

## **REVIVING AN AMERICAN COUNTY VIA TECHNOLOGY & IMC: AIKEN COUNTY, SOUTH CAROLINA AND THE CENTER FOR HYDROGEN RESEARCH: A VEHICLE FOR ECONOMIC DEVELOPMENT**

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*Fred E. Humes was Director of the Economic Development Partnership (EDP), a non-profit organization that serves Aiken and Edgefield Counties in the State of South Carolina, as well as the Director of the Center for Hydrogen Research, a laboratory facility in Aiken County with 30,000 square feet of leasable space.*

*Fred's primary responsibility was to bring new businesses to the region, stimulate job creation, and grow the local economy. Within the boundaries of Aiken County lied the Savannah River Site (SRS), a DOD nuclear processing facility. In addition, there was the Savannah River National Laboratory (SRNL), a DOE research center, and several institutions of higher education.*

*While the area had an attractive natural environment and a supportive infrastructure for fostering research and development advances in alternative energy, the task of promoting the area was still quite challenging given a recent environmental disaster. The scientific and technological resources found in the community will need to be taken into consideration in developing an integrated marketing communications strategy to achieve the objectives of the EDP.*

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In the early wintery morning hours of January 6, 2005, a Norfolk Southern Railway train pulled into the small town of Graniteville, South Carolina. Graniteville was a small, unincorporated community in Aiken County, five miles west of the city of Aiken. Most of Graniteville's 2,500 residents were fast asleep as the train approached the town, carrying among its rail cars many tons of chlorine, a strong oxidizing agent which is extremely poisonous in high concentrations. Additional rail cars carried sodium hydroxide and cresol. At 2:40 A.M., the train collided with a second Norfolk Southern train near the Avondale Mills textile plant in the center of town. Both locomotives were derailed upon

collision. The impact was followed by large explosions, and several of the tank cars ruptured. Over 70 tons of the deadly yellow chlorine gas were released upon an unsuspecting population (Buckley, Hunter, Addis and Parker, 2007). The small southern town was now awake, and the town's fate was forever changed. The accident was, as later investigation revealed, attributed to an incorrectly-aligned railroad switch (Wald, 2005).

Eight people died on the day of the tragic accident, and one more person later died due to chlorine inhalation. More than 250 people were treated for chlorine exposure, and more than 5,000 Aiken County residents within a one mile radius of the crash site were evacuated (Stock, 2006). The accident even got the attention of Texas folk artist Doug Burr who, in 2007, released a song named "Graniteville" that told the story of a husband attempting to rouse his wife from sleep to escape the dangers of the chemical spill.

The economic consequences of the accident were not limited to the initial cost of \$30 to \$40 million to Norfolk Southern, and the \$140 million price tag to Avondale Mills for both cleanup and additional compensation to the evacuees (Jordan, 2005). Instead, five months after the incident, Avondale Mills announced that the company would be forced to reduce its workforce in the Southeast, a decision that effected 4,000 jobs (Stock, 2006). The disaster serves to highlight the fragile relationship between business and the environment. In the wake of the disaster, it was the job of Fred Humes, Director of the Aiken-Edgefield Economic Development Partnership and the Center for Hydrogen Research to overcome any negative publicity and bring new jobs to the region.

### **THE CHALLENGE OF REVITALIZING THE LOCAL ECONOMY**

Fred Humes was a native of Charleston, South Carolina where he graduated from Chicora High School in 1958 with honors. He graduated from the University of Tennessee with a Bachelor of Science degree in Business Administration and later received a Master of Science degree from Troy State University. Mr. Humes enlisted in the United States Air Force in 1962. He became a commissioned officer and, after advanced pilot training, Fred served 13 months in Vietnam and returned to the United States as a Flight Instructor. He served in various capacities at Major Air Command Headquarters, US Air Force Headquarters, and at the Pentagon in staff and operational assignments.

Mr. Humes completed his Air Force career in 1983 and began a second career with a nationally syndicated television show in Aiken, South Carolina. In 1990, he switched careers once again and joined the Economic Development Partnership (EDP), an organization that represented the economic development interests of Aiken and Edgefield Counties. Fred's primary responsibility was to

bring businesses to the region, stimulate job creation, and grow the local economy. While Director, the Partnership announced over \$5.0 Billion in new capital investment and 11,000 jobs in Aiken and Edgefield Counties. For his accomplishments, Mr. Humes was recognized twice as the "Economic Development Practitioner of the Year" by Southern Business and Development Magazine, and he was selected as one of the Top Ten Economic Developers of the Decade by the same magazine. As Director of the EDP, he was also given the responsibility of serving as the Director of the Center for Hydrogen Research, a laboratory facility in Aiken County.

