

# Revving the Economic Engine: South Carolina's Auto Cluster

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NATIONAL ASSOCIATION OF DEVELOPMENT ORGANIZATIONS  
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# The Auto Cluster: A Look Under the Hood

"The auto cluster supports 84,935 full-time equivalent jobs in South Carolina."

~ Moore School of Business



# “South Carolina people are good at making things,”

says Robert “Bobby” Hitt, South Carolina’s Secretary of Commerce.<sup>1</sup> With a growing presence of world-class manufacturers like BMW, Boeing, and Michelin, it seems clear that the international business community believes in South Carolinians as well.

Nowhere is this more evident than in the rise of the state’s automotive and ground transportation related industries (the “auto cluster”). “Over the last 30 years South Carolina has developed a flourishing, globally competitive automotive and ground transportation cluster” which is a “major engine of economic growth in the state,” finds a 2011 economic impact study conducted by the Moore School of Business at the University of South Carolina.<sup>2</sup>

Decades of effort on South Carolina’s part are paying off handsomely, as today’s auto cluster is yielding major economic dividends to the Palmetto State in the form of good-paying manufacturing jobs and an impressive multiplier effect that ripples through a chain of suppliers, service providers, and related consumer spending. According to the 2011 study, “the auto cluster supports 84,935 full-time equivalent jobs in South Carolina” (see “The Auto Cluster by the Numbers” page 9).

And it now appears to be a particularly good time to be “good at making things” in America, at least for those states and regions that can produce the higher-end products that are in world demand, such as in the auto sector, and have the reach to deliver these goods to markets across the globe. In the post-recession economy, there is renewed emphasis on manufacturing, exporting, and reclaiming domestic markets to help boost America’s economic fortunes, in the face of what has been a chronic trade imbalance between the U.S. and its global trading partners.

President Obama set the bar for this renewal with his 2010 State of the Union address when he called for doubling U.S. exports in five years. International exports have been one of the economic bright spots, helping to drive economic growth in the current recovery.<sup>3</sup> Other trend lines would also appear to favor a comeback for manufacturing in America, not only in terms of pursuing international opportunities, but competing on the home front as well.

Recent work conducted by the Boston Consulting Group (BCG) indicates that the “onshoring” of production-related jobs back to the states is gaining real momentum, and combined with

surging exports could create up to 5 million jobs in the United States by the end of the decade.<sup>4</sup> Interestingly, BCG highlights recent foreign investments in U.S. tire production as indicative of this emerging trend.<sup>5</sup> Much of this investment is occurring in South Carolina, which is expected to be the leading tire producing state in the country within the next year or two (see “South Carolina’s Booming Tire Industry” on page 16).

So why the pendulum swing? BCG points to rising labor costs in China and Eastern Asia that are helping to level the playing field, as well as the “new abundance of energy resources” in North America such as low-priced natural gas. The United States also stacks up well against its Western European competitors, as BCG notes that adjusted for productivity, the average U.S. worker is approximately 35 percent less expensive than their Western European counterpart.



## Building a Platform for Global Commerce

For its part, South Carolina is not only an experienced hand at the economic development game but the international arena as well, having over the years attracted an impressive array of international businesses and investment to its shores. Byron Miller of the South Carolina Ports Authority notes

that since the influx began in the 1980s and 1990s, “foreign direct investment has been a huge driver of employment, prosperity, and port volume in South Carolina.”<sup>6</sup>

June 2012 marked the twentieth anniversary of BMW’s decision to locate its first manufacturing facility outside of Germany, BMW Manufacturing, in Greer, located in the “Upstate” region of South Carolina.<sup>7</sup> The cluster has certainly blossomed since BMW’s arrival, and South Carolina has benefited greatly from the company’s ongoing expansion (with over 7,000 jobs as of 2012 and more on the horizon) and the extensive supplier-network that followed BMW’s move to South Carolina and has grown with the company.<sup>8</sup> But, 1992 was not the beginning of this story, nor the only story line.

For its part, Michelin, one of the world’s leading tire producers based in France, has been in South Carolina for nearly

four decades, with its North American headquarters located in the city of Greenville. Employing about 8,000 people from its South Carolina facilities, Michelin has led the ascent of South Carolina's tire industry, along with sizable recent investments from other multi-national corporations including Japanese tire maker Bridgestone and German-based Continental Tire. The industry is expanding to meet the demand for not only passenger tires, but for other uses as well, such as off-road tires used in the mining and construction industries.

Robert Bosch, a leading world supplier of automotive components based in Germany, has also had a presence in the state since the 1970s and today has more than 4,000 associates in South Carolina, according to company officials. It is among the more than 300 core automotive-related suppliers in the state. Bosch was recently named by Fortune magazine as the "most admired" auto parts supplier in the world for 2012.<sup>9</sup>

In addition to luxury passenger vehicles, a range of automotive parts, and tires of various size and purpose, the cluster also includes a mix of other ground transportation ventures. These range from military and emergency response vehicles, to alternative energy buses and all-terrain vehicles.

The state's success in developing the auto cluster would appear to be due to a combination of factors. To begin with, South Carolina has a well-deserved reputation within economic development circles for being a very competitive state, based on its pro-business attitude, aggressive incentive programs and site location assistance, and in some cases just plain out-hustling the competition. Recent national recognition for South Carolina includes Area Development Magazine's 2012 Golden Shovel Award for its overall economic development efforts, as well as win-

ning the magazine's Project of the Year Award for its efforts to support Continental Tire's expansion in the state.<sup>10</sup>

Teamwork is key. Working with the South Carolina Department of Commerce to promote jobs and investment are several local and regional groups, such as the Upstate Alliance, an economic development organization situated in the heart of the auto cluster (see "A Regional Perspective" on page 16). South Carolina is also known for its comprehensive worker training and recruitment services to job creators through readySC, anchored by the South Carolina Technical College System which has supported the state's economic development efforts for more than 50 years.

Complementing these efforts is also a number of private, public, and academic stakeholders working to grow the cluster from the "bottom up," driven by industry collaborations,

cluster-based approaches, and partnerships between education and industry to capitalize on joint research and innovation. These efforts are being led by groups such as New Carolina, the Clemson University International Center for Automotive Research, and the South Carolina Automotive



Photo of North Charleston, SC facility, courtesy Bosch

"Foreign direct investment has been a huge driver of employment, prosperity, and port volume in South Carolina."

~ Byron Miller, South Carolina Ports Authority

Council, which is an initiative of the South Carolina Manufacturing Alliance. Such initiatives complement state and local efforts to build a competitive economic environment by engaging business and community leaders at the ground level in identifying opportunities and removing obstacles to growth.

In addition to its ability to "make things," it should be noted that South Carolina is pretty good at moving things as well, which is also vital to industry productivity and tapping into new market opportunities. The intermodal freight system is anchored by the deepwater Port of Charleston, South Carolina's trade window to the world. South

Carolina is aggressively investing in its port facilities and inland connections to help ensure it has the intermodal freight capacity to compete on the global grid, and take full advantage of opportunities arising with the widening of the Panama Canal and the expected increase in large cargo vessel calls. The transportation system also includes strategic rail and highway connections both to the port and into North American markets, proximity to international airports, and a larger network of players that comprise the South Carolina Transportation, Distribution and Logistics (TDL) cluster which is a significant job generator in its own right (see Transportation and Logistics, page 18).

