

Opportunity Assessment: *Clean Technologies in Nanjing, China*



Prepared By: GreenWorld Capital, LLC

January 2013
All rights reserved



About this report

We would like to extend special thanks to GreenWorld's Nanjing Project Team that was primarily responsible for creating this report: Vikram Dhawan (team leader), Ashwin Baweja, and Jiten Suthar; in addition, Vikram Dhawan provided editorial support. GreenWorld maintains an active internship program with leading academic institutions across the United States. Our interns are extraordinary and we are very grateful for their efforts. Their skill, dedication, creativity and attitude reflect the very best characteristics of the future leaders in the new energy economy and add great value to GreenWorld and our clients.

Disclaimer

This material is intended for informational purposes only and is not intended to be relied upon to make any investment decision. It does not constitute investment advice or an offer or solicitation and is not the basis for any contract to purchase or sell any security or other instrument, or for GreenWorld Capital, LLC ("GreenWorld") and its affiliates to enter into or arrange any type of transaction as a consequence of any information contained herein. Neither GreenWorld nor any of its affiliates gives any warranty as to the accuracy, reliability or completeness of information which is contained in this document. Except insofar as liability under any statute cannot be excluded, no member of GreenWorld, or any officer, employee or associate of GreenWorld accepts any liability (whether arising in contract, tort or negligence or otherwise) for any error or omission in this document or for any resulting loss or damage whether direct, indirect, consequential or otherwise suffered by the reader or recipient of this document or any other person.

The views expressed in this document constitute GreenWorld's or its affiliate's judgment at the time of issue and are subject to change without prior notice. This document is for professional investors. This document was prepared without regarding to specific objectives, financial situation or needs of any person who may receive or read it. Past performance or any prediction or forecast is not indicative of future results. No further distribution is allowed without prior written consent of GreenWorld

Any forecasts, projections or estimates provided herein are based upon our opinion at this date and are both subject to change and dependent on future changes in the markets. Any prediction or forecast about the economy, stock market, bond market or economic trends of the markets is not necessarily indicative of future or likely performance.

For more information please contact:

David W. Elkin, Managing Director, david@greenworldcap.com

Michael J. Howe, Managing Director, mike@greenworldcap.com



Contents

Executive Summary	4
About GreenWorld Capital, LLC	5
I. Introduction to Nanjing	6
a. Fact Sheet	6
b. Economic Overview: Structure and Momentum	7
c. Energy Overview	9
II. Major Industrial and Development Zones	9
a. NHZ	10
b. JNGZ	11
c. NJXG	11
d. CIP	13
III. China's 12 th Five-Year Plan	14
a. China's 12 th FYP and Nanjing's Initiatives	14
b. Jiangsu Province Outlook and Goals	15
IV. Green Industry in Nanjing	16
a. Solar	17
b. Wind	18
c. Water and Waste Management	19
d. Electric Vehicles	20
e. Energy Efficiency	20
Investment Opportunities in Nanjing	21
V. References	22



“Nanjing is well on course to be a trade, business, finance, tourism and logistical center, complete with an enviable service sector.”

■ *Xia Huan, Staff Writer for [China Daily](#)*

Executive Summary

As the above quote underscores, there are compelling reasons for companies and investors to investigate growth opportunities in Nanjing. Nanjing was ranked as one of the top three commercial cities on the Chinese mainland. It has also been recognized by Forbes magazine as “one of the most promising cities on the Pacific Rim”. The recent recognition affirms Nanjing’s potential to become one of the most progressive cities in China, if not in all of Asia.

In addition to a lucrative economy and steady GDP growth rate, Nanjing has also been recognized for its green technology. Coined the “Green City” in 2003, the region has made significant strides in the last decade to develop its environmental sustainability and forge new forms of energy and materials.

Nanjing’s location in the Yangtze River Delta has been a major factor in the City’s advancement. With an abundance of natural resources and agreeable climate, Nanjing is initiating energy reform and sustainability measures on a very large scale. Nanjing has capitalized on its strengths by improving already strong incumbent industrial sectors, such as transportation (e.g., automotive), and energy (e.g., wind power and solar power), as well as establishing new initiatives in water and waste management.

China’s 12th FYP has been a primary driving force behind Nanjing’s motivation to create a more sustainable society. The government of Nanjing has been very mindful of the goals and guidelines of the 12th FYP. These national directives have prompted Nanjing to institute more stringent regulations and promote the research and development of new energy and materials that will further the growth of green industry in the region and throughout China.

This report is intended to provide summary of information pertinent to U.S. companies and investors who are interested in exploring opportunities in Nanjing.



About Greenworld Capital, LLC

GreenWorld is an international merchant bank focused exclusively on serving the financial and strategic needs of cleantech companies and investors in the U.S. and abroad.

GreenWorld's senior professionals have completed over 400 transactions with an aggregate value approaching \$10 billion over their careers. Complementing this broad transaction experience is extensive cleantech industry knowledge backed by a network of international relationships and a suite of proprietary information tools. GreenWorld is well positioned to identify and implement effective strategic and financial solutions on behalf of public and private companies as well as their investors in the areas of M&A, tax equity, debt and equity capital.

GreenWorld works diligently to anticipate industry trends, rather than simply react to them and is committed to be a creative source of innovative ideas and opportunities for our clients and partners. With offices in Philadelphia and Palo Alto in the U.S. and Nanjing in China, GreenWorld provides geographical coverage of North America and Asia while maintaining numerous relationships which provide the firm access to European and other overseas markets.

Unlike many other firms, which are active in multiple industries, GreenWorld's sole focus is the cleantech and renewable energy sector. GreenWorld believes that the complexity of the cleantech environment, as well as the magnitude of its potential, demand dedication. GreenWorld delivers its investment banking services with a client-centric perspective. In addition on the merchant banking side, GreenWorld proactively pursues entrepreneurial opportunities that emerge as a consequence of today's dynamic global energy marketplace and the underlying environmental challenges driving national policies in this marketplace.