In his dual role, Mr. Humes maintained two separate offices, one in the Center for Hydrogen Research near the Savannah River Site nuclear facility, and the other in the offices of the Economic Development Partnership housed at the University of South Carolina Aiken (USC Aiken). The challenges to him and his agency were to identify the unique competitive advantages of the area and successfully market the twin counties to investors, businesses, and other types of employers. The thrust of his efforts was to spotlight the Aiken County Center for Hydrogen Research and its proximity to the Department of Energy researchers working in the adjacent Savannah River National Lab (SRNL).

#### **BACKGROUND INFORMATION**

The Savannah River Site (SRS) was established in 1950 to support the defense mission of a nation deep in the throes of the cold war. The Savannah River National Lab (SRNL) was established in 1951 to provide research and development support for SRS. Originally, the most important activity of SRS was the production of weapons grade tritium (a radioactive isotope of hydrogen) and plutonium. At its peak, SRS covered 198,000 acres and employed over 38,000 workers. As the Cold War wound down, however, the site began to reduce its workforce. Today it employs approximately 10,000 people and the top priorities at SRS are nuclear disposal, Environmental Management (EM), and cleanup.

The Center for Hydrogen Research, a facility administered by EDP, was initially funded by a \$10 million investment from several sources, including major research universities, the South Carolina Hydrogen and Fuel Cell Alliance, the State of South Carolina, and private businesses. It was opened in October 2005, and had a total area of 60,000 square feet, with 30,000 square feet of leasable space. The purpose of the facility was to utilize local expertise in order to develop commercially viable hydrogen-related technology, given the 60 years of experience accumulated by SRS in the handling and storage of hydrogen. Half of the facility was used by SRNL, while the other half was open to private sector and academic clients who desired the ability to interact and have contact with the hydrogen scientists from SRNL.

The lab space was more than 17,300 square feet and contained a variety of state of the art equipment. This included a once-through ventilation system for hydrogen safety, temperature and humidity controls, hoods available in a variety of configurations, snorkels and other ventilation and exhaust systems, research gases piped into each lab, high capacity electrical service, and flexibility and adaptability to future growth.

Aiken County was also home to both the University of South Carolina Aiken (USC Aiken) and Aiken Technical College. The University of South Carolina Aiken had been consistently ranked as the best public baccalaureate college in the South by U.S. News and World Report. They offered several different Bachelor's degrees in the physical sciences, including a Bachelor of Science with a major in chemistry. In addition, Aiken Technical College had eight courses focused on fuel cells and hydrogen technology and offered a solar repair and maintenance certificate program. Additional background information on the region can be found in Appendix III.

The state of South Carolina had a great commitment to hydrogen research and to strengthening hydrogen's economic impact in the future. In a speech given on June 23, 2009, the Speaker of the South Carolina House of Representatives made the following statement:

"Over the past few years, South Carolina has made significant advancements in growing our state's knowledge-based economy. Particularly in the area of growing a hydrogen industry, South Carolina has become a national and international leader and that reputation is attracting companies looking to relocate or expand their services here."

The human resource advantage present in the area scientists, the opportunity to forge educational partnerships with USC Aiken and Aiken Technical College, and the prospect of building technological leadership in alternative energy, especially hydrogen, all need to be taken into consideration in marketing the Aiken County Center for Hydrogen Research. However, in the wake of the Graniteville train derailment disaster, Mr. Humes was concerned about the negative attention focused on Aiken County. Moreover, the accident could potentially prejudice some Aiken County residents against any new businesses dealing with potentially dangerous chemicals or related technologies.

