

UCLA School of Public Affairs

Luskin Center

FOR INNOVATION

2011

Clean Technology

Company Case Studies in the
Los Angeles Region

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Acknowledgements

We wish to thank Alex Fay, senior director of the Los Angeles Mayor's Office of Economic and Business Policy, and Michael Swords, executive director of strategic research initiatives at UCLA in the Office of the Vice Chancellor of Research, for their advice in the design phase of this project.

Thank you to the five clean technology firms profiled in this report, and specifically the company representatives with whom we interviewed. Any errors or omissions are the sole responsibility of the authors.

Interviewees

Balwinder Samra, Chief Executive Officer and Chairman, Balqon Corporation

Michael Austin, Vice President, BYD America

Diana Schulz, Chief Executive Officer, Cyber-Rain

Steve Roth, Corporate Controller and Media Relations, International Solar Electric Technology

Chris Beaven, Senior Director of Business Development and Public Relations, Origin Oil

Introduction

Los Angeles has the opportunity to become a clean technology leader. By some accounts, Los Angeles is already a hub of leading-edge clean technology firms.¹ The following case studies highlight key information about a select number of firms, in varying stages of commercialization, that represent major sectors of the clean technology (cleantech) industry in the Los Angeles region.

Company	Commercialization Stage	Sector
Balqon	Product Commercial Development and Market Development	Clean Transportation
BYD American	Market Development and Market Volume	Clean Transportation
Cyber Rain	Market Entry and Market Volume	Smart Water Systems
International Solar Electric Technology	Technology Development and Demonstration (Pilot Plant)	Renewable Energy Generation
Origin Oil	Product Commercial Development and Market Development	Alternative Fuels

The companies were selected for this report to collectively tell a story about the diversity of the cleantech industry in Los Angeles. In addition to representing different sectors, the firms represent different stages of commercialization, from technology development and demonstration, to product commercialization and market development, and to market volume. Some of the firms are small start-ups that sprung from technology developed at local research universities while another – BYD America – is a large international company headquartering their North America office in Los Angeles. The Los Angeles Mayor’s Office of Economic and Business Policy and a literature review helped identify these sectors of strengths and the representative companies.

The company case studies serve to highlight key public policies, business incentives, and regional characteristics helping to drive the cleantech industry in the city of Los Angeles and the broader region. Some similarities among market drivers underscore larger trends. The city’s assets include a network of research universities, internationally connected transportation systems, some progressive policies, and cleantech industry clustering.² Challenges include the cost of doing business in the region and limited financing opportunities compared to other leading cleantech regions.³

Information for the case studies was derived from both a literature review and interviews with a representative of each of the five cleantech firms profiled. The interviews were conducted during the fall and winter of 2010. The company executives we interviewed shared their insights and provided recommendations aimed to help make the Los Angeles region a more attractive destination for cleantech firms. Direct quotes from the interviewee are marked as such and paraphrased portions of the interview are indicated in brackets. See the preceding page for a list of the five interviewees and their affiliations.

1. CleanTech Group LLC. "Global CleanTech 100," 2011. <http://cleantech.com/GlobalCleantech100.cfm>.
2. Bedrossian, K.; Locher, S.; Lopez, F.; O’Keefe, M. "Clean Technology in Los Angeles: Improving the City’s Competitiveness." April 2010. <http://luskin.ucla.edu/content/clean-technology-los-angeles>.
3. *Ibid.*



SECTOR

Clean Transportation

COMMERCIALIZATION STAGE (2010)

Product Commercial
Development and Market
Development

OPERATIONS

Headquarters & Manufacturing
Facility in San Pedro, CA

NUMBER OF EMPLOYEES

16

WHY LA REGION?

The San Pedro Bay Ports
Clean Air Action Plan and
Clean Trucks Plan

COMPANY WEBSITE

www.balqon.com

Company Description: Balqon Corporation develops and manufactures zero emission heavy-duty electric trucks and tractors for both off-highway and on-highway applications. Balqon products use lithium-ion batteries, a proprietary battery management system and flux vector control technology.