Our Team

David W. Elkin
Managing Director

Michael J. Howe
Managing Director

Jeffrey B. Magill
Managing Director

Anthony Zadnik
Director

Michael Mufson
Director

James Hunter
Director

Anthony Lopez Ona
Director

Peter Hill
Director

Joseph Manko
Director

Andrew M. Goldstein
Vice President of China
Business Development

Alice Ye
Vice President of China
Business Operations

Chris Brown
Vice President of China
Business Development

Yijie Hu
China Business Advisor

Yan Wang
China Business Analyst

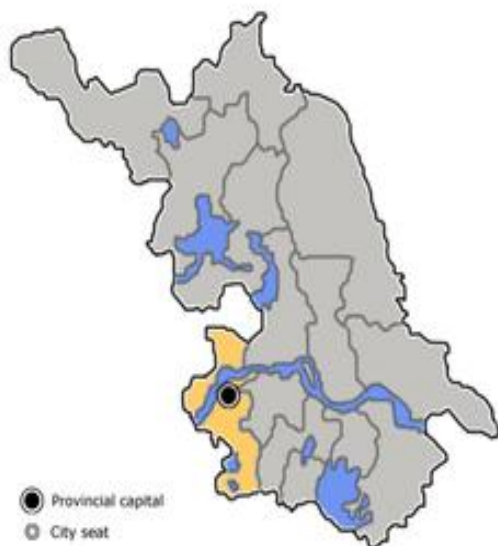
Xirong Jiang
Senior China Business Advisor

Broker dealer services provided through Mufson Howe Hunter & Partners LLC, a member of SIPC and FINRA



I. Introduction to Nanjing

a. Fact Sheet ⁱ



Province	Jiangsu
Government type	Sub-provincial city
Area - city	2,548 sq mi (6598 km²)
Population - region	8,109,100
Population – Urban	7,165,600
GDP (2011)	RMB 623 Billion (USD 93.7 Billion)
Per capita GDP	RMB 77,000 (USD 12,010)
GDP Growth (2011)	12%
Average Disposable Income per head	RMB 28,312 (USD 4,427)
Foreign Investment	USD 2.8 Billion

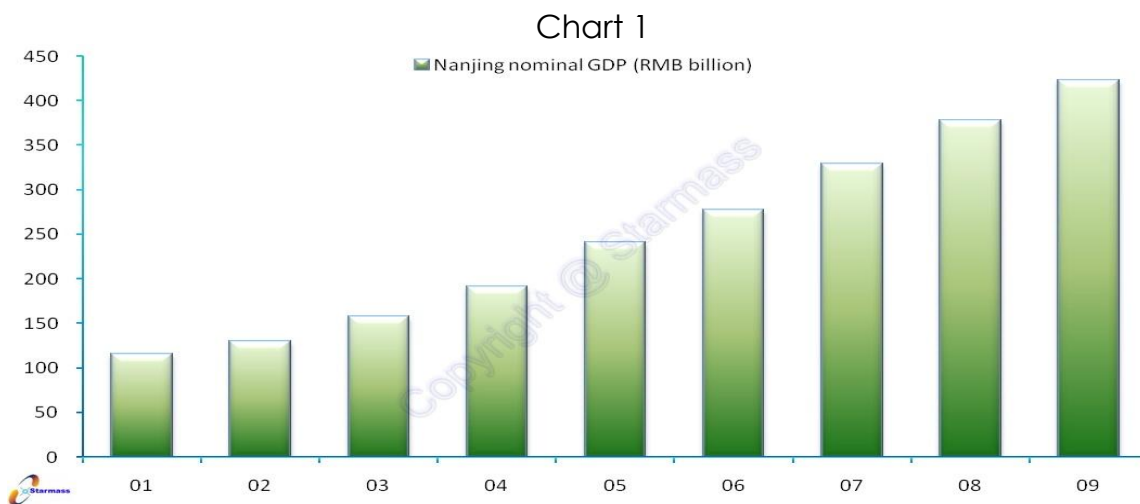


b. Overview: Economy, Structure and Momentum ^{i,ii,iii,iv}

Nanjing, the next largest city in the Yangtze River Delta after Shanghai, is the economic, academic, and political center of the Jiangsu Province. Due to its close proximity to the Yangtze River and fertile land, Nanjing has abundant natural resources. The sub-provincial city has established itself as a major commercial center of China as a result of its reservoir of rich resources and its location at the nexus of major water and land transport routes.

According to a Forbes magazine, Nanjing is now the second largest commercial center in the Yangtze River Delta and it ranks fifth in overall competitiveness among all mainland cities. Due to the increasing attention that the region has received from foreign investors recently, the government of Nanjing has commenced a number of proactive initiatives to stimulate more foreign direct investment. The majority of these initiatives are aimed at improving the sustainability of Nanjing through new energy ventures and environmentally friendly projects. The projects are attractive to new investors because of Nanjing's bountiful resources and opportune location.

Nanjing has also experienced accelerated GDP growth over the past 10 years. As can be seen in Chart 1 below, Nanjing's domestic product has been steadily increasing since the turn of the century thanks to the region's strong commercial base (i.e., the "Five Pillar Industries") which drives Nanjing's economy. These "Five Pillar Industries" are electronics, cars, petrochemical, iron & steel, and power. The current annualized GDP growth of the region is over 13%, which places Nanjing among the fastest growing cities in the world.



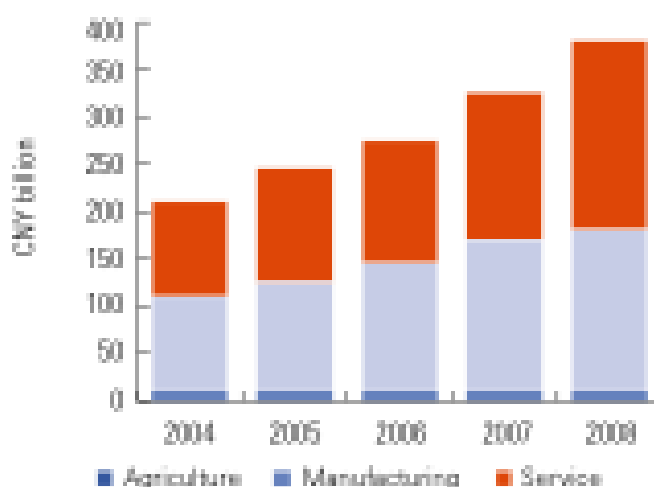
Nanjing is a primary educational center in China. With 48 colleges and universities as well as 508 scientific research institutions, Nanjing is consistently



attracts the best & brightest thereby creating a sustainable and self-sufficient environment which put it on par with other academic communities in the world.