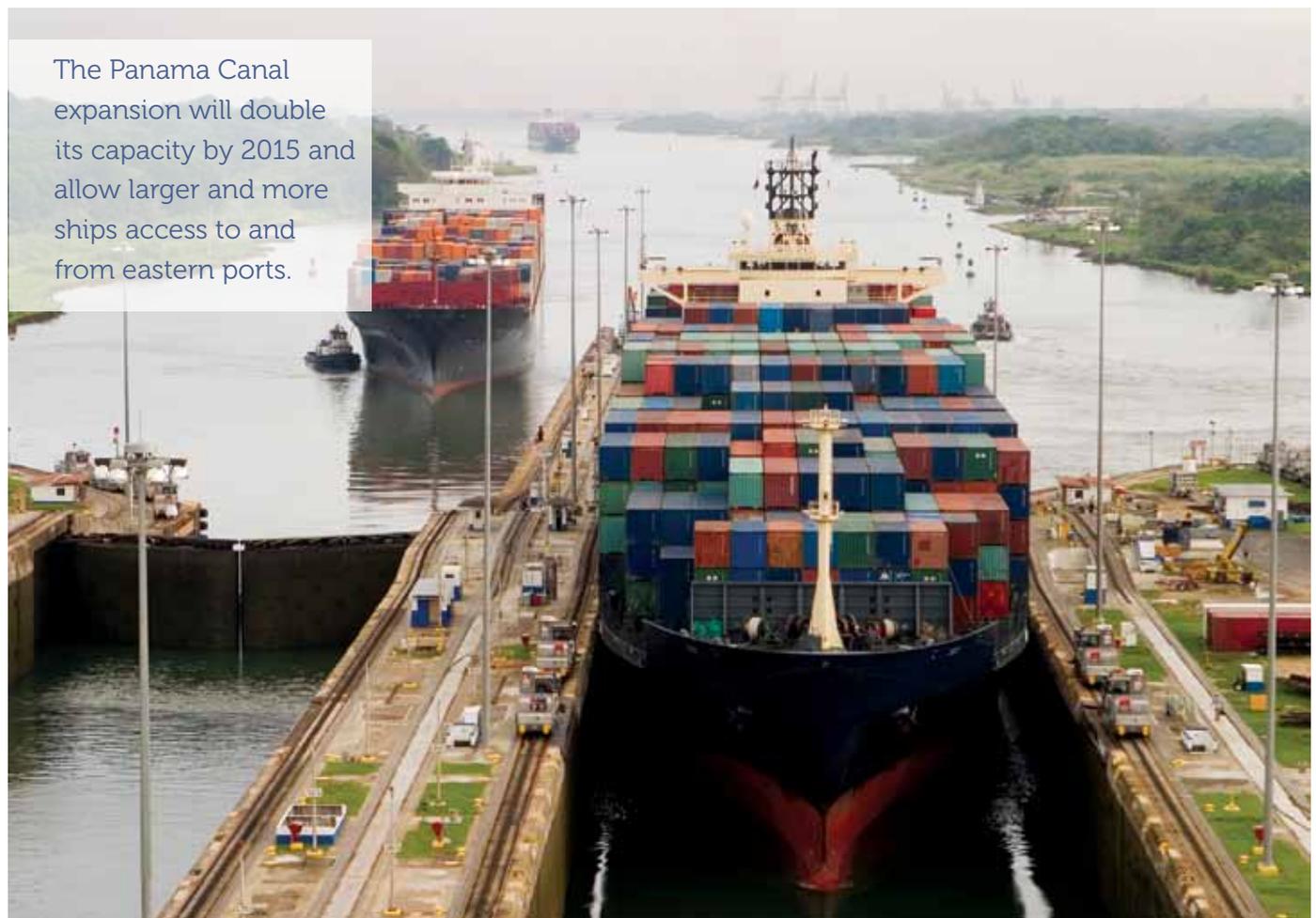
South Carolina's strong commitment to economic development reflects an imperative to create jobs and raise income levels in a state where median household income is about 80 percent

of the national average (US Census Bureau, 2011).<sup>11</sup> South Carolina was hit particularly hard by the recession, with unemployment running well above the national average, reflecting the impacts of the downturn on cyclically sensitive industries such as the automotive sector. Unemployment in South Carolina peaked at 12 percent in November of 2009 compared to the national average of 9.9 percent. As of December 2012, however, the rate had dropped to 8.4 percent in South Carolina, more in line with the national average of 7.8 percent.<sup>12</sup>

Fortunately, employment in South Carolina's auto industry is now on the upswing, with a number of new jobs in the pipeline. Continued growth in the auto cluster should help raise income standards in the state as well, as the average wage in the South Carolina automotive cluster is \$45,631, versus the state average of \$34,965 based on 2010 data.<sup>13</sup>

Having weathered the recent cyclical downturn brought on by the 2007 recession, prospects for the global auto industry are looking good. Goldman Sachs Japan is forecasting a sharp rise in worldwide demand for auto sales from 2012 to 2020, from 83 to 107 million vehicles annually. Much of the growth is expected in the developing nations, in particular China which is projected to grow from 20 million to 30 million vehicles over this period.<sup>14</sup>

Reflecting this momentum, the 2010s are off to a strong start for South Carolina. Since January 2011, the state has attracted more than \$5 billion in automotive-related investment, which is expected to generate more than 8,000 new jobs.<sup>15</sup> That's a good report card for South Carolina and a major vote of confidence in the state and the future prospects for the automotive and ground transportation cluster.



The Panama Canal expansion will double its capacity by 2015 and allow larger and more ships access to and from eastern ports.

## Clusters, Innovation, and Economic Development

Before taking a deeper dive into the South Carolina auto cluster, some context around the role of “industry clusters” and cluster-based approaches may be helpful. In the post-World War II era, economic development activities focused primarily on securing jobs through the attraction, expansion, and retention of business, principally manufacturing-related facilities in the early days and broadened over the years to reflect America’s shift into the services sector. Industrial targeting techniques have been refined over time, as have the range of incentives and other forms of site location assistance being offered by states and communities to secure jobs and investment.

A new school of economic development thinking arose in the early 1980s when David Birch, an MIT professor, published ground-breaking research on the role of small business in job creation in the United States, revealing that the majority of all new jobs came from small business.<sup>16</sup> With manufacturing jobs in decline, and the broad appeal of helping local business, the “grow your own” era was born and the economic development field was broadened to include more “organic” approaches to job creation such as entrepreneurship programs, business incubators, research and development initiatives, and revolving loan funds, funded in many cases by new and expanded state and federal programs as well as private foundations.

The organic approach was taken to a new level in the early 1990s when Harvard Business School professor and economic development guru Michael Porter introduced the “cluster” approach to economic development. According to Harvard’s Institute for Strategy and Competitiveness (which is headed by Porter): “Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, and as-

“Clusters connect to research and to economic development to enhance innovation, efficiency and entrepreneurship, and help bring world class companies and the best and brightest young talent to a region.” ~New Carolina

sociated institutions in a particular field that are present in a nation or region. Clusters arise because they increase the productivity with which companies can compete.”<sup>17</sup>

In essence, Porter brought to the table a new way of looking at local and regional economies from a micro-economic level in terms of how networks of businesses and their support systems relate to each other, their region and the marketplace. “Cluster mapping” by itself is a useful tool for most any economic development effort, as it helps identify key industry interconnections and related support systems in the local economy, strengths and weaknesses, and opportunities to build on identified clusters.

From a practitioner’s standpoint, these two approaches (traditional recruitment vs. homegrown) are not considered mutually exclusive, and in practice, they are largely complementary. Many states and regions have both a targeted business attraction program as well as business development efforts centered on such things as innovation, capital formation, incubation, and quality of place. This complementary, hybrid approach would seem to describe South Carolina as well.