History and Financing: The company was founded in 2005 and went public in 2008. Originally located in Orange County, in 2008 Balqon received assistance from the Port of Los Angeles (POLA) to move into its current manufacturing plant to the POLA adjacent community of San Pedro. The company currently has a total of 16 full-time employees: six in direct labor, six in research & development, and four in administration.

Case Study Key Theme: Policy and Regulation can Spur Economic Development Through Public-Private Partnerships

Company Key Insight: Clean Air Action Plan Creates Green Jobs

“Our experience with the City of Los Angeles business environment has been exceptional. Balqon was originally located in Santa Ana. We were in the innovative phase of growth when we met with POLA and South Coast Air Quality Management District (AQMD) to discuss their use of zero emissions electric tractors. Shortly after, in 2007, we entered into an agreement with the POLA and the AQMD to build an electric tractor for demonstration and testing purposes. It was during this time that the POLA assisted us in finding and locating our current manufacturing plant in the community of San Pedro. After having successfully passed rigorous testing, AQMD put in a purchase order for one Nautilus E20 electric tractor and in 2008 the City of Los Angeles put in an order for 20 Nautilus E20 tractors and 5 Nautilus E30.”

“These orders would not been possible without the San Pedro Bay Ports Clean Air Action Plan.” On November 20, 2006, the ports of Long Beach and Los Angeles took an unprecedented joint action by adopting the San Pedro Bay Ports Air Action Plan (CAAP), a landmark plan aimed at significantly reducing health risks posed by air pollution from port-related ships, trains, trucks, terminal equipment and harbor craft.⁴

4. San Pedro Bay Ports Clean Air Action Plan (CAAP) www.cleanairactionplan.org/.



BALQON CORPORATION

SECTOR

Clean Transportation

COMMERCIALIZATION STAGE (2010)

Product Commercial
Development and Market
Development

OPERATIONS

Headquarters &
Manufacturing
Facility in San Pedro, CA

NUMBER OF EMPLOYEES

16

WHY LA REGION?

The San Pedro Bay Ports
Clean Air Action Plan and
Clean Trucks Plan

COMPANY WEBSITE

www.balqon.com

The CAAP ushered in a slew of anti-air pollution strategies including the ports' Clean Trucks Programs, which progressively banned the oldest, most polluting trucks from port property and phased in trucks that met the most recent federal emission standards set. This created a market for clean trucks. Also part of the CAAP, the ports developed a Technology Advancement Program, which has more than \$9 million in funding available for new technology projects since 2007. This funding has supported many clean technology companies such as Balqon.⁵

"The partnership with POLA should be replicated for other companies. For domestic orders, Balqon assembles the electric heavy-duty trucks here. This process is quite labor intensive and requires high-skilled labor. As we continue to get more orders, additional jobs will be created. These are good paying jobs."

Company Key Insight: From Innovation to Integration: Los Angeles Should Focus on Getting Companies "Over the Hill"

"The City of Los Angeles needs to be strategic about how it looks to stimulate the cleantech industry. If the City focuses on being an incubator that does not necessarily mean it will lead to jobs. Incubators direct investment toward the innovation phase of technology. It is very difficult to predict which companies are going to make it. There are more losers than winners. It makes sense to focus on the integration phase of a company's growth. This involves looking at which companies have succeeded in research & development, technology and development or the "pilot phase" and are ready to move toward the commercial and market development stage."

"The Balqon model is an example of this process. Our strategic partnership with the City took us from the innovation phase to the integration phase. The City should look at getting companies over the hill and into the integration phase. It is the integration phase that creates jobs – green jobs."

Company Key Insight: Regulatory Model Can Help

"Balqon has distribution offices in nine countries. We are targeting our efforts in European and Asian Countries because of their aggressive model to reduce CO2 emissions. The difference is that they [European & Asian Countries] have a regulatory model in place, while the United States has an incentive based model. From our point of view the incentive based model is growing at a much slower rate while the regulatory model has induced growth for companies such as ours."