An extension of such progress can be seen by the growth of the tertiary sector of Nanjing's economy; the tertiary sector refers to industries that provide services which improve productivity, sustainability, and performance, but do not necessarily provide discrete, stand-alone goods or products. The tertiary sector of any economy can only emerge once the primary and secondary sectors have been fully developed thereby laying the foundation for the region's infrastructure and goods to meet society's basic need, such as agriculture and manufactured products (think Maslow's hierarchy of needs). The development of Nanking's tertiary sector has lead to rejuvenation of region's industry sectors which had been dormant but now contribute to the region's vitality and enhance its potential. As can be seen by Chart 2 below, the tertiary sector has contributed most of the region's GDP growth over the past few years. By looking at the progression of Nanjing's GDP by sector, it can be seen that the tertiary (service) sector had doubled in size between 2004 and 2008. The service sector accounts for the largest share of Nanjing's GDP.

Chart 2
Nanjing GDP by sector 2004-2008



Source: <http://www.kpmg.com/CN/en/IssuesAndInsights/ArticlesPublications/Documents/nanjing-envir-study-0905.pdf>

Nanjing also receives an influx of foreign traffic and goods due to the Nanjing Lukou International Airport, which ranked as the 10th busiest cargo traffic airport and the 13th busiest passenger traffic airport in China. Due to the rapid growth of the region and the growing amount of attention which Nanjing receives, the airport is being expanded to handle almost three times the amount of traffic by the end of this year. Nanjing's economy has benefitted greatly from the confluence of cultures and ideas which the region enjoys. To capitalize on the



benefits of being a multifaceted economy, Nanjing has constructed four large industrial parks which provided the focus and impetus for much of the secondary and tertiary sector growth. These parks have not only improved the infrastructure of Nanjing, but they have also been magnets for the foreign direct investment in the region.

c. Energy Overview ^{v,vi}

In terms of energy-related goals, energy efficiency is the main focus of the local government. With the implementation of the 12th FYP and the progression of Nanjing to a more sustainable city, the government has undertaken efforts to ensure that the region as a whole is more conscientious about saving energy. This can be seen by the collaboration between the University of Sheffield in the UK and Nanjing University to create a more energy efficient region, country and world over the next 50 years. Initiatives such as this have not only spurred more stringent regulations in Nanjing with respect to energy efficiency, but they have also prompted many manufacturers in the region to increase their R&D efforts.

In addition, as of 2015, Nanjing will institute a 65% energy efficiency standard for new residential buildings. While comparable stringent regulations have not been imposed on the lighter commercial sector, the government has released guidelines for energy saving measures that must be adhered to by more basic industries in the region. These guidelines specifically promote the use and development of energy saving technologies, such as the widespread use of solar water heaters and analytical measuring tools that will be able to gauge the energy efficiency “index” of various buildings and facilities. Finally, the current FYP has more “teeth” than prior plans; local government officials will now be held accountable for the attainment of many of the FYP’s goals.

II. Major Industrial & Development Zones

Nanjing has 4 major industrial and development zones: Nanjing High and New Technology Industrial and Development Zone (NHZ), Jiangning Economic and Technological Development Zone (JNDZ), Nanjing Economic and Technological Development Zone (NJXG), and Nanjing Chemical Park (CIP). Each of these four zones contributes significantly to the province’s GDP. Each of the four zones has its own key industries which are the primary drivers of the respective local GDP’s. While the zones are different in many respects, certain similarities, such as their focus on researching and developing new energy and new materials, enable Nanjing as a whole to make significant progress as an environmentally sustainable society and a center of influence throughout China. We now highlight each zone.



a. Nanjing High and New Technology Industrial Development Zone (NHZ)^{xiv,xv,xvi}

Nanjing High and New Tech Development Zone
Established: September, 1988
Distance from Nanjing: 15.5 km
Planning Area: 16.5 km ²

NHZ is home to numerous parks, including the Nanjing HIDZ Software Park and the Nanjing European Scientific and Technological Industrial Park.

The zone relies on a tremendous scientific research prowess to attract high-tech enterprises to the zone, with focus in information technology (IT), aviation and space flight, new materials, medicine, and biotechnology (BT). Furthermore, its location near universities, vocational schools, and technical institutes of over 120,000 students provides rich pool of human resources to sustain on-going development efforts.

NHZ represents by far the largest portion of major technological activity in Nanjing. The zone constitutes more than 75% of the total number of high-tech

NHZ Key Industries:

- ✓ Information Technology (IT)
- ✓ Aviation and Space Flight
- ✓ Medicine
- ✓ Biotechnology (BT)
- ✓ New Materials

enterprises in Nanjing, with close to 175 high-tech companies that account for 90% of the zone's total revenue.

As of 2008, the value-added industrial output of the zone reached RMB 27.7 billion (USD 4.4 billion) with exports amounting to RMB 46.4 billion (USD 7.3 billion). In addition, more than 30 Fortune 500 companies had entered the zone. In 2010, total GDP for the zone measured RMB 25 billion (USD 4 billion).



b. Jiangning Economic & Technological Development Zone (JNDZ)^{vii, viii}

Jiangning Economic & Tech Development Zone
Established: June, 1992
Distance from Nanjing: 7 km
Planning Area: 317 km ²

JNDZ has undergone rapid industrial development, securing investment from over 42 countries and regions to fuel more than 1800 projects. Moreover, 300 of these projects exceeded RMB 600 million (USD 100 million) in value, resulting in a

JNDZ Key Industries:

- ✓ Electronic Information
- ✓ Software R&D
- ✓ Electric Power Control
- ✓ New Energy
- ✓ New Materials

cumulative investment of over RMB 50 billion (USD 8 billion) of which RMB 25 billion (USD 4 billion) is foreign capital. The influx of investment has allowed for the development of several key industries including electronic information, software research & development, electric power control, new energy research, and new material research. In addition, 35 of the Fortune 500 companies have already entered the zone.

“At present, the development zone has entered its output stage, with GDP, financial revenue and other major economic indicators increasing by over 35% annually on average; its output of high and new technology enterprises accounts for over 70% of the total.”

c. Nanjing Economic & Technological Development Zone (NJXG)^{ix,x,xi}



Nanjing Economic & Tech Development Zone

Established: September, 1992

Distance from Nanjing: 5 km

Planning Area: 30 km²

NJXG is able to leverage its location near the Nanjing Port (China's third largest inland river port in terms of throughput volume) to spur development in key technological industries while bolstering export initiatives that promote foreign exchange.

The zone has already accumulated funding for more than 400 enterprises from over 20 countries and regions. In addition, 40 of the Fortune 500 companies have already entered the zone. Nearby, the Xianlin University district with over ten universities and more than 150,000 students & faculty members serves as a rich source of R&D talent for continual development in the area.