#### **INTEGRATED MARKETING COMMUNICATIONS (IMC) PROGRAM**

Mr. Humes decided that in order to effectively market the facility and lease the space to new businesses, the Aiken County Center for Hydrogen Research needed

a new name, slogan, and logo, and that an integrated marketing communications (IMC) program should be developed. Although a decision had already been made to rebrand the Center for Hydrogen Research as the Applied Research Center for Hydrogen (or ARC: Hydrogen), Mr. Humes was not certain that this was the right approach. In order to help evaluate the ARC: Hydrogen name, and to help in the development of an IMC strategy, EDP retained the services of consultants in the field of marketing research. These experts outlined the following steps in developing a suitable IMC strategy for the center:

Phase I: Survey of Resources/Determine Principal Target Audience for Communications: Commercial Prospect List

Phase II: Evaluate Potential Visual Positioning Theme: Logo and slogans

Phase III: Determine the Key Customer Benefit and Principal Selling Message: Unique Selling Proposition (USP)

#### **PHASE I: SURVEY OF RESOURCES**

In Phase I, the consultants conducted a series of depth interviews and focus group studies to identify the unique resources available in the region. Based on these resources, a list of commercial prospects and potential investors was developed. These lists are provided in Appendixes I and II.

In addition, an interview with Dr. Joette G. Sonnenberg, Associate Laboratory Director, Energy Security and Engineering, of the Savannah River National Laboratory (SRNL), was conducted on Wednesday, December 16, 2009 at USC Aiken. The interview was designed to uncover the technical capabilities of SRNL, which may be instrumental in helping to promote the Aiken-Edgefield County Area.

The researchers began by asking, “What is the primary mission of SRNL?”

Dr. Sonnenberg responded, “SRNL has three divisions, Energy and Engineering, Environmental Management, and Homeland Security. The first one (Energy and Engineering) is mainly for hydrogen related infrastructure, the second one (Environmental Management) is for nuclear waste processing and management, and the third one (Homeland Security) is mainly for national security and not for commercial usages”.

Added Dr. Sonnenberg, “SRNL is the oldest Department of Energy (DOE) site, and also the smallest and newest as a national lab, only having that designation since 2004. Through a Lab Research Fund, the lab has been supporting the Coast

Guard, FBI, and other government agencies with sensor types of technology including such technical applications as advanced GPS”.

“The nuclear waste processing part is not commercially viable, but other technologies, such as microbe for bio fuels, algae, hydrogen from bio, and other intellectual properties (IP) in biotech are ready to be licensed to potential commercial buyers, even though DOE owns the right to first refusal. Of particular importance is the hydrogen storage technique utilizing microspheres, where glass beads at the micron level can form chemicals for medical applications such as drug delivery and other applications.”

Dr. Sonnenberg went on to say, “Businesses may be attracted to the area in many ways. One of these is the emerging nuclear renaissance. We can provide training with the test reactors, help with tank storage, use remediation technology for site cleanup work, and produce bio fuels through algae farming and sorghum farming along the I-95 corridor. For nuclear reactors, now we are into Gen 3, which is not human dependent, and Gen 4 High Temperature reactors are available as well.”

In an effort to focus the discussion towards the practical benefits to new businesses, the researchers asked, “What would be the unique advantage of the technical skills and talents found in the Aiken area?”

Dr. Sonnenberg replied, “We can absolutely say that the Aiken area boasts the highest concentration of hydrogen scientists in the world! Also SRNL has received the “Center of Excellence” designation by DOE.”

“Another advantage we have is that the Savannah River Grid, our exclusive electricity provider, is only 10% utilized. This would be a benefit to potential commercial users. And, the Center for Hydrogen Research is another attraction to potential investors,” said Dr. Sonnenberg.

Dr. Sonnenberg concluded by saying, “There are already some energy/alternative energy companies in the area, such as Cell Guard, a manufacturer of solar panels.”

“Are there any other strengths that SRNL possesses that we should consider?” asked the researchers. “We have expertise in training, in nuclear related fields, especially in materials. Our strengths are in technology development, technologies for fuel separation and processing, capabilities studies, bio technology, clean fuels technology, battery technology, solid hydrogen storage and new energy source,” Dr. Sonnenberg replied.

“Also, the use of SRNL facilities is possible. We can choose to have shared management, pay-per-use, small pilot plants, pilot facilities, etc., to help new businesses reduce cost,” continued Dr. Sonnenberg.

Finally, the researchers asked, “What would be the advantage of SRNL over other labs? Who are your competitors?”