New Carolina, South Carolina’s Council on Economic Competitiveness, has taken the lead in facilitating the cluster-based approach in South Carolina, building on the recommendations of Porter when he visited the state in 2003.<sup>18</sup> New Carolina identifies 15 South Carolina clusters ranging from tourism to nuclear energy, including the auto and TDL clusters.<sup>19</sup> “Clusters connect to research and to economic development to enhance innovation, efficiency and entrepreneurship, and help bring world class companies and the best and brightest young talent to a region,” according to New Carolina.<sup>20</sup>

That process of connecting research and economic development within the South Carolina automotive cluster is led by the Clemson University International Center for Automotive Research (CU-ICAR), located in Greenville. CU-ICAR is “an advanced-technology research campus where academia, industry and government organizations engage in synergistic collaboration,” whose vision is to be “the premier automotive and motorsports research and educational facility in the world.”<sup>21</sup>

“CU-ICAR distinguishes the cluster,” reflects a 2011 Harvard Business School study on the South Carolina automotive cluster.<sup>22</sup> Established in 2003 and opened in 2006, CU-ICAR has made impressive in-roads in a relatively short period of time. According to the CU-ICAR website, total investment in the 250-acre complex has reached \$250 million with 770 on-campus jobs and another 720 announced.<sup>23</sup> Partners include industry pillars such as BMW (which has a research facility within the park) and Michelin, as well as new and upcoming companies such as Proterra, Inc., which was formed in 2004 and is at the foreground of producing zero-emission battery-electric buses for America’s transit community (see A Regional Perspective, page 16).<sup>24</sup>



CU-ICAR students roll out Deep Orange 3 at the 2012 Specialty Equipment Market Association show in Las Vegas. Deep Orange is part of the graduate automotive engineering program at CU-ICAR, where students are required to create and manufacture a new vehicle prototype, working with multi-disciplinary faculty and industry partners. Utilizing the latest breakthroughs in product and process innovation, the program provides students with hands-on experience in vehicle design, engineering, prototyping, and production. Photos courtesy CU-ICAR.





Not going unnoticed, CU-ICAR was recognized in 2009 as the “top emerging technology research center” by the Association of University Research Parks, a group which represents research parks from around the world.<sup>25</sup> CU-ICAR was also recently named as one of five global best practices by the National Academy of Sciences.<sup>26</sup> It should also be noted that Clemson ranks among the top automotive engineering programs in the United States, a major asset to the South Carolina auto cluster in terms of supporting research activities, as well as workforce development, providing an ongoing stream of undergraduate and graduate engineers to the cluster.

In addition to innovation, another watchword of cluster development is industry collaboration. The South Carolina Automotive Council (SCAC) is a division of the South Carolina Manufacturers Association (SCMA) and is the “state’s leading organization dedicated to advancing the state’s automotive manufacturing sector in a global marketplace.”<sup>27</sup> According to Lewis Gossett, President of the SCMA, the SCAC is unique among its various industry councils in that it includes not only industry members, but also economic development partners, including CU-ICAR and regional economic development organizations throughout the state.<sup>28</sup> The SCAC provides a forum to “collaboratively and collectively” address the needs of the auto manufacturers over a range of issues and provide a direct conduit to regional allies who can help advocate for these needs.<sup>29</sup>

## Reinventing the Wheel

The “Tweel” is a next generation tire developed at the Michelin Americas Research Company (MARC) in Greenville, SC. First introduced by Michelin in 2005, this technological breakthrough was named by Time Magazine as “One of the most amazing inventions of the year” and was a 2013 Edison Awards finalist. The Tweel is a tire and wheel combination that does not require air. According to Michelin, “It replaces the 23 components of a typical radial tire and is comprised of a rigid hub, connected to a shear band by means of flexible, deformable polyurethane spokes and a tread band, all functioning as a single unit.” In October 2012, Michelin announced that it would be distributing the MICHELIN® X-TWEEL™ SSL for skid steer loaders used in the landscaping, construction, and agricultural industries, among others. (Source: Michelinmedia.com).



*Photos courtesy Michelin NA*

## The Cluster by the Numbers

While the impact of the auto and ground transportation industries on the South Carolina economy may seem obvious with the large presence of BMW and Michelin alone, the full breadth and depth of the auto cluster was not realized until 2011, when the University of South Carolina (USC) Moore School of Business published the first comprehensive analysis of this economic engine.<sup>30</sup> Such analysis is quite valuable to economic development and industry organizations, not only for strategic planning purposes, but also in terms of return-on-investment (ROI) data needed to influence public policy and generate support for programs and initiatives that help foster economic development.

The results are eye-opening, describing a “flourishing” industry cluster that plays a “unique role” in job creation, “which is the most pressing economic imperative in South Carolina today.” According to the USC study, which was based on 2008 data, the auto cluster has a total economic impact of \$27.1 billion through the “knock-on effect” of spending by assemblers and suppliers tied to the industry. The ripple effect of this chain of activity supports an estimated 84,935 full-time job equivalents, based on calculations done at the Moore School of Business, Division of Research, or about 5.4 percent of the state’s total employment.

So how does the auto cluster generate so many jobs and such an economic impact? The “unique role” the auto cluster plays in job creation refers to the high employment multipliers that are prevalent in this industry relative to others, which drives this ripple effect in terms of direct, indirect, and induced income and employment.

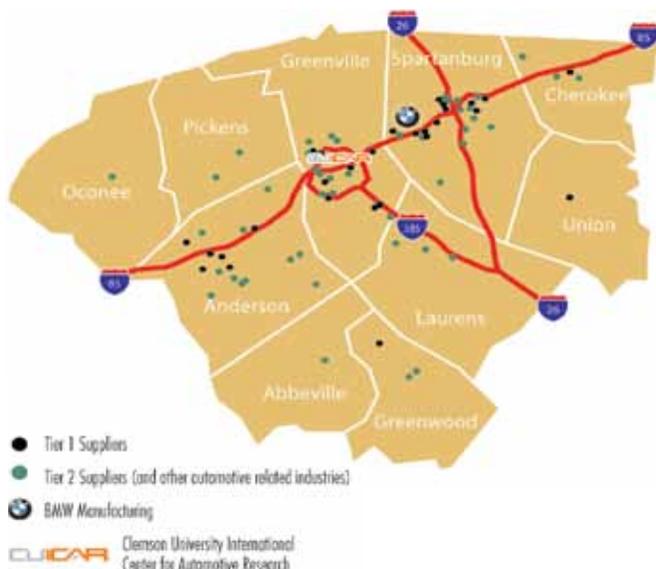
For example, auto manufacturing has a total employment multiplier of 4.09. This means that for every one job created in auto manufacturing, over three jobs are created elsewhere in the economy. The multiplier is even higher for military vehicles (5.52) and light truck and utility vehicle manufacturing (4.59). The automotive manufacturing multipliers are more than 1.5 times higher than the South Carolina industry average, according to the USC study.

So what comprises this auto cluster? According to the USC study, the “core” cluster includes 12 Original Equipment Manufacturers (OEMs) that assemble a final product in the state, and 309 core suppliers who are mostly “Tier 1,” meaning they sell directly to OEMs. The larger cluster supplier network is composed of over 4,600 firms that include “Tier II” suppliers who generally do not sell directly to OEMs and provide a wide range of goods and services.

BMW is the sole assembler of passenger vehicles in the state and represents the majority of the OEM numbers. Other OEMs include a range of other ground transportation firms, such as Force Protection, a large armored military vehicle OEM, and American La France which produces emergency vehicles, among others, according to the Moore School.<sup>31</sup>

It should also be noted that the average salary in the South Carolina automobile industry is about 30 percent higher than the state average, based on 2010 data.<sup>32</sup> Together, these impressive economic data points help validate the state and regional resources that have been used to nurture the auto cluster, and certainly makes a good case for continued support.