5. CAAP) www.cleanairactionplan.org/.



SECTOR

Clean Transportation
& Alternative Energy

COMMERCIALIZATION STAGE (2010)

Product Commercial
Development and Market
Development

OPERATIONS

Main Headquarters in
China North American
Headquarters &
Manufacturing Facility in
Los Angeles (Downtown), CA

NUMBER OF EMPLOYEES

150 (anticipated hiring by
end of 2011)

WHY THE LA REGION?

Incentives from the city of
Los Angeles coupled with a
large market for electric cars
in Southern California and
spurred by California's
stringent vehicle emissions
standards

COMPANY WEBSITE

www.byd.com

Company Description: BYD “Build Your Dreams” is the fastest growing Chinese automotive manufacturer in the world. It is a market leader in solar manufacturing, consumer electronics, and environmentally friendly energy storage chemistries.

History and Financing: The company was founded in 1995 and went public in 2002 on the Hong Kong Exchange. In 2008, billionaire investor Warren Buffett's MidAmerican Energy Holdings Co., a subsidiary of Berkshire Hathaway, purchased a 9.9 percent stake in the company. In 2010, Bloomberg Business Week ranked BYD number one in its Tech 100 list of companies and Fast Company ranked it 16th most innovative company in the world, the only automaker to make the top 50 list.

The North American headquarters will be located on the historic Figueroa auto row corridor and is expected to open by 2012. BYD will display its green energy technologies and will feature its vehicles, solar panels, energy storage systems, and advanced LED lighting products. It expects to hire 150 employees by the end of 2011. It rolled out its first fleet of vehicles to California markets in 2010.

Company Key Insight: Companies can Leverage Los Angeles' Assets to Grow Their Brand

“Installing a U.S headquarters in Los Angeles prepares us well for distribution of our products throughout the United States and sets the stage for release of our all-electric crossover vehicle, the e6. Los Angeles has several assets that are unique to this city. Those include LA Live, Los Angeles International Airport, the Convention Center and Hollywood. Los Angeles is also fortunate to have the largest municipal water and power utility in the United States. BYD is pleased to partner with the City and Los Angeles Department of Water and Power on the development of energy storage solutions that will allow the City's solar and wind power to have a firm capacity. BYD will leverage all of these assets to build its brand equity in North America.”



SECTOR

Clean Transportation & Alternative Energy

COMMERCIALIZATION STAGE (2010)

Market Development and Market Volume

OPERATIONS

Main Headquarters in China North American Headquarters & Manufacturing Facility in Los Angeles (Downtown), CA

NUMBER OF EMPLOYEES

150 (anticipated hiring by end of 2011)

WHY THE LA REGION?

Incentives from the City of Los Angeles coupled with a large market for electric cars in Southern California and spurred by California's stringent vehicle emissions standards.

COMPANY WEBSITE

www.byd.com

Company Key Insight: Los Angeles Must Package its Incentives for Companies to Notice

“Los Angeles was not at the top of our list when we began looking at cities to set-up our North American headquarters. However, once Mayor Villaraigosa and his business team called and provided us a set of incentives, it made sense for us to be in Los Angeles. For the Chinese it is important to have a presence in Southern California that has a car culture history.”

The agreed upon incentive package includes:

- A reduced tariff rate at the Port of Los Angeles for all Zero emission vehicles
- Visibility and space within Los Angeles International Airport to market BYD vehicles to air travelers
- Business opportunities accessible via the City's Request for Proposals.

In addition the City will:

- Purchase ten BYD e6 vehicles to replace old stock
- Lease an additional twenty vehicles for a market fleet test
- Pilot five BYD buses for a market fleet test
- Purchase twenty solar shaded parking spaces
- Contribute to the renovation of BYD's headquarters with technical and financial assistance, neighborhood improvements, and LADWP rebates and subsidies.