NJXG focuses on four leading industries: electronic information, biomedical, light machinery, and new materials. Of these, the electronic information industry dominates with an output value that is 80% of the total industrial output value of the zone. With over 60 companies retaining a total investment of more than RMB 16 billion (USD 2.5 billion), the electronic information industry accounts for some

NJXG Key Industries:

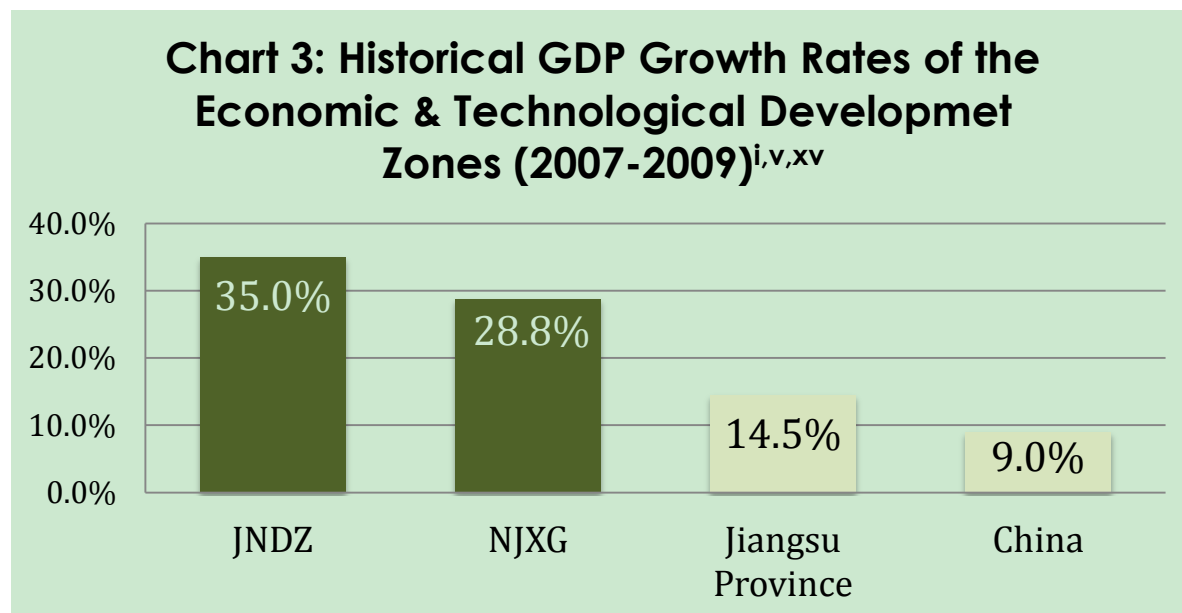
- ✓ Electronic Information
- ✓ Biomedical
- ✓ Light Machinery
- ✓ New Materials

of the largest investment enterprises of the region.

As of 2009, the zone had generated a GDP figure of RMB 26.6 billion (USD 4.2 billion), which was up 28.84% from 2008, and attracted RMB 1.7 billion (USD 264 million) of foreign direct investment of which 98% (USD 258 million) was effectively used to finance its primary industries. By effectively utilizing foreign investment for its main industries, the zone is able to maintain its strong GDP growth. For example, LG Philips' initial investment of USD 77 million in their manufacturing plant increased the zone's GDP substantially. As can be seen in



Chart 3, NJXG has experienced strong GDP growth in the recent past. This growth is primarily due to intelligent investments in the zone's key industries.



Source: GWC data

d. Nanjing Chemical Industry Park (CIP)^{xii,xiii}

Nanjing Chemical Industry Park	
Established:	October, 2001
Distance from Nanjing:	30 km
Planning Area:	45 km ²

CIP, one of only two state-level petrochemical industry bases in China, focuses on the development of petrochemicals, organic chemical raw materials, fine chemicals, macromolecule materials, new chemical materials, and life science

CIP Key Industries:

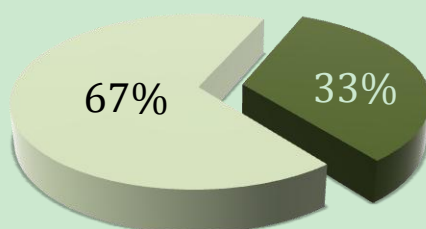
- ✓ Petrochemicals
- ✓ Organic Chemical Raw Materials
- ✓ Fine Chemicals
- ✓ Macromolecule Materials
- ✓ New Chemical Materials
- ✓ Life Science



products.

The petrochemical industry is one of Nanjing's top industries. In 2006, 34.7% of the total sales from Nanjing's up-scale industries came from petrochemical. Furthermore (in 2006), Nanjing's petrochemical industry sales by itself accounted for 33% of total revenue of petrochemicals in the entire Jiangsu Province.

Chart 4: %of Total Petrochemical Sales in the entire Jiangsu Province (2006)^{vii}



■ Nanjing Alone ■ Rest of Jiangsu Province

With an investment exceeding RMB 190 billion (USD 30 billion), this zone has been able to revitalize many of the legacy foreign and domestic enterprises.

III. China's 12th Five-Year Plan

a. China's 12th FYP & Nanjing's Initiatives ^{xvii,xviii,xix}

Chinese planners have created several preferential tax, fiscal and procurement policies designed to develop seven Strategic Emerging Industries (SEIs): biotechnology, new energy, high-end equipment manufacturing, energy conservation and environmental protection, clean-energy vehicles, new materials, and next-generation IT.

The government is projected to spend more than RMB 10 trillion (USD 1.7 trillion) on these industries during the 12th FYP period (2011-16) with an aim to increase the SEI's economic contribution from today's approximately 5 percent of GDP to 8 percent by 2015 and 15 percent by 2020. In addition, the 12th FYP contains preferential measures for developing energy-efficiency technology, as well as for mandating a 17 percent reduction in carbon emissions per unit of GDP (from the 2010 levels).

For the first time, this FYP holds local government officials accountable for attaining 'green development' goals and sustainability targets, such as water consumption per unit of GDP, and the proportion of GDP that is invested in



environmental protection. The 12th FYP includes a cap on domestic coal production; coal is China's largest energy source and a major contributor to the country's environmental problems. The FYP also contains significant support for nuclear and hydropower development with wind power having a threefold expansion in capacity over the term of the plan and domestic natural gas utilization expected to double.