## A Regional Cluster:



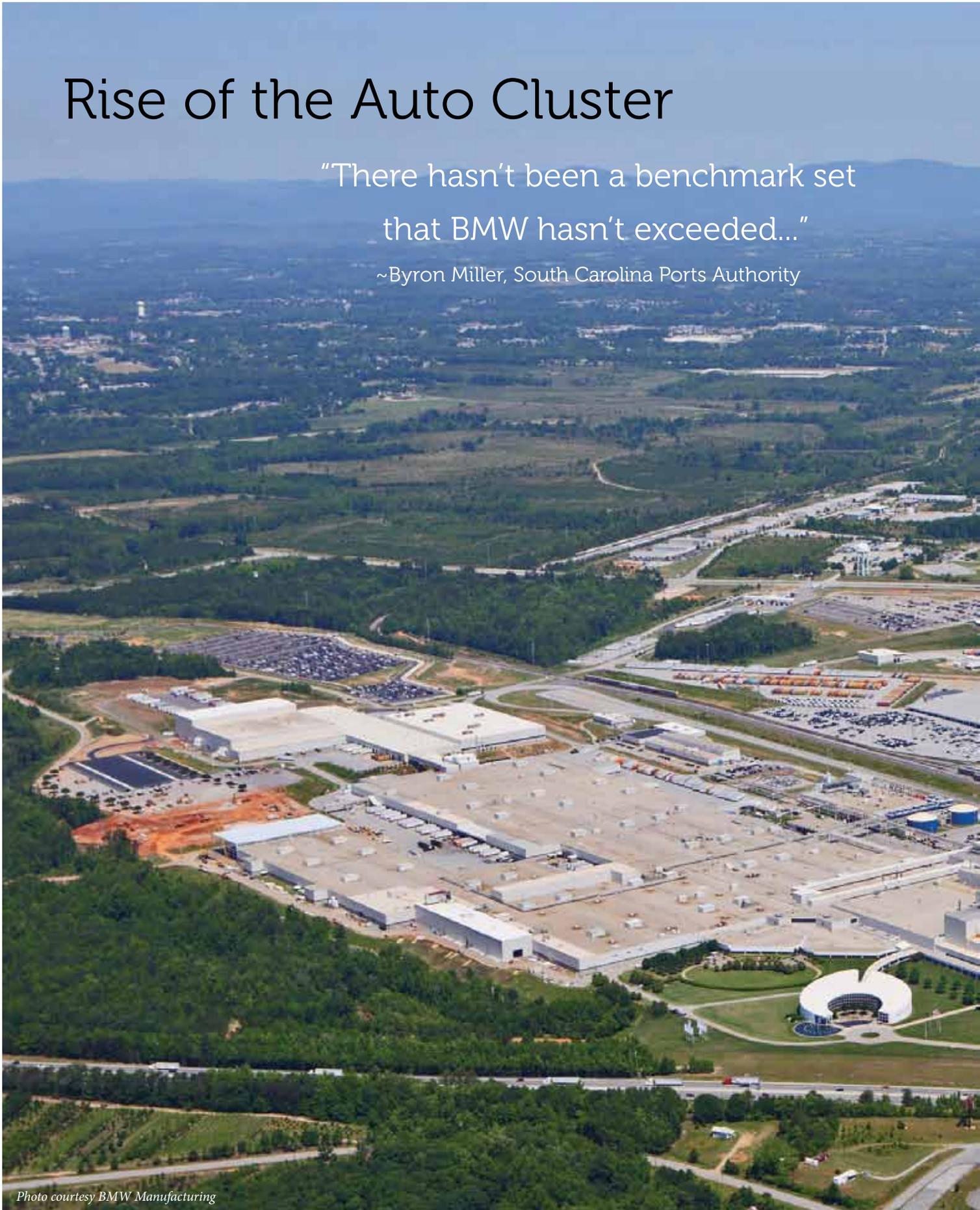
## The Upstate

While there are several local concentrations within the state, Spartanburg and the surrounding Upstate region is the largest. The “cluster map” of the Upstate (left) features its array of assets, including BMW as a major anchor, several Tier 1 and Tier 2 suppliers, and Clemson University’s International Center for Automotive Research (see “A Regional Perspective: The Upstate,” page 16). Map courtesy of the Upstate Alliance.

# Rise of the Auto Cluster

“There hasn’t been a benchmark set  
that BMW hasn’t exceeded...”

~Byron Miller, South Carolina Ports Authority



*Photo courtesy BMW Manufacturing*



## The Beginnings: Textiles, Tires, and Auto Parts

While today's auto cluster in South Carolina has largely emerged over the last few decades, manufacturing roots run deep in the state. In fact, BMW is not South Carolina's first auto assembler. Anderson Motor Company assembled custom built luxury vehicles in South Carolina from 1916 – 1926, producing 35 cars a day at its peak, and South Carolina fabrics were also reportedly used in the car seats of the Ford Model T.<sup>33</sup>

Anyone familiar with South Carolina knows that the textile industry is a big part of the state's economic history. Textile employment peaked at about 230,000 in 1973,<sup>34</sup> and has since seen a steep decline. Much of this can be attributed to increased foreign competition and automation that reduced the industry's labor needs.

As the textile industry began its decline in the 1970s, so too did the state see the arrival of companies such as Michelin and Bosch, the beginnings of today's auto cluster and part of an economic "changing of the guard."<sup>35</sup> As Commerce Secretary Hitt explains, employment attributed to the automotive industry was not insignificant at the point when BMW arrived in 1992, with the equivalent of about 20,000 jobs being automotive-related.

### BMW Comes to Town (1992)

According to Commerce Secretary Hitt, "BMW put us on the map" when the company decided in 1992 to locate its first full manufacturing facility outside of Germany in Spartanburg, which was organized as BMW Manufacturing Company. Hitt says the parent company's decision "had a remarkable effect on the psychology of the state," with BMW being recognized worldwide as a "high brand" in Hitt's words.<sup>36</sup> How high?

BMW was ranked 12th by Interbrand for Best Global Brands for 2012, one notch above Disney.<sup>37</sup>

The decision to locate in South Carolina did turn a lot of heads at the time. Site Selection Magazine, a leading economic development trade publication, reported in August 1992 that BMW had decided to bring "perhaps the year's biggest facility—a huge new manufacturing plant—to the Greenville-Spartanburg area... chosen from among 250 sites worldwide."<sup>38</sup>

Why South Carolina? Most accounts point to some common themes, such as availability of qualified workers, a good educational training system, necessary transportation infrastructure including the deepwater port of Charleston, and a pro-business attitude led by then-Governor Carroll Campbell. The presence of several international companies doing business in the state and region was certainly a plus, such as Michelin and Bosch. It has been noted that being in the Eastern Time Zone was also helpful, in terms of facilitating communications between Germany and the United States within the same business day.

Beyond the number crunching and decision matrixes, however, more intangible factors also help shape business

site selection decisions. John Butera currently serves as senior economic adviser to Maine Governor Paul LePage, but 20 years ago he worked for Fantus, the site selection company that advised BMW in the selection process and helped negotiate the incentives package.

What Butera particularly remembers from his work on the Fantus project team was the speed and responsiveness of South Carolina officials "at all levels of government," who were able to do "amazing things" in a tight timeframe. "In this business, there are those who 'talk the talk,' and then those who can actually 'walk the walk,' but the South Carolina team was in a league of its own," says Butera.<sup>39</sup>

### The Cluster Blooms (1992 – Present)

Since BMW's arrival, the estimated employment impact of the auto cluster has grown over four-fold. Other contributing factors include expanded auto parts manufacturing, the rapid growth of the state's tire industry, the location and growth of other segments of ground transportation, and the role of transportation and logistics services which help facilitate the sourcing of parts and raw materials and delivery of finished goods.