BYD will also receive benefits associated with locating its headquarters in a Federal Renewal Community, a State Enterprise Zone, a Community Redevelopment Zone, and a Business Improvement District.

SECTOR

Smart Water Systems

**COMMERCIALIZATION
STAGE (2010)**

Market Entry and Market
Volume

OPERATIONS

Headquarters & Operations
Office in Encino, CA

NUMBER OF EMPLOYEES

12

WHY THE LA REGION?

Need for water resource management in Southern California, including the availability of rebates provided by Los Angeles Department of Water and Power and other local water districts

COMPANY WEBSITE

www.cyber-rain.com

Company Description: Cyber-Rain focuses on creating a smart sprinkler controller system for commercial and residential customers that checks the weather via the internet and automatically adjusts watering times.

History and Financing: The company was founded in 2005 and is privately held. The company has received private placements and investors including venture capital firms such as Momentum Ventures and Funk Ventures, both based in Los Angeles.

There are currently 12 employees at Cyber-Rain who work in software and technology development and sales. Cyber-Rain has a partnership with a Los Angeles based electronic assembler who manufactures the smart controllers locally.

Case Study Theme: California's Regulatory Environment is a Double-edged Sword for the Smart Water Systems Sector

Company Key Insight: Regulatory Environment in California is both a Driver and a Barrier to Growth

“The regulatory environment of California is progressive. The Governor of California has called for a 20 percent reduction in statewide water usage by 2020. Most agencies are adhering to the water conservation policies and goals. There are a number of rebates and regulations encouraging the use of smart devices such as Cyber-Rain. Yet, water agencies are penalized for aggressively encouraging conservation because rates are not decoupled, as they are with electricity. If customers reduce water usage, then the water agency loses revenue. This issue needs to be addressed if the state wants to see significantly more water reduction.”

“Education is a big component for our company's growth. Water customers need to be aware that easy-to-use and cost effective tools exist for them to conserve. Cyber-Rain typically pays for itself in less than 2 years, but many people don't know this technology even exists.



SECTOR

Smart Water Systems

Company Key Insight: Southern California is an Ideal Geographic Market for a Business Start-up

COMMERCIALIZATION STAGE (2010)

Market Entry and Market Volume

“Southern California is the ideal market for a smart water system company because there is a need for water resource management and conservation. In addition, many of the inhabitants are progressively minded individuals, companies, and water agencies looking for ways and tools to use our resources wisely. It is the intersection of those factors that makes great sense for us to be located here.”

OPERATIONS

Headquarters & Operations
Office in Encino, CA

Company Key Insight: Strategic Partnerships are Drivers of Commercialization & Growth

NUMBER OF EMPLOYEES

12

“One of the main drivers for our growth is the availability of rebates from water agencies such as Los Angeles Department of Water & Power, the Metropolitan Water District of Southern California, and other water agencies. The ability of these agencies to offer rebates to their customers to purchase smart water controllers not only lowers the cost to the water consumer but also provides the incentive for them to find ways to reduce their water usage.”

WHY THE LA REGION?

Need for water resource management in Southern California, including the availability of rebates provided by Los Angeles Department of Water and Power and other local water districts

COMPANY WEBSITE

www.cyber-rain.com

INTERNATIONAL SOLAR ELECTRIC TECHNOLOGY (ISET)



SECTOR

Renewable Energy

COMMERCIALIZATION STAGE (2010)

Technology Development and Demonstration (Pilot Plant)

OPERATIONS

Headquarters & Manufacturing Facility in Chatsworth, CA

NUMBER OF EMPLOYEES

11

WHY THE LA REGION?

Access to aerospace industry, research institutes, and solar incentive programs by local utility companies

COMPANY WEBSITE

www.isetinc.com

Company Description: International Solar Electric Technology (ISET) has developed a patented ink-based process for manufacturing thin-film CIGS (copper, indium, gallium, selenide) solar modules that offer fundamental cost and efficiency advantages over existing photovoltaic (PV) solutions.