China's 12th FYP has already prompted the Nanjing government to enact initiatives that will serve as the first steps in fully developing the SEIs. Some of the most immediate examples of the 12th FYP's effects in Nanjing can be seen by the energy conservation measures that have been adopted. Not only has the government enacted more stringent energy efficiency standards, but companies within the region are beginning to develop equipment that will help conserve energy in the near future.

“The 12th Five-Year Plan period is a crucial time for deepening reform and opening up and accelerating the transformation of the economic structure”

– Luo Zhijun, Party Chief of Jiangsu Provincial Committee

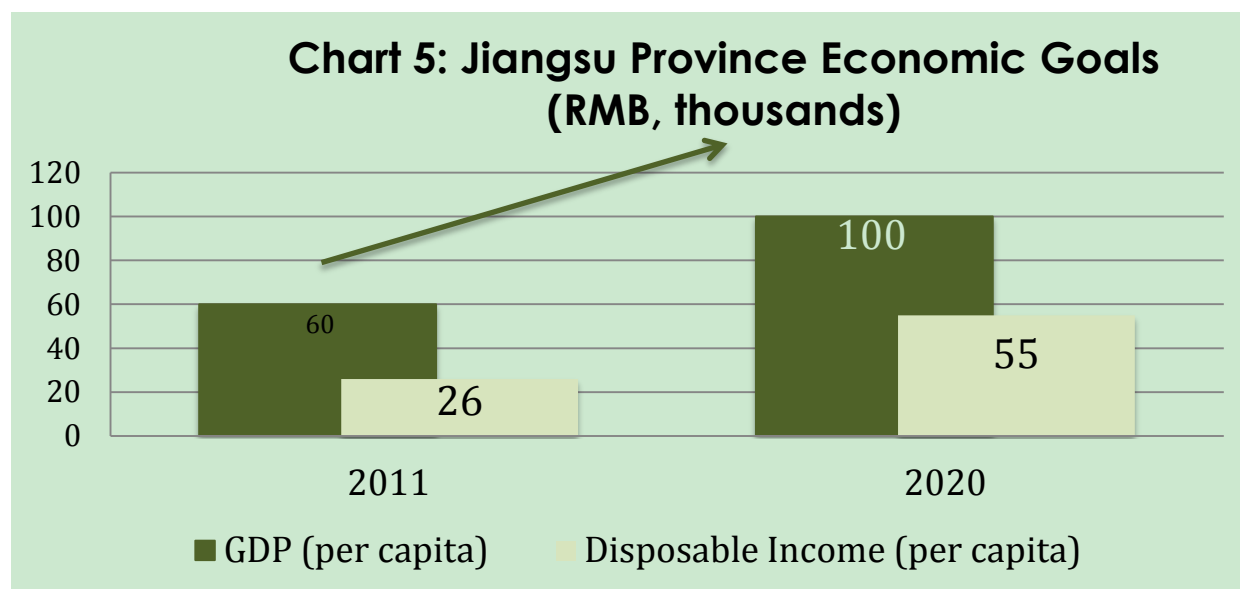
In addition, research and development efforts have received more attention recently by the government and various private industries. This increased focus in R&D in Nanjing is likely to lead to new materials, new energy, and more advanced clean-tech vehicles (an area in which Nanjing has already made significant progress).

b. Jiangsu Province Outlook and Goals ^{xx,xxi,xxii}

Jiangsu province had the second highest GDP figure in China with a value of RMB 5.3 trillion (USD 838 billion) and a growth rate of 9.2% in 2011. Despite its previously strong performance, the province hopes for even more rapid development during the remainder of the 12th FYP period.

By the year 2020, the government plans to build the province up to a per capita GDP of RMB 100,000 (USD 15,800) from its current level of RMB 60,000 (USD 9,400).





Two pillar industries, namely the service industry and high-tech industry, are expected to play the largest role in future economic prospects of Jiangsu province with service expected to account for up to 53% of GDP and high-tech expected to account for 45% of GDP by 2020. The government plans to sustain growth in the high-tech sector with an investment of 2.8% of GDP into R&D initiatives. Furthermore, in accordance with sustainable development measures, the province will develop and implement strategies to reduce emissions and save resources while pursuing the region's commercial economic endeavors.

With the proposed changes, local disposable income per capita is expected to more than double to RMB 55,000 (USD 8700) by 2020, from RMB 26,000 (USD 4100) in 2011.

IV. Green Industry in Nanjing ^{i,ii,iii}

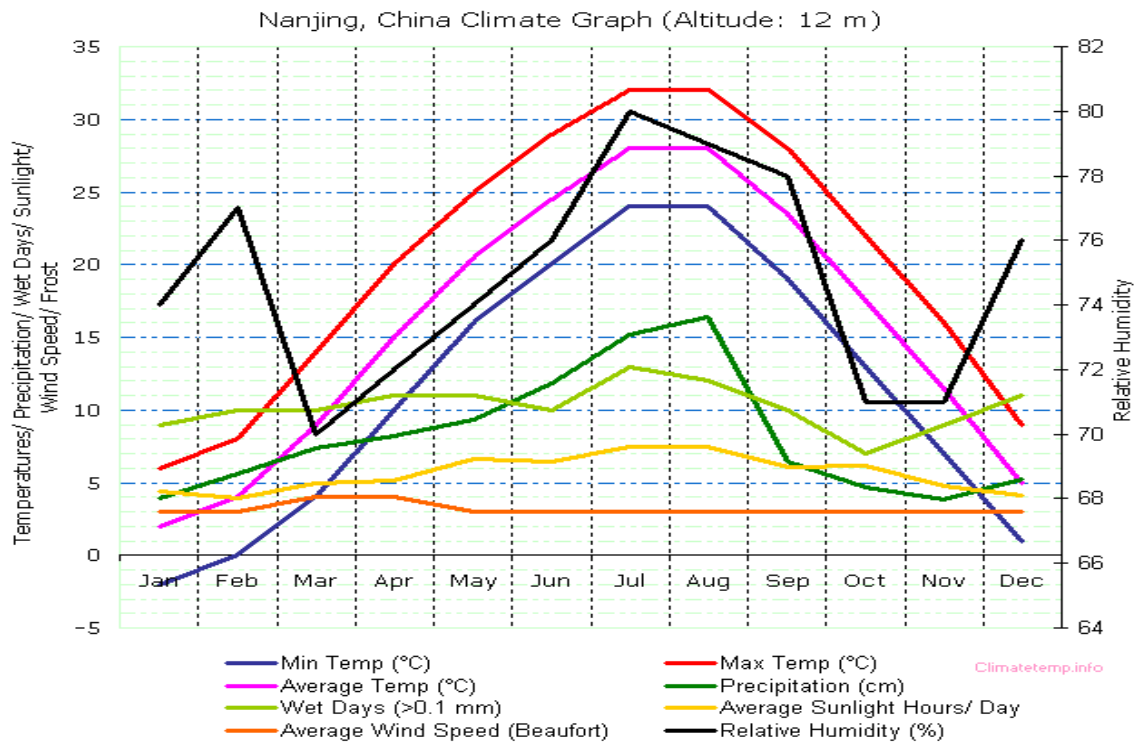
Green technology in Nanjing has significantly advanced in the past decade and is continuing to progress. Apart from the region's opportune location, Nanjing's many educational and research facilities have fueled growth in green energy. Seminars and events that promote green technology are becoming more common in universities in Nanjing. The next generation of innovators has embraced sustainable technologies, thereby fostering considerable advancements in green energy sector.