Regarding the company's own trajectory, "there hasn't been a benchmark set that BMW hasn't exceeded," notes Byron Miller of the South Carolina Ports Authority.<sup>40</sup> According to a written history of BMW Manufacturing and its workforce provided by the company,<sup>41</sup> its initial pledge in 1992 was to invest \$600 million in new facilities, employ 2,000 associates by the year 2000, and attract at least nine suppliers to the state.

To Miller's point, by the year 2000 the company actually reached 3,000 people, a number that grew to over 7,000 by 2012. In that year, BMW announced yet another expansion approaching \$900 mil-

"In this business, there are those who 'talk the talk,' and then those who can actually 'walk the walk,' but the South Carolina team was in a league of its own." ~John Butera



*Employees look on during an April 2012 announcement that Michelin is building a new Earthmover tire facility in Anderson County, SC and expanding an existing plant in Lexington County, SC. Photo courtesy Michelin N.A.*

lion to increase volume to 350,000 units per year and add another product line by 2014, and hire another 300 employees in 2012 and 1,000 by the end of 2014.

In terms of the company's footprint in the community, between 1992 and 2010 the BMW plant went through four expansions totaling \$5 billion (not including the most recent \$900 million expansion). The current facility covers about 4 million square feet of production space, roughly 92 acres of building space. These walls house not only the assembly lines but body and paint shops as well as other support services.

BMW's growth has also fed into a flourishing supply chain. Its North

American supplier network has grown from 22 companies in 1992 to 170 today, 40 of which are in South Carolina. Between BMW's own operations, its South Carolina supply chain, and other associated activities, annual economic output was more than \$8.8 billion, based on 2007 data, according to a study conducted by the University of South Carolina.<sup>42</sup> BMW reports that its activities account for more than 28,000 jobs in the state, about 3.2 percent of the state's manufacturing workforce.<sup>43</sup>

Contrary to other foreign automotive companies that have set up production facilities in the United States, in recent decades to focus on the North American markets, BMW was set up in

Spartanburg from the beginning to be a global company. In fact, South Carolina is also the largest auto exporting state in the United States based on value, \$7.4 billion in 2011.

Beginning with one line in the early 1990s, today BMW Manufacturing of South Carolina is the sole global producer of the X3 Sports Activity Vehicle, X6 Sports Activity Coupe, X6 M Sports Activity Vehicle, X5 Sports Activity Vehicle, X5 M Sports Activity Vehicle, and the X5 xDrive 35d (Advanced Diesel Vehicle). Any of these models seen on the streets of China, Germany, Brazil, or anywhere else around the world are most likely among the more than 2 million vehicles built to date at the Spartanburg facility.

## South Carolina's Booming Tire Industry

Another driver of the auto cluster's impressive numbers is South Carolina's rapidly expanding "sub-cluster" of tire makers.<sup>44</sup> South Carolina overtook Ohio in 2011 as the largest exporter of tires in the country, reaching \$1.6 billion, triple the previous year's production. With three international tire makers all making major investments in new capacity, South Carolina is likely to become the top tire producing state in the nation within the next year or two, overtaking Oklahoma.

The story begins in the late 1960s.<sup>45</sup> Michelin was at the forefront of introducing the radial tire to the North American market at that time, landing major contracts with Ford and Sears, which helped establish the company as a major player. Responding to accelerating global demand for radial tires, Michelin North America embarked on an ambitious expansion plan that involved 23 new plants, all producing radials.

In 1971, two plants were opened in Nova Scotia, and Michelin announced its intention to locate two new plants in western South Carolina as well, both opening in 1975. The plant known as "US1" in Greenville was designated to produce finished radial passenger tires from semi-finished products supplied by the "US2" facility in Anderson, South Carolina. A third plant ("US3") opened in Spartanburg in 1978, dedicated to producing radial truck tires for that growing market segment.

According to Steve Evered, Michelin's Vice President for Government Affairs, some of the key location determinants were the availability of sites that met Michelin's needs, the deepwater Port of Charleston, and a good

workforce.<sup>46</sup> He also stresses the critical role of the Technical College System in partnering with the company to address workforce training needs, recognizing the work of late Governor Ernest "Fritz" Hollings, who drove the creation of the modern technical college system in the early 1960s that is now nationally acclaimed for partnering with private industry to meet workforce needs.<sup>47</sup>

Moving into the 1980s, the partnership between Michelin North America and South Carolina rose to a new level when the company moved its headquarters to Greenville in 1988. Today, Michelin North America employs approximately 22,300 in the United States, Canada, and Mexico. About 8,000 employees are based out of South Carolina, making Michelin the state's largest manufacturing employer. As home base for Michelin, South Carolina and the Upstate benefit from approximately 1,960 employees assigned to the Greenville headquarters (which does include field sales and support staff members who work remotely). Greenville is also home to Michelin Americas Research Company (MARC), employing another approximately 1,000 people, many of whom are engineers.<sup>48</sup>

In response to growing market demand, Michelin North America announced in April 2012 that it would break ground on a new earthmover tire plant in Anderson County and expand its existing earthmover facility in Lexington County.<sup>49</sup> The two projects total \$750 million in investment and 500 jobs, on top of Michelin's 2011 commitment to invest \$200 million into its Lexington County passenger and light truck tire manufacturing facility that will create 270 jobs.<sup>50</sup>

More recently, the company announced in January 2013 that it would expand its existing rubber production operations



*Jochen Etzel, Continental Tire, is joined by South Carolina Governor Nikki Haley and other state and local officials for a March 2012 ground breaking in Sumter County, SC. Photo courtesy SCDOC.*



*(Above) Gary Garfield, CEO and President of Bridgestone Americas, is joined by South Carolina Governor Nikki Haley and other state and local officials for the announcement of the construction of a new 1.5 million sq. ft. off-road radial tire manufacturing facility in Aiken County, SC, and an additional 474,000 sq. ft. expansion of an existing passenger and light truck tire plant in Aiken County. (Photo: SC Dept. of Commerce)*

*(Right) Michelin North America President Pete Seleck at a January 2013 announcement of a \$200 million expansion of Michelin's semi-finished rubber production plant in Starr, SC. (Photo courtesy Michelin)*



in Anderson, investing approximately \$200 million and generating another 100 jobs when the facility goes online in 2014. All totaled, over the last 24 months Michelin has committed to invest a total of \$1.15 billion and create at least 870 new jobs in South Carolina.

Other South Carolina tire makers are also making major investments to increase capacity. In September 2011, Bridgestone Americas (a subsidiary of Tokyo-based Bridgestone) announced the construction of a new 1.5 million square foot manufacturing facility in Aiken County to produce off-road radial tires, as well as a 474,000 square foot expansion of its existing passenger and light truck tire plant in Aiken County.<sup>51</sup> The total investment of \$1.2 billion in these new projects will generate more than 850 jobs.

Shortly after the Bridgestone announcement, Continental Tire the Americas, LLC announced in October 2011 that it would be building a new \$500 million green-field facility in Sumter County to produce passenger and light truck tires.<sup>52</sup> The new plant is expected to produce 1,700 jobs over the next ten years.