History and Financing: The company was founded in 1985 with the objective of developing low cost materials and processes for manufacturing PV modules. It primarily received government contracts and customers' orders for advanced technology R&D, turnkey production equipment, and CIGS solar cells.

In 2007, the company moved into a production facility in Chatsworth to manufacture printed CIGS PV modules. The company currently has 11 employees for pilot line operation and R&D. The company plans to expand its pilot line operation into a full scale 30 MW production plan and to hire an additional 120 employees in the near future.

The company has been funded primarily through government contracts and private placements from investors such as David Gelbaum, one of the country's largest private investors in cleantech.

Case Study Key Theme: Los Angeles Provides Access to Complimentary Firms, Research Institutes and Emerging Markets that are Necessary for a Company's Growth.

Company Key Insight: Los Angeles has a Rich Collection of Complimentary Firms, Leading Research Institutes, and Utility Incentive Programs

ISET's founder Dr. Vijay Kapur established his presence in Los Angeles over 30 years ago when he led Arco Solar's R&D and manufacturing activities as Director of Applied Research to create the first stand alone PV systems. At ISET, Dr. Kapur has collaborated with leading Los Angeles based aerospace companies including Lockheed Martin, Aerospace Corporation, and the Jet Propulsion Laboratory (JPL). The close proximity to Los Angeles' collection of aerospace firms and research institutes has played a key role in ISET's development. Dr. Kapur took advantage of the opportunities found in Los Angeles by receiving his Masters of Business Administration at UCLA Anderson School of Management.⁶

6. ISET Inc. "Company and Founder Profile" www.isetinc.com/founder-profile.php.

INTERNATIONAL SOLAR ELECTRIC TECHNOLOGY (ISET)



SECTOR

Renewable Energy

COMMERCIALIZATION STAGE (2010)

Technology Development and Demonstration (Pilot Plant)

OPERATIONS

Headquarters & Manufacturing Facility in Chatsworth, CA

NUMBER OF EMPLOYEES

11

WHY LA REGION

Access to aerospace industry, research institutes, and solar incentive programs by local utility companies

COMPANY WEBSITE

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Utilities in the Los Angeles Region, including the Los Angeles Department of Water and Power (LADWP) and Southern California Edison (SCE), have important solar incentive programs for their customers. Under the California Solar Initiative, SCE residential and commercial customers can apply for rebates if they install solar panels on existing homes.⁷ LADWP also has its own Solar Incentive Program, part of the LADWP Solar LA Plan, to create a 1.3 gigawatt solar network of residential, commercial, and municipally-owned solar systems.⁸ Having close proximity to these companies is important for ISET's growth in the solar industry.

Company Key Insight: Los Angeles is the Gateway to the Emerging Markets of Developing Nations

"The company is targeting expansion in the markets of developing countries. Los Angeles, at the doorstep of the Pacific Rim, is well positioned to have access to emerging markets. These markets are looking for products that provide the basic necessities. ISET has developed customized solar PV modules to be used for producing solar lanterns that can be charged by the sun during the day and used comfortably and efficiently at night. We continue to work on the cost reduction and energy efficiency of these modules. In the coming years, the fastest growth will occur in these markets."

Company Key Insight: A Los Angeles Renewable Energy Fund Would Support Local Startups

"We have established a pilot production line that can accommodate further expansion to an annual capacity of 30 MW and that will generate over a 120 jobs. However, we need to raise capital to grow. The current financial environment is a challenge for us and other companies like ours. If the City of Los Angeles had a clean investment fund, this would attract the attention and investment of other investors. It would send the message to the rest of the country that Los Angeles is a driver of this industry. That is why we support the Mayor's efforts to create a Renewable Energy and Efficiency Fund and encourage the Los Angeles City Council to approve the idea. This fund could invest in companies like ours and play a role in creating more quality paying jobs for Angelinos."

