water-based instead of toxic, high-solvent paints.

An understanding of sustainability, particularly recycling, is a well-known advantage of German business, one they can bring to the United States through inward investment. Like other companies based in Germany, BMW is conscious of the life cycle for its products. Therefore, it puts plans in place for dismantling its vehicles at the end of use. The older parts are recycled for use in new automobiles. In Germany, the company was a pioneer in recycling, creating a Recycle and Dismantling Center in 1990. A similar center has been established in the United States.

As evidence of environmental commitment, BMW is a charter member of the EPA’s National Environmental Performance Track, along with the South Carolina Environmental Excellence Program. BMW has been recognized at the South Carolina Governor’s Pollution Prevention Awards Dinner and won the Environmental Protection Agency’s Green Power Leadership Award.

**BMW’s Community Support**

Primarily, BMW contributes to community development through state and local taxes and fees. This revenue would otherwise not be available if the company had not chosen the South Carolina location in the early 1990s. Company records show that total taxes and duties paid for 1993 through June 2008 amounted to $1.9 billion.

The state and local community benefit substantially from BMW contributions to revenue. A 2002 study by the Moore School of Business calculated the net benefits of the BMW plant on South Carolina for the state, counties, and school districts. These fiscal impacts accounted for incentives and the additional costs of public services and education resulting from BMW’s presence in the area. Because the benefits are calculated net of costs, they represent incremental funds for improving local government services and education. The state government was found to garner $30 million in net fiscal benefits. Local benefits
were presented for the four South Carolina counties most affected by BMW's presence: Anderson, Greenville, Laurens, and Spartanburg. The county benefits were also net of costs of providing services to citizens. Overall, the four counties received $2.4 million annually in additional net revenue, money that can be spent on meeting the many services that require additional funding. Spartanburg ($1.4 million) and Greenville ($518,000) gained the most, yet Laurens and Anderson also receive over $200,000 in new revenue. The local school districts gained $3.2 million annually. (See Division of Research, Moore School of Business, Economic Impact of BMW on South Carolina, http://mooreschool.sc.edu/export/sites/default/moore/research/presentstudy/bmw/bmwmay.pdf).

The present study focused on economic, not fiscal impacts. Beyond the direct payments from the company, fiscal effects are engendered through employee property, income, and sales taxes. It should be recognized that it is difficult to parcel out a large company's contributions to property and sales tax revenue since employees live in different counties and school districts, with varying sales and property tax rates. They also have unknown housing assessments and spending patterns that would influence taxes.

Based on the labor income impact presented earlier, the state income tax contribution can be estimated. Recall that the total state labor income amounted to $1,216,000,000 in 2007. Using reasonable assumptions about taxable income and deductions, state income tax would be roughly 5.2 percent of this income. At this rate, BMW's 2007 activities generate $63,230,000 in state income taxes alone.

Beyond taxes and fee payments, BMW is directly involved in South Carolina's local social and economic progress. A progressive business balances its focus on profit with community responsibilities. BMW's dedication to community development is shown in a variety of ways.

Specifically, significant resources have bolstered the state's innovative and technology capacity through a $15 million investment establishing the Information Technology Research Center (ITRC), located on Clemson University's International Center for Automotive Research (CU-ICAR) campus. Currently, the ITRC is an 84,000-square-foot facility comprising six separate, secure research zones, a data center, and a lab. The center's research has focused on onboard computing, maintenance system automation, and telematics; that is, computer and mobile communications technology used in automotive navigation systems. Moreover, the company has donated $10 million to support two endowed chairs in automotive engineering at Clemson University. Overall, BMW has caused $50 million to be invested in South Carolina's CU-ICAR. It is projected that 300 engineers will work at the upstate South Carolina center, adding to the state's effort to build a knowledge-based economy.
Importantly, BMW has been a strong advocate for vocational and K-12 education, which are critical needs in South Carolina. For example, the company has donated robots to local vocational schools and financially contributed to the Call Me Mister program (Mentors Instructing Students Toward Effective Role Models). This national program’s mission is to increase the pool of available teachers from diverse backgrounds. In South Carolina, BMW also is a sponsor of the Teacher of the Year Award; the winner receives use of a Z4 roadster for one year.

Since 1996, BMW has given $23.2 million to local charities. Its most visible charity event was started in 2001, when BMW held its inaugural Charity Pro-Am golf tournament. Featuring golf professionals from the PGA’s developmental league, local amateurs and celebrities, the event raises money for charities in upstate South Carolina and western North Carolina. The tournament is held each spring at The Cliffs golf course in Greenville County. In its eight-year history, the tournament has raised approximately $6.6 million for charities in upstate South Carolina and western North Carolina. Celebrities helped to draw an estimated 42,000 attendees to the 2007 tournament.

Conclusion

Over the past sixteen years, BMW has produced 1.4 million vehicles in South Carolina. By 2012, the company projects that it will produce 240,000 vehicles annually—a 50 percent increase over current production.

This study has documented the contemporary economic impact of the BMW complex. BMW accounts for more than 23,000 jobs in South Carolina, about 1.2 percent of the statewide workforce. Through linkages with businesses and individuals throughout the state, the company is responsible for $8.8 billion in gross output and $1.9 billion in gross state product, or value added (in 2007). With future growth in production, the impact will increase as well.

BMW exhibits many of the economic advantages of inward foreign investment in the United States: job creation and capital investment. At the same time, BMW appears to have a long-term commitment to the state and local economic development through advanced research and development activities at CU-ICAR, along with ongoing support for basic education in South Carolina. Thus, as it reaches out through community and education activities, BMW has evolved to become more than a major manufacturer, investor, and employer.

Above all, BMW epitomizes South Carolina’s competitiveness, proving that it is possible to succeed in export-oriented manufacturing from a base in South Carolina, while at the same time meeting rigorous environmental standards and acting as a leading innovator in “green” management, extensive recycling and reuse programs, and clean energy sourcing. As such, it functions as a paradigm for sustainable enterprise in South Carolina. From a business perspective, an interesting extension of this research would be to examine the extent to which the recycling, alternative energy, and other environmental initiatives have improved company-level competitiveness and profitability at the Upstate South Carolina complex.