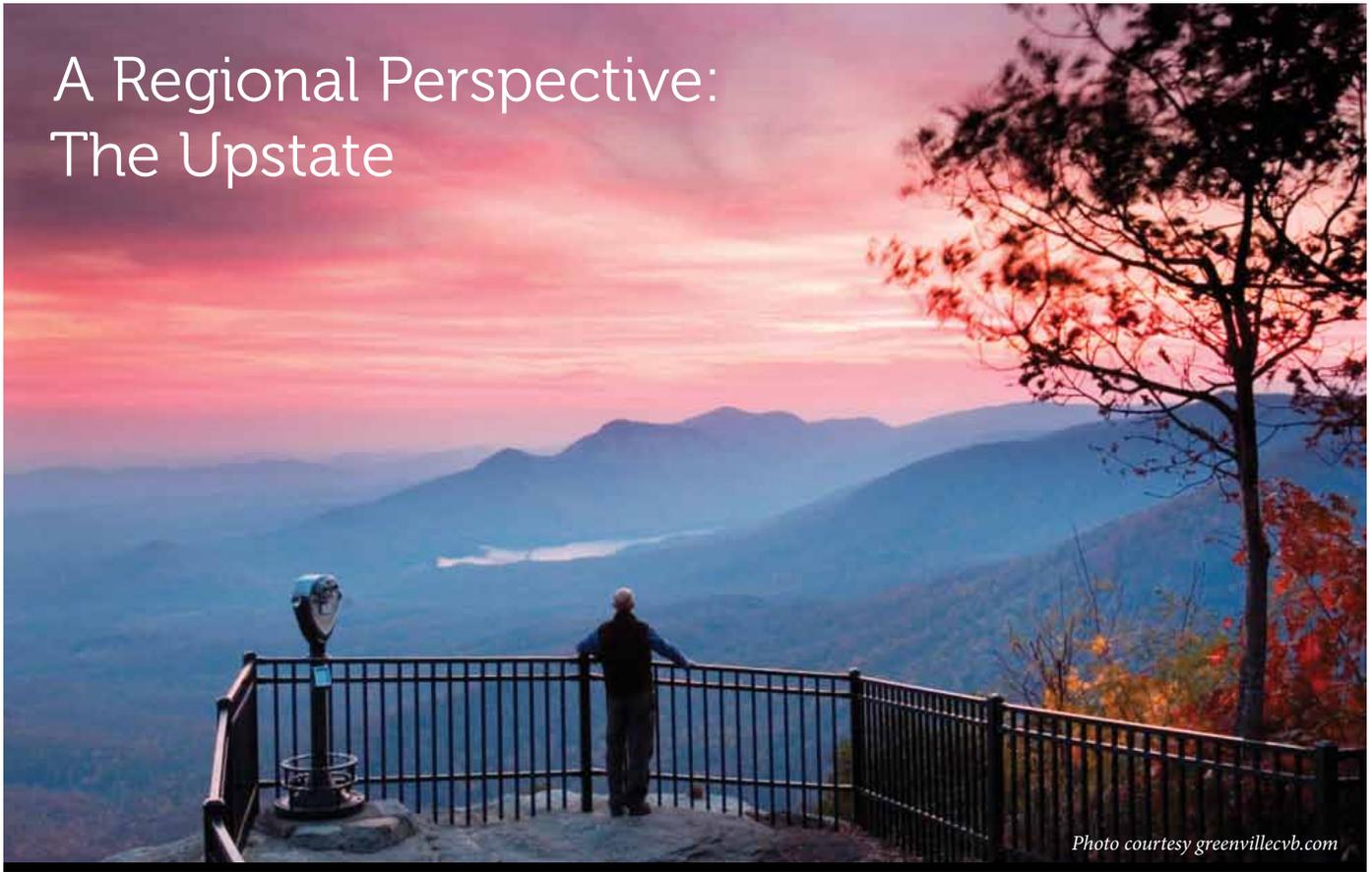
To help leverage these and other such investments, the state provides site and infrastructure grants as well as eligibil-

ity for job credits and other economic development incentives. In these cases, the state is providing \$15.5 million in grants to Bridgestone for infrastructure and site work including public road improvements adjacent to the site. It is providing \$31 million for the purchase and improvements to the Continental site, as well as \$4 million in federal Community Development Block Grant funds. Michelin is receiving a \$1.5 million grant from the state to support its recently announced expansion in Anderson County.

The Upstate, comprising 10 counties in northwest South Carolina, is home to BMW Manufacturing Company in Greer, and Michelin North America, which includes its North American headquarters in Greenville, several manufacturing plants, and Michelin's primary North American research facility. These two firms alone employ thousands of people in the Upstate and are among the more than 150 automotive-related companies that call the region home.<sup>53</sup>

The success of the automotive and ground transportation industries in the Upstate can be traced to a manufacturing tradition going back decades, as the region has historically been the manufacturing center of the state. As of 1972, about 41 percent of the region's jobs were in manufacturing, which alone represented almost half of all manufacturing jobs in the entire state.<sup>54</sup>

# A Regional Perspective: The Upstate



*Photo courtesy greenvillecvb.com*

The Upstate, following state and nationwide trends, experienced a major economic restructuring over the subsequent decades from a heavy concentration in traditional manufacturing (like textiles) to more jobs in the trades and service sectors. In addition, the region was also able to leverage its manufacturing-related assets to successfully diversify into new areas such as the automotive industry.

Steve Pelissier is the executive director of the Appalachian Council of Governments (ACOG), an economic development district that serves six of the Upstate counties. ACOG, along with three metropolitan planning organizations, oversees regional transportation planning efforts under contract to the South Carolina Department of Transportation. Pelissier credits area leaders back in the 1970s and 1980s for having the vision to target Western Europe for foreign direct investment, given the relatively large concentration of German, French, and Italian companies that already existed at the time along the I-85 corridor.<sup>55</sup> The textile industry was also buying much of their production equipment from German and Italian companies who had become familiar with the Upstate. Leveraging these international connections and supporting assets helped lay the foundation for the rise of the auto industry in the area.

Leading the way is the Upstate South Carolina Alliance, which was formed in 2000. The Upstate Alliance is a public-private economic development organization charged to “position

and market the Upstate South Carolina region to successfully compete for business investment globally.” The Alliance has targeted not only the auto industry, but also energy, biosciences, aerospace, and advanced materials.<sup>56</sup> Hal Johnson, president of the Alliance for over eight years, says the Alliance was formed to leverage the efforts of various county and business groups to be the “marketing and branding arm” for the region through “a singular message.”<sup>57</sup>

According to Johnson, the population in the greater Greenville metro area has now grown to about 1.3 million people. From a marketing standpoint, the area’s population is reaching a critical mass in competing for types of development that require the amenities and services of a larger urban area. He points to the region’s strategic location between Atlanta and Charlotte on the I-85 corridor (both about 2-3 hours away), connections to the Port of Charleston, and air service through the Greenville-Spartanburg Area International Airport and nearby Atlanta and Charlotte.<sup>58</sup>

While the Upstate Alliance and other groups are heavily involved in marketing the region to potential investors, the Appalachian Council of Governments is another voice at the table, albeit in more of a supporting role. Through its regional economic development planning process, ACOG engages in strategic planning with local public and private stakeholders to ensure adequate access and capacity of roads, water, sewer, and

bandwidth, and to work with the local governments and identify grant resources to provide such infrastructure.<sup>59</sup>

In addition, ACOG created and administers a program called InfoMentum, an online economic development support system. InfoMentum is used by the Alliance and each county economic development office to market industrial properties, report socio-economic data, and access maps for traffic counts, Census tracts, and aerial photos, all of which plays a role in the region's growth in the auto industry and other sectors. Through InfoMentum, ACOG supported economic development efforts that resulted in the announcement of almost \$2.3 billion in capital investments and 4,117 new jobs in 2012 alone.<sup>60</sup>