“We have advantages in many nuclear related fields, such as medical diagnostics, sensor technology, and agricultural potential in farming crops for energy,” said Dr. Sonnenberg. “Oak Ridge national Lab (ORNL) in Tennessee and the Tennessee Valley Authority (TVA) may be competing with us. They also have advantages in nuclear fuel processing and hydrogen capabilities.”

## **PHASE II: EVALUATE POTENTIAL VISUAL POSITIONING THEME**

To begin this phase of the project, several qualitative studies were conducted, including depth interviews, focus groups, and brainstorming sessions. Summaries of three separate qualitative research reports are included below.

### **QUALITATIVE RESEARCH REPORT #1**

The research was conducted on December 1, 2009 in Aiken, SC.

Objectives: The objectives of this research were to explore attitudes and impressions regarding the “Applied Research Center (ARC)” concept which the Center for Hydrogen Research was leaning towards introducing and to obtain further direction concerning additional positioning and marketing strategies. Specifically, the study sought to assess initial reactions to the following proposed positioning concepts:

- (1) ARC: Hydrogen - Applied Research Center for Hydrogen
- (2) SPARC - Sustainable Power Applied Research Center
- (3) SPARC - South Carolina Production and Applied Research Corridor
- (4) SHARE - Savannah River Hydrogen and Alternative Fuel Research Enclave
- (5) SMART - South Carolina Manufacturing and Applied Research Triangle

One focus group was conducted in Aiken, SC on December 3, 2009. The focus group consisted of a mix of 10 male and 5 female undergraduate marketing students. All participants were between the ages of 20 to 24. The focus group session lasted for approximately one hour.

Participants were asked to describe their initial impressions and perceptions of the Applied Research Center ARC concept as an umbrella organization/theme for incorporating a wide range of alternative energy initiatives. Top-of-mind impressions for Applied Research Center ARC were consistently negative and included the following:

- “The term ‘applied’ has a less than scientific connotation and seems too simple as if no groundbreaking science is taking place”
- “The primary word in the title, ‘Applied’ seems too generic”
- “The title does not cover any of the areas it should – it does not cover”:
  - New energy
  - Science
  - Aiken county
  - South Carolina
- “An acronym is useful, but ‘ARC’ is too plain”
- “Maybe it needs a logo to spice it up”
- “You should change the term to something more specific”
- “The acronym ‘ARC’ reminds you of helping others, kind of like a charity, as in Noah’s Ark”
- “Needs new descriptive terminology in the title”
- “The term ‘ARC’ reminds me of arc welding”

Participants were asked to describe their initial impressions and perceptions of the Sustainable Power Applied Research Center SPARC concept as an umbrella organization/theme for incorporating a wide range of alternative energy initiatives. Top-of-mind impressions for Sustainable Power Applied Research Center SPARC were mostly positive and included the following:

- “That is an excellent acronym”
- “It is really good and very creative”
- “The term ‘SPARC’ encourages solutions”
- “It suggests something to think with”
- “I think that acronym is really marketable and can be used in very creative ways”
- “It’s good , but I think it’s too long”

Participants were then asked to describe their initial impressions and perceptions of the South Carolina Production and Applied Research Corridor SPARC concept as an umbrella organization/theme for incorporating a wide range of alternative energy initiatives.



Top-of-mind impressions for South Carolina Production and Applied Research Corridor SPARC were consistently negative and included the following:

- The term ‘corridor’ has a very militaristic connotation”
- “Too much of a government association with ‘South Carolina’ in the front and ‘corridor’ at the end”
- “South Carolina just isn’t that reputable or marketable”
- “The term ‘Southern’ is probably better than ‘South Carolina’”

Participants were asked to describe their initial impressions and perceptions of the Savannah River Hydrogen and Alternative Fuel Research Enclave SHARE concept as an umbrella organization/theme for incorporating a wide range of alternative energy initiatives.

Top-of-mind impressions for Savannah River Hydrogen and Alternative Fuel Research Enclave SHARE were consistently negative and included the following:

- “The term ‘enclave’ makes it sound like an underground government conspiracy”
- “It is way too long”
- “It makes it sound like ‘Area 51’”
- “You should replace the word ‘enclave’ with ‘environment’”
- Prophetically, one participant said “you should come up with an acronym that spells out SMART”

Participants were asked to describe their initial impressions and perceptions of the South Carolina Manufacturing and Applied Research Triangle SMART concept as an umbrella organization/theme for incorporating a wide range of alternative energy initiatives.