As discussed below, Nanjing has made significant progress in the solar and wind energy industries. With its optimal location in the Yangtze River Delta and the local presence of many of China's leading energy companies, Nanjing has been able to develop its wind and solar sector fairly quickly. In addition, Nanjing's focus on energy conservation has led the city to establish organizations and programs that monitor and manage energy efficiently. Along



the same lines, Nanjing has also enacted initiatives to manage water and waste efficiently to ensure that unprecedented amounts of energy and resources are not wasted. Finally, the region has been able to catapult itself to the forefront of the clean-tech vehicle industry in China due to its traditional strengths in transportation and vehicle development. Nanjing was already home to established automotive companies so development of a clean-tech vehicle sector was not a significant stretch for the region.

Chart 6



a. Solar^{xxiii,xxiv}

China, as a whole, produces about 3.1 GW of solar energy, about half of the world production. Six main manufacturers dominate the industry of solar energy, although none of these six is located in Nanjing. However, the presence of large, international solar companies, such as CEEG, helps to advance the development of new solar technologies in the region.

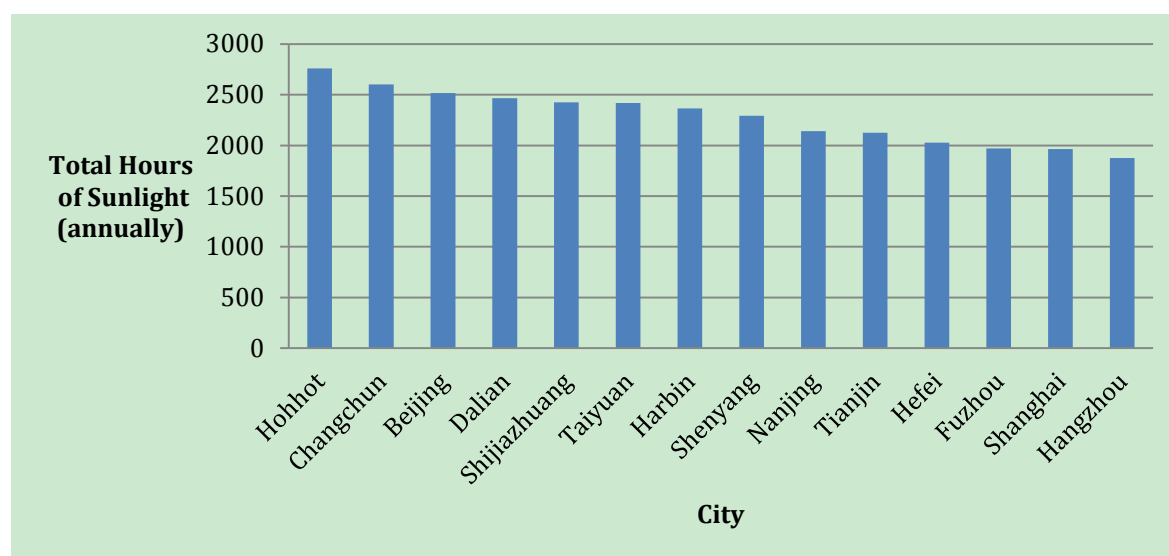
BDP, an international organization of architects, designers and engineers, is also designing a "new high-tech, low carbon, sustainable housing complex [in] Nanjing, China". The housing complex features solar energy, earth tubes, and energy efficient HVAC systems that will ultimately reduce energy consumption. The building will also be oriented east-west to take advantage of the positioning of the sun; in the winter, the sun will heat the homes, and in the summer, the windows can be opened to create cross ventilation and natural cooling. BDP



has initiated the first of many projects that will expand the utilization of active and passive solar energy as part of Nanjing's green urban planning initiative.

While solar energy is on the rise in Nanjing, it must be noted that the average hours of sunlight per day in Nanjing is below the average for China as a whole. Specifically, China experiences an average of 7.4 hours of sunlight a day, whereas Nanjing only receives 5.6 hours of sunlight per day. As a result, Nanjing is likely to place a heavier focus on wind energy than solar energy; nonetheless, many companies in the region are still striving to develop new technologies that will advance the solar energy industry.

Chart 7



Source: http://www.allcountries.org/china_statistics/1_18_monthly_sunshine_hours_of_major.html

b. Wind ^{xxv,xxvi,xxvii}

Wind power is growing rapidly in Nanjing. The introduction of some of the largest wind turbine manufacturers in the world, such as GoldWind Group, has catapulted Nanjing to the forefront of wind energy in China. In 2008, Nanjing recognized an annual growth rate of 60% in wind energy with revenues over RMB12 billion (USD 2 billion).

In May 2012, Nanjing Turbine, "an established player in China's wind power market" (Mr. Jianhua Wu), placed an order for about 800 motor shaft forgings which amounted to a total of approximately \$1.7 million. Nanjing is continuing to invest in materials and technology that will expand the wind energy industry in the region. Since Nanjing's average wind speed is much higher than the average wind speed for China as a whole local development is on the rise.

The region has begun capitalizing on its resources to take the lead in wind energy generation in China. Nanjing has not only expanded its wind energy



industry and created more wind power in general, but it has also promoted renewed R&D efforts and more widespread production of various wind energy technologies in order to fill out the supply chain. A prime example of this initiative is Nanjing High Speed Gear Manufacturing Co. which has an 80% market share of China's wind transmission equipment market and is in the global top three in terms of scale of production.