Together, these marketing and supporting efforts have positioned South Carolina's Upstate for growth, especially through foreign direct investment. Beyond the ongoing expansions at BMW and Michelin, the Upstate has recently landed some other notable projects. The Germany-based ZF Group, which is ranked among the top ten automotive suppliers worldwide, announced in 2010 that it would be investing \$350 million to build a transmission plant in Laurens County, adding this major auto component to the local supply-mix, and creating an estimated 900 jobs. Due to rising demand, ZF further announced in 2011 that it was investing an additional \$80 million in the Laurens County facility that would result in another 300 jobs, citing the "outstanding" relationship between ZF and the county, a \$500,000 site assistance grant from the state, and readySC training assistance.<sup>61</sup>

The Upstate is also the center of innovation for the South Carolina auto industry, with the Clemson University International Center for Automotive Research located in Greenville (see Clusters, page 6). One example of a company

that has benefited from this collaboration between industry, academia, and economic development in the Upstate is Proterra, Inc. The company is the leading provider of zero-emission commercial transit solutions and maker of the world's first battery-electric fast-charge transit bus, the EcoRide™. Proterra relocated to Greenville in 2010 and had 35 employees at that time. Today they are at 175 with expectations to grow rapidly within the next few years.<sup>62</sup>

As testimony to the support the company has received in the Upstate, Proterra CEO David Bennett has stated, "I know that great support from the Upstate business and political community made it easy for us to locate here. When you combine that with Clemson University's local automotive technology initiative (CU-ICAR) and the local talent base that we have here in the automotive field, Greenville is the perfect home for Proterra."<sup>63</sup>



*Photo courtesy Proterra*



*Carol A. Campbell Graduate Engineering Center at Clemson University. Photo courtesy CU-ICAR*



*ZF Group groundbreaking in Laurens County, Feb. 2, 2011. Photo courtesy SC Dept. of Commerce*

# Transportation and Logistics: The Lifeblood of Commerce



Photo courtesy BMW

## The South Carolina Freight System and the Auto Cluster

A sizeable portion of the automotive industry in South Carolina is concentrated in the Upstate region along Interstate 85, which runs north-south through the northwestern part of the state and connects to the major population centers and transportation hubs of the Southeast. The heavily industrialized I-85 corridor is projected to be the fastest-growing part of the Southeast over the next 20 years, with the Upstate strategically centered on that route between Atlanta and Charlotte.<sup>64</sup>

There is a significant concentration of the automotive and ground transportation industry located around Charleston as well, including automotive components manufacturer Robert Bosch and armored vehicle manufacturer Force Protection. Also within the transportation industries family, aviation giant Boeing has a significant presence in the region. Transportation connections between the Port of Charleston and the Upstate/I-85 corridor are therefore vital to the success of the South Carolina auto cluster for the inward and outward movement of raw materials, intermediate and finished goods, and people, as well as access to domestic and international markets.

Interstate 26 is the major east-west highway in the state, connecting the Port of Charleston with the Upstate (and I-85 corridor), about a 3.5-hour trip between the Port and Greer, home of BMW.<sup>65</sup> I-26 also intersects with I-95, which runs

north-south through the coastal corridor of South Carolina connecting the state to the major East Coast cities from Boston down to Miami. Interstates 20 and 77 connect the central regions of the state into the mix as well.

South Carolina's rail system has 2,200 miles of track in the state serving all 46 counties.<sup>66</sup> This trackage includes two Class I railroads—CSX and Norfolk Southern—which both operate large rail yards in Charleston and long-haul opportunities for South Carolina manufacturers.<sup>67</sup> South Carolina also has three international airports to accommodate business needs, and the Hartsfield-Jackson Atlanta International Airport is in close proximity to the Upstate as well. Highway, rail, port, and air transportation in various combinations all play an important role in supporting the auto cluster and the varied needs of its members.

In July 2012, the South Carolina Department of Transportation began the preparation of a long-range multimodal transportation plan that will extend out to a 2040 time horizon. The planning process will have a strong focus on “enhancing freight mobility across all modes to promote South Carolina's economic competitiveness in a global market place.”<sup>68</sup> The process will involve a wide group of stakeholders through a Freight Resources Planning Committee and will culminate in SC's first-ever Statewide Freight Plan, which will also coordinate freight movement needs with local economic development plans.<sup>69</sup>

Ron Mitchum is executive director of the Berkeley-Charleston-Dorchester Council of Governments, which provides the Charleston region with economic development, regional planning, and transportation planning services, including the operation of the federally designated metropolitan planning organization, which conducts the ongoing transportation planning for the region. Mitchum, who has a long history of service in the area, has seen the changing demands on the transportation system particularly with the arrival and growth of BMW with its “just-in-time” transportation needs and world-wide markets.<sup>70</sup>

Mitchum notes that there is a much greater level of interaction today between the transportation groups, as well as a greater recognition of the connection between transportation and economic development, pointing to SCDOT’s long-range multimodal transportation plan and the strong economic development and freight components of the plan, and active participation of the South Carolina Ports Authority, and Department of Commerce. He also points to the emergence of the Transportation, Distribution and Logistics Council, which is bringing a new level of stakeholder involvement to the table.

## Role of the South Carolina Ports

The South Carolina Ports Authority (SCPA) owns and operates the Ports of Charleston and Georgetown.<sup>71</sup> The Port of Charleston includes five public terminals spanning three communities, which handle containers, automobiles and other rolling stock, and other non-containerized and bulk commodities, as well as machinery and heavy equipment destined for production facilities in the region. Georgetown is located about an hour north of Charleston and specializes in bulk and break-bulk materials such as cement, steel, and forest products. Over

30 marine carriers service the South Carolina ports.

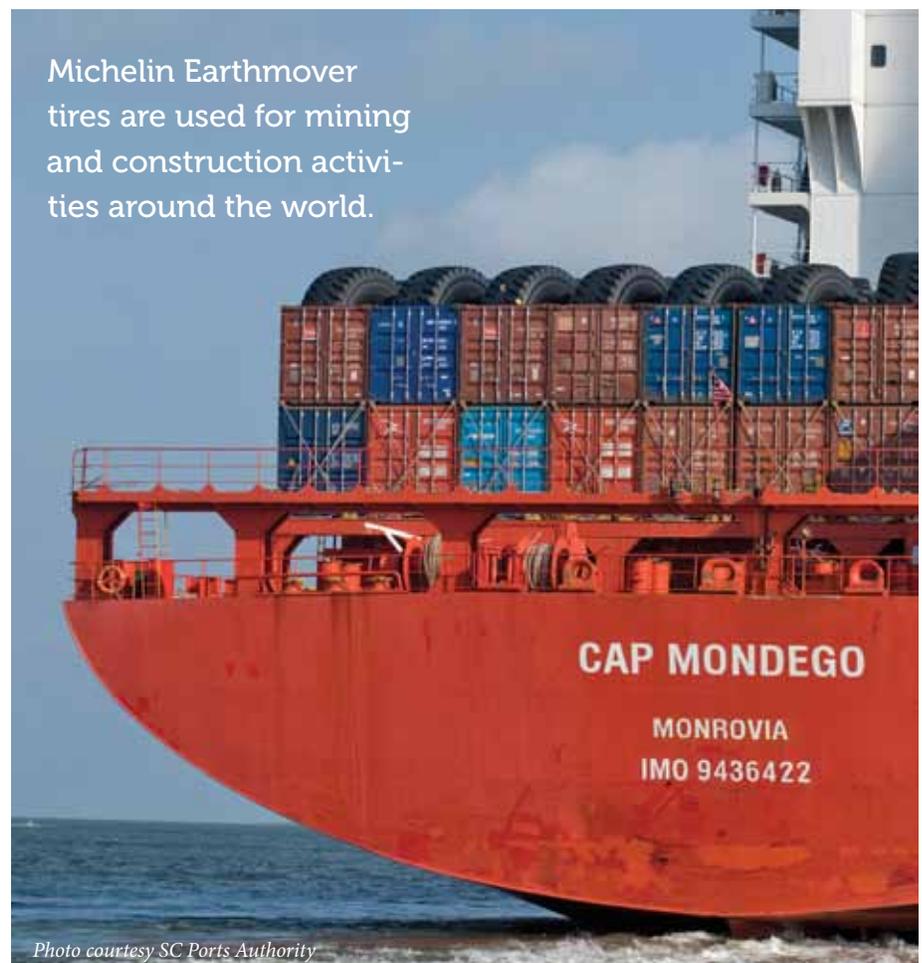
According to Byron Miller, SCPA’s vice president for Marketing and Sales Support, the ports serve a six-state region in the Southeast, with South Carolina representing the core of the business, about a third of the volume. In terms of domestic reach, there are approximately 60 million people within 500 miles of the Port of Charleston, and the Southeast market is expected to grow by 43 percent over the next 20 years according to the SCPA.<sup>72</sup>