Top-of-mind impressions for South Carolina Manufacturing and Applied Research Triangle SMART were mixed and included the following:

- “The use of the word ‘Triangle’ is not descriptive”
- “South Carolina is not good and should not be used in the title”
- “The ‘Triangle’ idea is good for graphic design”
- “I like ‘Triangle’ because it ties Aiken to Columbia and Greenville”
- “In general, the Hydrogen ‘Triangle’ concept can help market Hydrogen power in the entire state”

Finally, the participants began to independently brainstorm regarding a suitable acronym and suggested: Environmental and Applied Research through Hydrogen EARTH. An additional suggestion was to modify the spelling of the website on any visual communication in which it is incorporated to include the actual dot (in .org) to be represented by a globe.

## **QUALITATIVE RESEARCH REPORT #2**

In order to develop additional insights and creative approaches, a qualitative research study was planned and carried out on December 7, 2009. The session, conducted in Aiken, South Carolina, involved a brainstorming session. Participants included ten young adults ranging in ages from 20-24.

The moderator introduced the background information about the project, and explained the procedure to the participants. The following is what emerged as a result of the brainstorming session:

Marketing plan/logo should incorporate: Open Air Peace of Mind, Smiling Faces Beautiful Places, Renewing Resources Renewing Life, Alternative Ideas for Alternative Energy, Go Aiken (with pictures), Aiken is a little greener than the rest (golf course and pastures then move into economics of the area), Beautiful, Resourceful...Greener, the grass is always greener on the Aiken side.

Niche/strength of the area: Land, between two metropolitan areas, nice weather, good schools to educate skilled workers, technology, less traffic, less distraction, cheaper in SC, in the middle between Atlanta and Columbia, easier distribution for new products, prestige in Aiken (golf courses with people who want to spend more, open land for solar power, two educational institutions, lower crime rate, developing and growing in the number of small business.

Disadvantage of the area include: area not really attractive to younger people, everything is fading out (example: mall), not much support from elderly people about environmental changes.

A second brainstorming session was performed on December 9, 2009, with ten additional participants, also ranging in age from 20-24. The following ideas emerged to promote the Aiken area:

Aiken has many good restaurants, downtown is well developed, it has country clubs, polo, steeplechase, and a great deal of diversity for a small community (in terms of people, places, etc.). There are a fair number of big plants already here: including Kimberly Clark and Bridgestone. An active labor market centered around SRS- with an emphasis on renewable energy.

Slogan/Logo/Ways to attract business: Inform the people what actually goes on in SRS plant. Take business on tours to SRS/hydrogen research center. Smiling Faces, Beautiful Places. Promote educational institutions. Close to metropolitan areas and major cities. Less competition. Low crime rate. Promote ARRA (American Recovery Reinvestment Act). Aiken, South Carolina's Best Kept Secret. Good for families.

### **QUALITATIVE RESEARCH REPORT #3**

Research Conducted on January 20, 2010 in Aiken, SC to explore attitudes and impressions regarding four proposed logo designs, and to obtain further direction concerning future positioning and marketing strategies.

#### Methodology:

One focus group was conducted in Aiken, SC on January 20, 2010. The focus group consisted of seven business professionals. Specifically, the group included four males and three females, each of whom serves as an executive, upper level manager, owner, or director of a locally based company. The participants ranged in age from the mid-forties to the upper-sixties. The focus group session lasted for approximately one hour.

#### Note of Caution:

It is important to keep in mind the qualitative nature of these findings. Based on the sample size and composition, the findings are not meant to be conclusive, but only suggestive of the likely attitudes and reactions of a larger and more diverse population.

#### Introduction:

Participants were first provided with an overview of the research activities taking place at the Aiken County Center for Hydrogen Research. They were provided with three categories of goals to be pursued by the Aiken Economic Development Partnership:

1. Increase leasing to hydrogen oriented technology companies in the Center for Hydrogen Research facility
2. Attract a wide variety of advanced technology companies to Aiken and build a research community that provides future jobs in Aiken county
3. Enhance technological breakthroughs and research developments that benefit society as a whole

Summary of Findings:

Perceptions of Logo 1

Participants were asked to describe their initial impressions and perceptions of Logo 1:

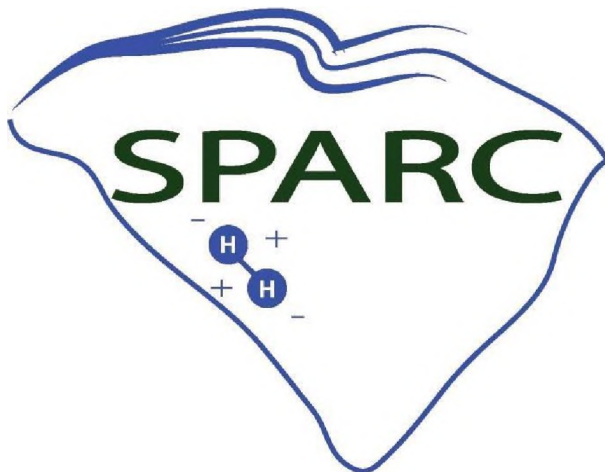


Top-of-mind impressions for Logo 1 were generally positive and included the following:

- “The art appears to signify a sun burst and is good”
- “The sun burst looks somewhat like a 1950s clock”
- “The sun burst doesn’t bother me”
- “It comes close but it combines two fonts, a serif and a san serif font”
- “I would remove the arc and the slogan”

Perceptions of Logo 2

Participants were asked to describe their initial impressions and perceptions of Logo 2:



Top-of-mind impressions for Logo 2 were overwhelmingly negative. Although very few comments were offered, specific comments included the following:

- “The top of the design is confusing”
- “Too much of a focus on the state, which may be unrecognizable to anybody north of the Mason-Dixon line”
- “It’s terrible”

#### Perceptions of Logo 3

Participants were asked to describe their initial impressions and perceptions of Logo 3:



Top-of-mind impressions for Logo 3 were mostly positive and included the following:

- “I like it but the “S” should not be separated from the PARC”
- “You might want to put a dot on Aiken county”
- “I like it- I can see it on a shirt or on a bumper sticker”
- “It has a clean look with minimal verbiage”
- “Maybe put the Palmetto tree and moon in place of the state- but that might be too much”
- “Leaving the state can be a source of mystery”
- “The state may look like just a dot if the design is used on a very small scale”
- “I do like the “applied research center” in lower case”
- “It reminds me of a medical facility”
- “Needs the “S” and “P” defined”

#### Additional Information Concerning Logo 3

Conversations with the artist who designed Logo 3 indicate that the circles on either end of the Logo were based on the hydrogen molecule. In addition, one can look at the “S” in the first circle as a general representation of the Savannah

River. Finally, the green color is a representation of the environmentally oriented nature of the facility.

#### Perceptions of Logo 4

Participants were asked to describe their initial impressions and perceptions of Logo 4:



Top-of-mind impressions for Logo 4 were overwhelmingly negative and included the following:

- “Is that an amusement park?”
- “It looks like something is happening in Edisto” (a coastal community in SC)
- “It’s eye appealing but it does not tell me anything”
- “It has a fun font, but not a business font”
- “It would be good for the tourism board”
- “I would not choose that at all”

#### Summary of Suggestions Offered

Of the Logos presented, the consensus opinion was that Logo 3 was by far the best. One suggestion related to Logo 3 was that the “S” could be used as a stand-alone Logo, and could even be converted into a lapel pin. Logo 1 was the second most favored design. Logo 4 was clearly the least favorite design.

#### **FRED’S DECISION AND PHASE III: DETERMINE THE KEY CUSTOMER BENEFIT AND UNIQUE SELLING PROPOSITION (USP)**

Mr. Humes has decided to get started on a new IMC plan for the area. How can he best approach the marketing of the Center for Hydrogen Research? Advise Mr. Humes.

## **APPENDIX I: COMMERCIAL PROSPECT LIST**

### **Producers of Hydrogen**

- Air Products and Chemicals Inc. Linde AG
- Praxair, Inc.

### **Photovoltaic Companies**

- Evergreen Solar, Inc. Exide Technologies First Solar, Inc.
- Konarka Technologies, Inc. Kyocera Solar, Inc.
- LDK Solar Co., Ltd. Nanosolar, Inc.
- Q-Cells SE, Germany SolarWorld AG, Germany
- Suntech Power Holdings Co., Ltd., China Sunpower Corporation
- Yingli Green Energy Holding Company Limited, China

### **Makers of Hydrogen Fuel Storage and Delivery Devices**

- Dynetek Industries Ltd., Canada
- Quantum Fuel Systems Technologies Worldwide, Inc.