Perhaps the biggest player in the wind power industry is China High Speed Transmission Equipment Group Co., Ltd. Its wind power transmission equipment has found applications in over half the domestic market, and about 24% of the international market. With the presence of numerous turbine and operational companies, such as Nanjing Turbine and GoldWind Group, Nanjing has been able to establish a complete wind energy generation supply chain which has spurred the rapid growth of the industry in the region.

c. Water and Waste Management ^{xxviii}

As Nanjing's population growth and economic development continue, water and waste management have become increasingly important challenges in the region. Several facilities and technologies have been implemented to manage the water supply more efficiently. As a corollary to advancing the water management systems, Nanjing is also improving its waste management so as to conserve energy and promote hygiene.

Western Water Group (WWG) is responsible for both the water supply and wastewater treatment plant in the Nanjing County High Tech Industrial District. WWG will provide 20,000 cubic meters of water per day, while the plant will treat between roughly 15,000 to 30,000 cubic meters of waste water per day. The water is treated so that it can be reused with the hopes of decreasing Nanjing's already high water usage per capita. Additionally, WWG is planning to develop similar plants beyond Nanjing throughout China, in districts such as Qujing, which is the gateway to Yunnan Province.

In addition to managing wastewater, landfill waste management systems have also been developed. One of the major waste management firms in Nanjing, Camco, has been effectively managing landfill gas (LFG) such as methane, which can be very harmful to the environment if not captured; the "waste" gas is used to fuel boilers which, in turn, provide hot water. By doing so, the negative effects of the waste gas are minimized, energy is conserved, and water recycled.



d. Electric vehicles ^{xxix, xxx}

Nanjing Jiayuan Electric Vehicle & Ship Manufacturing Company, Ltd. is one of the oldest R&D companies for electric vehicles. Having researched EVs for 28 years, Nanjing Jiayuan now participates in all aspects of the EV production process.^{vi} The Company has already developed an electric automobile and is in the process of improving its EV design. The next challenge they must overcome still is broadening their market reach and distribution; success here should help spur demand for their EV beyond the region which will help reduce the harmful emissions that are currently stressing China's environment.

EV demand is growing not only in China but also throughout the rest of the world. Although gasoline has been an efficient source of energy, its use as the primary fuel in the internal combustion engine in vehicles has contributed significantly to the problem of environmental pollution, especially in major cities throughout the world. As such, electricity provides a cost-effective and practical alternative to gasoline, and may very well power a significant share of the world's cars in the future.^x

e. Energy Efficiency ^{xxx}

As mentioned in the introduction, Nanjing is very focused on saving energy as a result of the 12th FYP and its desire to become a more sustainable region. Various institutions in the region are currently collaborating with foreign parties and investors to ensure that energy efficiency is increased in Nanjing. This can be seen by the construction of more energy efficient buildings that use HVAC systems and other modern technologies to conserve energy. Nanjing's desire to reduce energy wastage is also demonstrated by the various educational measures taken in the region that extol the energy efficiency message.

The Nanjing Municipal Urban Management Bureau signed an agreement with China Everbright International to incinerate 660 tons of waste per year to turn it into energy. The construction of the plant will commence in 2012 and cost about \$168 million. The Bureau is also continuing research new ways in which to use the waste to conserve energy.

Energy efficiency is also being incorporated into commercial and residential buildings by way of reconfiguring the heating and cooling systems so as to conserve electricity. HVAC systems and different types of turbines that will allow buildings to cut down on the amount of energy wasted are being produced in the region. Apart from fostering development of the SEIs, Nanjing is pursuing these energy efficiency efforts due to the financial benefits they deliver. By reducing the amount of energy wasted in commercial and residential buildings,



billions of Yuan will be saved on an annual basis. The prospect of creating an infrastructure that is projected to have a relatively short payback period and substantial future returns has motivated the government of Nanjing to focus on energy conservation.

Investment Opportunities in Nanjing

With an abundance of resources, an educated population and established high technology industries, Nanjing is in the perfect location for U.S. companies wishing to establish a presence in a major economic hub within China. The city is located in the Yangtze River Delta, which has already enabled the region to make significant progress in the clean technology and renewable energy sectors and attract the attention of many foreign investors. For example, the combination of highly developed manufacturing plants and optimal weather condition has allowed the wind and solar industries in Nanjing to flourish very quickly. 81 Fortune 500 corporations have already invested in the region and, as a result of Nanjing's rapid development, more investors are discovering the advantages of this city.

Nanjing is also a hub of education. The city's 40+ universities and hundreds of scientific research organizations, provide a well-trained workforce for the green technology space. The construction of "Green Nanjing", an automobile construction facility developed by Ford, is symbolic of a city which has shifted its focus to establish sustainable and environmentally friendly technologies. As a result of this initiative, many companies, such as Universal Business Innovation, have been developing funds that will solely be used to invest in green technology in Nanjing.

This is the time for U.S. Corporations and U.S. investors to consider opportunities in Nanjing which, in turn, could be a gateway to China as a whole.



V. References

- ⁱ "Focus on Nanjing, China." *The Canadian Trade Commissioner Service*. N.p., n.d. Web. 22 June 2012. <<http://www.tradecommissioner.gc.ca/eng/document.jsp?did=96285&cid=512&oid=32>>.
- ⁱⁱ "Nanjing." *Wikipedia*. N.p., n.d. Web. 22 June 2012. <<http://en.wikipedia.org/wiki/Nanjing>>.
- ⁱⁱⁱ "Macro-Economic Conditions." *Nanjing Foreign Investment*. N.p., n.d. Web. 24 June 2012. <<http://english.njfiw.gov.cn/col1557/col1562/articlecolumn.php?colid=1562>>.
- ^{iv} "Nanjing demographic analysis and economic overview." *Starmass*. N.p., n.d. Web. 15 June 2012. <http://www.starmass.com/china_review/city_overview/nanjing.htm>.
- ^v "Nanjing promotes energy efficient building." *JSChina*. N.p., n.d. Web. 27 June 2012. <<http://english.jschina.com.cn/TodayJiangsu/201202/t965191.shtml>>.
- ^{vi} "News." *The University of Sheffield*. N.p., n.d. Web. 23 June 2012. <<http://www.shef.ac.uk/news/nr/nanjing-china-chen-jun-tao-wang-1.174543>>.
- ^{vii} "Jiangning Development Zone." *Jiangning Development Zone*. N.p., n.d. Web. 18 June 2012. <<http://www.jndz.gov.cn/eng/>>.
- ^{viii} "Jiangning Economic Development Zone." *Nanjing.gov.cn - Investment Carriers*. N.p., n.d. Web. 18 June 2012. <http://english.nanjing.gov.cn/tz/tzzt/200812/t20081214_256578.htm>.
- ^{ix} "Nanjing Economic and Technological Development Zone." *Nanjing Economic and Technological Development Zone*. N.p., n.d. Web. 18 June 2012. <<http://www.njxg.com/www/njxg/english/index.htm>>.
- ^x "Nanjing Economic & Technological Development Zone." *Nanjing.gov.cn - Investment Carriers*. N.p., n.d. Web. 18 June 2012. <http://english.nanjing.gov.cn/tz/tzzt/200812/t20081214_256574.htm>.
- ^{xi} "Profiles of China Provinces, Cities and Industrial Parks: Nanjing Economic and Technological Development Zone." *Hktdc.com*. N.p., n.d. Web. 18 June 2012. <<http://www.hktdc.com/info/mi/a/mpcn/en/1X071YLL/1/Profiles-Of-China->