The impact of the state ports is far reaching, as port operations facilitate an estimated 260,800 jobs in South Carolina and approximately \$45 billion in annual economic activity, as well as handling international commerce valued at around \$58 billion per year. While the Ports Authority is operationally independent and self-supporting, there is little ambiguity

about its mission or role in the state’s economic development, as it “exists to drive economic investment to South Carolina.”<sup>73</sup>

BMW Manufacturing and the SCPA have an “incredibly close working relationship” requiring “constant communication,” says Miller. Indeed, the BMW operation in South Carolina exports about 70 percent of the vehicles manufactured in the state to 130 countries around the world, with an exported cargo value of approximately \$7 billion.<sup>74</sup>

On the import side, Charleston handles about half of the components imported for BMW, according to Miller. The Ports Authority was on the team that worked to bring BMW to South Carolina, played prominently in the company’s location decision, and actually provided the land in Greer where the BMW campus now sits.



The relationship between the Ports Authority and Michelin goes back even further, almost 40 years, and also played a key role in attracting the company to South Carolina. According to Steve Evered of Michelin, about 35–40 percent of everything that Michelin North America moves in and out of the United States goes through the Port of Charleston. Michelin imports large quantities of rubber from Southeast Asia, which feed its two rubber conversion plants in Anderson County, including the largest such facility in the world. Evered notes that Michelin North America was set up to serve the North American market, which absorbs about 90–95 percent of tire production, so exporting isn't a large part of the business. An exception is the earthmover tire, with about 80 percent being exported to markets as far away as Australia.

While the Port of Charleston has played an essential role in the growth of the South Carolina auto cluster and supporting economic development in the state, the port did experience some slippage in containerized volume in the 2000s. Charleston had ranked fourth in the country, but as of 2010 had dropped to ninth on the list, catching the attention of the business and economic development communities. Meanwhile, the Port of Savannah, Georgia (Charleston's primary competitor), rose from ninth to fourth place. According to New Carolina, Savannah's ascent is largely due to the commitment of the State of Georgia to attract distribution centers near the port to better accommodate shipments into the U.S. market.<sup>75</sup>

## Meeting the Challenge: Investing for the Post-Panamax World

Despite the slippage during the 2000s, there has been a decided turnaround at the Port of Charleston and a number of positive developments. Ac-

cording to the SCPA, Charleston was the fastest-growing of the 10 largest container ports in the United States for the first six months of 2012, with Charleston container volume growing 7.4 percent from January to June 2012.<sup>76</sup>

For all of 2012, SCPA reports that container traffic was up nearly 10 percent.<sup>77</sup> The SCPA also has aggressive plans for upgrading the port facilities to compete for volume and support the state's industries.

Miller also points to the formation of the aforementioned Transportation, Logistics and Distribution Council in 2010, supported through New Carolina, South Carolina's Council on Economic Competitiveness. This initiative is focusing on TDL as an economic cluster in itself, bringing together key public and private sector stakeholders to help grow and nurture this support system which is also vital to virtually all industry in the state.<sup>78</sup> In this era of global trading and tight delivery windows, many shippers are looking for factory-floor to showroom-floor transportation solutions, and having the full package of transportation, as well as logistics and distribution services, will be a key to regional competitiveness.

Charleston and other Southeastern ports stand to potentially gain by the expansion of the Panama Canal, which will double its capacity by 2015. The expansion may eventually lead to some traffic from eastern Asia being diverted from the North American West Coast to the East or Gulf Coasts via the Panama Canal. The southeastern ports may be well positioned to capitalize on this opportunity, provided they can accommodate the growing fleet of the large Post-Panamax ships that are increasingly going into service and will be taking advantage of the expanded Canal when it is completed.<sup>79</sup>

Charleston already hosts about 5–6 Post-Panamax ships per week according to Miller, although access can be limited

to high tide for heavily laden vessels. Plans are underway to deepen the channel from 45 to 50 feet, which will provide greater access and higher volumes. As a strong vote of confidence in the port and its role in economic development, the South Carolina Legislature in 2012 appropriated \$300 million for the harbor deepening project.<sup>80</sup> At the federal level, the project has been included among seven major infrastructure projects that will be expedited as part of President Obama's "We Can't Wait" initiative.<sup>81</sup>

The South Carolina Ports Authority is also joining forces with Norfolk Southern Railway in developing an "inland port" (rail port) in Greer near BMW to complement its Charleston operations. Located approximately 220 miles inland, the facility will allow for the truck-rail transfer of containers for BMW and other shippers. The construction of the \$35 million terminal is underway and is expected to open in September 2013. The initial capacity is 40,000 containers, but that volume could go up to as much as 100,000 within five years, which will help relieve pressure on I-26 by diverting freight from truck to rail.<sup>82</sup>

Suffice it to say that the state's freight transportation system has played a vital role in the emergence of South Carolina's auto cluster with its global orientation and extended networks of suppliers and customers. But it is about more than just the infrastructure, as there is a good amount of logistics support and strategic thinking needed to keep this economic engine humming, not to mention a high level of public-private partnership and cooperation. The synchronization of all these efforts seems well-timed, given the positive economic signs emerging. In economic development and business in general, the time to plan and act is during the down-cycle, and the marketplace rewards those with the vision to be ahead of the curve.

# Concluding Remarks

The rise of the auto cluster in South Carolina is certainly an accomplishment to be celebrated. After all, this has been years in the making, long before the idea of “industry clusters” had even entered the economic development vocabulary. The numbers are impressive by just about anyone’s standard, particularly in a medium-sized state where 85,000 jobs stretch quite a distance. The rise of this cluster has hit all the right notes—partnership, innovation, workforce development, intermodal capabilities—all have contributed.

While the growth prospects for the current auto cluster and its mix of OEMs and suppliers appears good, long-term growth prospects may require attracting new OEMs and their accompanying supply-chains, and adding more major suppliers like the ZF Group, which has built a plant to manufacture transmissions in the Upstate, adding even more local content to the supply chain.

The auto cluster should not be seen as a silo however, and should serve as a model for leveraging South Carolina assets to promote other sectors. After all, the success of South Carolina’s ground transportation cluster and the state attributes that have helped foster its growth was likely noticed and appreciated by Boeing when in 2009 it decided to locate its second 787 Dreamliner factory in North Charleston with the promise of 4,000 new jobs and a significant supply chain.<sup>83</sup>

In the end, economic development is as much art as science, born of persistence and instinct as much as economic development theory and best practices. In that respect, South Carolina has on all counts proven itself to be a most worthy competitor, underscored by the success of the auto cluster.



*Photo courtesy BMW*

# End Notes

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Zentrum Visitors' Center. Photo courtesy BMW

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*Moon over Greenville, South Carolina, courtesy greenvillecvb.com*

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