### **Fuel Cell Companies**

- Ballard Power Systems Inc., Canada
- C&D Technologies Locations
- Hydrogenics Corporation
- Canada Plug Power, Inc.
- Shell Hydrogen BV, The Netherlands

### **Chemical Companies**

- Celanese Corporation Koch Industries, Inc.

### **Electrical Companies**

- Emerson Electric Co.

### **Nuclear Companies**

- ALSTOM, France Areva NP, France

## **APPENDIX II: VENTURE CAPITAL FIRM AND ANGEL INVESTORS**

Of about 150 top venture capital firms and angel investors in the United States, 30 of them focus on alternative energy, clean technology, or related fields.

- Khosla Ventures
- Element Partners
- Battelle Ventures L.P
- Nth Power
- Second Avenue Partners
- Venrock
- Advanced Technology Ventures (ATV)
- Mayfield Fund
- NGEN Partners
- Sequel Venture Partners
- U.S. Venture Partners
- @Ventures
- Tudor Ventures
- Draper Fisher Jurvetson
- VantagePoint Venture Partners
- New Enterprise Associates (NEA)
- First Round Capital (FRC)
- Mohr Davidow Ventures (MDV)
- Kleiner Perkins Caufield & Byers (KPCB)
- General Catalyst Partners
- Connecticut Innovations (CI)
- Sigma Partners
- ARCH Venture Partners
- Atlas Venture
- Lightspeed Venture Partners
- Trident Capital
- Bain Capital
- Bessemer Venture Partners
- Clearstone Venture Partners
- El Dorado Ventures (EDV)



### **APPENDIX III: BACKGROUND INFORMATION**

#### **The State of South Carolina**

According to U.S. Census (as of 2014), South Carolina had a total population of 4,832,482, of which 49% were male and 51% were female. The median age of the population was 35.4. Of the total population, 68.3% were White, 27.9% African American, 0.5% American Indian, 1.5% Asian, and 1.8% were classified as other races. A total of 5.3% of the population were of Hispanic or Latino decent. South Carolina had a total of 1.5 million households, of which 70% were family households.

Based on records of the U.S. Bureau of Economic Analysis, in 2013, South Carolina's GDP in current dollars was \$183.6 billion, ranking 24th in the nation, with an annual growth rate of 3.13%. Ten years earlier, it was \$102.9 billion, ranking 27th in the nation. The average annual growth rate in GDP during 1998-2008 was 1.7% in South Carolina, whereas the growth rate for the nation as a whole during this period was 2.5%. The growth of real GDP for South Carolina in 2008 alone was 0.6%, compared to 0.7% for the nation. The state debt in 2012 was calculated by one source to be \$22.9bn, or \$7,800 per taxpayer. South Carolina was comprised of 46 counties. The capital and largest city was Columbia with a 2013 population of 133,358.

Major agricultural outputs of the state were: tobacco, poultry, cattle, dairy products, soybeans, hay, rice, and swine. Industrial outputs included: textile goods, chemical products, paper products, machinery, automobiles and automotive products and tourism. According to the Bureau of Labor Statistics, as of March 2012, South Carolina had 1,852,700 nonfarm jobs of which 12% were in manufacturing, 11.5% were in leisure and hospitality, 19% were in trade, transportation and utilities, and 11.8% were in education and health services. The service sector accounted for 83.7% of the South Carolina economy.

#### **Aiken County, South Carolina**

Aiken County was located on the border of Georgia and South Carolina. With an area of 1,073 square miles, it was the fourth largest County in South Carolina. It was bordered by Edgefield County, SC and Richmond County, GA on the west, Saluda County, SC on the north, Lexington County, SC on the northeast, Orangeburg County, SC on the east, Barnwell County, SC on the south, and Burke County, GA on the southwest. The county seat was the city of Aiken.

Aiken County had a population of 142,552, with 48.2% male and 51.8% female. The population breakdown included 71.4% white, 25.6% African American, 2.1% Hispanic, and 0.6% Asian American. The total number of households was 55,587, 70.9% of which were family households, and 29.1% nonfamily households. Median household income was \$37,889, and per capita income was \$18,772.