Provinces-Cities-%20%20And-Industrial-Parks/Nanjing-Economic-And-Technological-Development-Zone.htm>.

xii "Nanjing Chemical Industry Park." *Nanjing.gov.cn - Investment Carriers*. N.p., n.d. Web. 18 June 2012. <http://english.nanjing.gov.cn/tz/tzst/200812/t20081214_256575.htm>.

xiii "Nanjing Chemical Industry Park." *Nanjing Investment Promotion Platform*. N.p., n.d. Web. 18 June 2012. <<http://nanjing.ciipp.com/en/recommend-park-view-10394.html>>.

xiv "Nanjing New and High-tech Industrial Development Zone." *Nanjing New and High-tech Industrial Development Zone*. N.p., n.d. Web. 18 June 2012. <<http://www.njnhz.gov.cn/index.jsp>>.

xv "Nanjing High and New Technology Industrial Development Zone." *Nanjing.gov.cn - Investment Carriers*. N.p., n.d. Web. 18 June 2012. <http://english.nanjing.gov.cn/tz/tzst/200812/t20081214_256573.htm>.

xvi "Profiles of China Provinces, Cities and Industrial Parks: Nanjing New and High-tech Industrial Development Zone." *Hktdc.com*. N.p., n.d. Web. 18 June 2012. <<http://www.hktdc.com/info/mi/a/mpcn/en/1X071YMK/1/Profiles-Of-China-Provinces-Cities-And-Industrial-Parks/Nanjing-%20%20New-And-High-Tech-Industry-Development-Zone.htm>>.

xvii *China's 12th Five-Year Plan: How It Actually Works and What's in Store for the next Five Years*. Rep. APCO Worldwide, 10 Dec. 2010. Web. 18 June 2012. <http://www.apcoworldwide.com/content/pdfs/chinas_12th_five-year_plan.pdf>.

xviii *Opportunity Assessment: Clean Technologies and Renewable Energy in Tianjin, China*. Rep. GreenWorld Capital, LLC, Feb. 2012. Web. 18 June 2012. <<http://greenworldcap.com/images/Tianjin.02.15.12.Rev.A.CLEAN.pdf>>.

xix *China's 12th Five-Year Plan: Implications for Greentech*. Rep. China Greentech Initiative, 17 Mar. 2011. Web. 18 June 2012. <http://www.amcham-shanghai.org/amchamportal/infovault_library/2011/Chinas_12th_Five-Year_Plan_Implications_for_Greentech.pdf>.

xx Xiao, Xu. "Jiangsu Special: Jiangsu Plots Path to Growth in next Five Years." *China Daily*. N.p., 14 Mar. 2012. Web. 18 June 2012. <http://www.chinadaily.com.cn/cndy/2012-03/14/content_14827893.htm>.



xxi "Jiangsu Demographic Analysis and Economy Overview." Jiangsu Demographic Analysis. Starmass International, 2011. Web. 10 July 2012. <http://www.starmass.com/china_review/provincial_overview/jiangsu_demographic_economy.htm>.

xxii "China's Provincial GDP Figures in 2011." *China Briefing*. N.p., 27 Jan. 2012. Web. 18 June 2012. <<http://www.china-briefing.com/news/2012/01/27/chinas-provincial-gdp-figures-in-2011.html>>.

xxiii "Solar Power in the People's Republic of China." *Wikipedia*. N.p., Web. 18 June 2012. <http://en.wikipedia.org/wiki/Solar_power_in_the_People's_Republic_of_China>.

xxiv "Nanjing Eco Housing." *Inhabitat*. N.p., Web. 18 June 2012. <<http://inhabitat.com/nanjing-eco-housing-to-feature-cascading-living-walls-and-high-tech-facade/>>.

xxv "Cleantech Solutions Receives \$1.7 Million in Orders for Wind Power Components." *Yahoo Finance*. N.p., Web. 09 July 2012. <<http://finance.yahoo.com/news/cleantech-solutions-receives-1-7-120000752.html>>.

xxvi "Company Information." *China High Speed Transmission Equipment Group Co.* N.p., Web. 18 June 2012. <<http://www.chste.com/en/about.asp?SortID=33>>.

xxvii "China Wind Power Newsletter." *Trade Council of Denmark*. N.p., 22 Jan. 2012. Web. 18 June 2012. <http://www.windpower.org/download/409/China_Wind_Power_Newsletter_2009.pdf>.

xxviii "Nanjing Water Supply and Wastewater Treatment Projects, Fujian." *Western Water Group*. N.p., Web. 25 June 2012. <http://www.wwcchina.com/en/projects/project/?project_id=8>.

xxix "Home Page." *Nanjing Jiayuan Electric Vehicle*. N.p., Web. 18 June 2012. <<http://www.jiayuan-ev.com/EnAboutus.asp?Title=Introduce>>.

xxx "U.S. Electric Vehicle Sales Forecast." *Baum & Associates*. N.p., Web. 10 July 2012. <<http://www.baum-assoc.com/Pages/EVForecast.aspx>>.



xxxi " Contract for 660,000 TPA Waste to Energy Project in China." *Waste Management World*. N.p., Web. 18 June 2012.
< http://www.waste-management-world.com/index/display/article-display/6473456497/articles/waste-management-world/waste-to-energy/2012/02/Contract_for_660_000_TPA_Waste_to_Energy_Project_in_China.html>.