7. California Solar Initiative. www.cpuc.ca.gov/puc/energy/solar/aboutsolar.htm.

8. Solar Incentive Program. www.ladwp.com.



SECTOR

Alternative Energy
Waste Water Remediation
Carbon Sequestration

**COMMERCIALIZATION
STAGE (2010)**

Product Commercial
Development and Market
Development

OPERATIONS

Headquarters & Scale
Demonstration Plant in Los
Angeles (West Adams), CA

NUMBER OF EMPLOYEES

10

WHY THE LA REGION?

AB 32, access to industry
experts, and research
institutes.

COMPANY WEBSITE

www.originoil.com

Company Description: OriginOil, Inc. develops technology that transforms algae as a source of renewable oil without disrupting the environment or food supplies. OriginOil was among the “50 Hottest Companies” honored as 2010’s bioenergy leaders at the Advanced Biofuels Leadership Conference in April, 2011.

History and Financing: The company was founded in 2007 in Los Angeles and went public in 2008. OriginOil currently has ten full-time employees who primarily work in R&D. The company is considering strategic options for commercialization. Among these options are:

- Forming partnerships with major industrial facilities to commercialize industrial-scale algae production for carbon sequestration
- Licensing technology of algae for production of oil
- Licensing patent technology for waste water remediation

Case Study Key Theme: Innovation is a Collaborative Process that is Led by Policy and Relies on Strategic Partnerships.

Company Key Insight: California has Historically been a Leader in Innovation and will Continue Leading with the Cleantech Industry

“OriginOil, Inc.’s founder Riggs Eckleberry believes that California has always been a leader in innovation and environmental policy.” Aerospace and high tech industries helped make California what it is today. OriginOil, Inc. was established in Los Angeles after Riggs Eckleberry led several high tech companies to success during the Dot Com era.⁹

“AB 32 is primarily responsible for creating market certainty for investment, research and development of inventions, similar to Origin Oil’s technology. AB 32 was passed in 2006 and after seeing the potential of what it meant for innovation of clean technology, Riggs Eckleberry founded OriginOil, Inc. shortly after in 2007.”

It makes sense to be where the significant algae industry players are clustered. “OriginOil’s approach has been to focus on building break through technology behind algae production, instead of producing algae itself.”

9. OriginOil. www.originoil.com/about-us/company/management.html.



SECTOR

Alternative Energy
Waste Water Remediation
Carbon Sequestration

**COMMERCIALIZATION
STAGE (2010)**

Product Commercial
Development and Market
Development

OPERATIONS

Headquarters & Scale
Demonstration Plant in Los
Angeles (West Adams), CA

NUMBER OF EMPLOYEES

10

WHY THE LA REGION?

AB 32, access to industry
experts and research
institutes.

COMPANY WEBSITE

www.originoil.com

**Company Key Insight: Establishing Local
Partnerships are the Keys to Success**

Successful R&D requires a collaborative approach that includes forming partnerships with key industry leaders. Close proximity and access to these leaders is critical to developing technology. OriginOil has formed research partnerships that include California State University of Long Beach and University of Southern California. By locating their facility in Los Angeles, they are nearby both of these institutions.

“In addition to research partners, OriginOil has established strategic customers and commercial partners that will allow us to scale-up production and expand in the appropriate markets. Los Angeles should develop a cleantech center that brings emerging companies and research institutes together.”

**Company Key Insight: Policy Framework and Climate
Change Legislation is Needed**

“There needs to be comprehensive climate change legislation at the federal level that creates a cap and trade system and establishes the price of carbon. The lack of legislation only disrupts the growth of cleantech companies and investment markets. Businesses need to see a clear framework in order to plan their growth strategy and make decisions.”

“In addition, streamlining regulation at the federal, state, and local level would spur the growth of additional enterprises and remove some of the barriers that are detrimental to many companies. If the government does not quickly resolve this you will continue to see companies opening up overseas, where there is a lower cost to do business. There is an urgency to address this now.”

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