According to Together Aiken County, Vision and Strategic Plan, wage rates in Aiken County were higher compared to other counties in South Carolina. Overall, the cost of doing business in Aiken County was low. This included local taxes, the cost of living, wage rates, and the cost for utilities. It had a well-regarded education system, including K-12, higher education, and other work force training programs. Area institutions of higher education included USC Aiken, Aiken Technical College, and Augusta University in Augusta, GA. The economy was dependent on several high-impact businesses, industrial parks, and research centers, including the Savannah River Site. Meanwhile, agriculture still played a prominent role in the economy.

Aiken County had several cooperative agencies dedicated to local economic development. For instance, in order to help stimulate the local economy as a whole, Aiken and Edgefield Counties formed an Economic Development Partnership (EDP), which combined public and private resources from both counties. From a business perspective, Aiken County was also part of the Augusta, GA Metropolitan Area and the I-20 urban corridor. It had limited regulatory control which created a “pro-growth” environment for business. On the other hand, Aiken County needed to diversify its local economy, and to minimize its dependence on the Savannah River Site and its current manufacturing base. It also faced a loss of agricultural resources, and a slow growth in the labor force.

The public/private investment in hydrogen created 229 jobs in South Carolina. With 65% of those jobs being created in the last 5 years, this was proving to be a growing industry. Bridgestone Firestone Manufacturing in Aiken switched over its entire forklift fleet to run on more efficient and cost effective hydrogen fuel cells, the City of Columbia was backing up its emergency broadcast towers with longer lasting fuel cells, and ETV was using cameras that run on hydrogen power. These are just a few examples of the real world applications of hydrogen that were taking place in South Carolina at the time.

#### Edgefield County, South Carolina

Edgefield County had a total population of 26,985 (2010 Census). Its county seat was the city of Edgefield. Among the population, 53% were male, and 47% female. The median age of the population was 35.6. Of the total population, 56.8% were white, 41.5% African American, 0.3% American Indian, and 0.2%

Asian. The county had 8,270 households, of which 6,214 were family households. Median household income was \$35,146, and per capita income was \$15,415. About 13% of families and 15% of the population were below the poverty line, including 19% of those under age 18 and 18% of those age 65 or over.

Edgefield County had as part of its western border the Savannah River; across the river was Augusta, Georgia. Edgefield was part of the Augusta-Richmond County, GA-SC Metropolitan Statistical Area.

In Edgefield County, the majority of employment was found in the manufacturing sector, which had 2,041 paid employees. There were 455 retail trade employees, 289 accommodation and food services employees, and about 200 people working in the health care and social assistance sector.

#### Augusta, GA and the adjacent area

The Augusta–Richmond County Metropolitan Statistical Area (MSA) consisted of six counties, including Richmond County, McDuffie County, Columbia County, and Burke County in GA, as well as Aiken and Edgefield Counties in South Carolina. The MSA had a population of 583,632 (2014 Census estimate). Of the total population, 62% were White, 34% African American, 1.5% Asian, 0.1% Pacific Islander, and 0.9% from some other race. Approximately 1.5% were two or more races, and 2.4% were Hispanic or Latino. The MSA had 176,872 households, and a median household income of \$38,103. Male full-time and year-round workers had a median income of \$34,879, compared to females at \$23,911. Approximately 11.8% of families were below the poverty level.

The three largest employers of the MSA were Augusta University (AU), the Savannah River Site, and the U.S. Army Signal Center at Fort Gordon. The medical industry in Augusta employed over 25,000 people, and had an economic impact of \$1.8 billion. AU's Medical College had over 7,000 employees alone. This made Augusta, GA a center for medicine and biotechnology. Other large employers in the Augusta market included Electrolux, CareSouth, T-Mobile, Solo Cup Company, Automatic Data Processing (ADP), International Paper, NutraSweet, Teleperformance, E-Z-GO, Elanco, Club Car, John Deere, Procter & Gamble, Kellogg's, and Delta Air Lines.

The city's famous golf course, the Augusta National Golf Club, hosted the first major golf tournament of each year, The Masters. Part of the Professional Golfers Association's Grand Slam, this tournament was arguably the most prestigious in the sport. The best professional and amateur golfers in the world came to Augusta during the first full week of April every year to compete, and The Masters

brought great economic opportunities for accommodation, food service, and retail sales for both Augusta and the city of Aiken.

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