



Cleantech Industry



An Assessment of Assets and Capabilities

in San Diego



By

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Photo Credit

Cover image of solar panels being installed at the Ruben H. Fleet Science Center courtesy of Ted Watson Photography and Kyocera Solar.

Table of Contents

- Executive Summary 3**
- Introduction..... 5**
- Clean Technology Defined 7**
- Cleantech Companies in the San Diego Region..... 9**
- The Business Climate for Cleantech..... 14**
- Research and Training Assets..... 19**
- Access to Risk Capital..... 24**
- Cleantech Policy Issues and Incentives 29**
- The Region’s Natural Resources and Weather Trends..... 35**
- Agricultural Products..... 40**
- Summary and Key Findings..... 44**
- Recommended Next Steps..... 46**
- Conclusion..... 48**
- Appendix 49**

Executive Summary

This study has been commissioned by the City of San Diego and the San Diego Regional Economic Development Corporation to assess the region's clean technology (or "cleantech") assets and capabilities. The report inventories companies in the region that offer cleantech products or services, and reviews issues relevant to the development of a cleantech cluster such as current higher education programs and research efforts, the business climate for technology companies, access to risk capital, policies and incentives, natural resources that may aid the development of cleantech, and related opportunities in agriculture.

Driven by concerns about climate change and high energy prices, there has been a tremendous amount of interest in clean technologies as an opportunity for addressing environmental challenges as well as for creating a new high technology industry. Overall, San Diego indeed has many of the elements to build a strong cleantech cluster.

- Using the definition and categories developed by the Cleantech Venture Network, there are 148 cleantech companies in San Diego. The majority, or 67 companies, offer products or services for energy generation. The next largest groupings are in water and wastewater, energy efficiency, and recycling and waste. Of the 148 cleantech companies in the region, 89 are within the City of San Diego. Among these companies are leaders such as Kyocera Solar, General Atomics, Hydranautics, and the Verenum Corporation.
- There is a talented pool of well-trained scientists and engineers for the emerging cleantech industry to draw upon thanks to the presence of other technology clusters, such as biotechnology, wireless telecommunications, and the defense industry.
- The region's support mechanisms, such as the newly formed CleanTECH San Diego industry association, CONNECT, the Center for Commercialization of Advanced Technologies (CCAT), the Center for Energy Sustainability, other technology trade associations, and a well-developed business services sector for high technology companies can help cleantech succeed in San Diego.
- San Diego's world-class research institutions, which include UC San Diego and San Diego State University and many leading non-profit research institutes, have the capabilities to lead the development of new clean technologies.
- With over \$1.2 billion in total investment in San Diego during 2006, there is potentially a large pool of risk capital to fuel the growth of cleantech startups. There are currently more than 90 risk capital firms with offices in the County and several angel investor networks, including the Tech Coast Angels and the Keiretsu Forum. In 2006, there were six cleantech deals valued at \$54 million in the region. Nationally, nearly \$3 billion was invested in cleantech, indicating a strong amount of interest in the sector by investors.
- Although complex, the federal, state, and local policy environment is rapidly becoming more favorable to supporting the development of a cleantech industry. Tax credits, incentive programs, and new laws that address environmental challenges, such as global climate change, are stimulating market demand for cleantech products and services.
- San Diego is endowed with certain natural resources, including solar radiation, wind power capacity, and energy generated from the ocean, that offer advantages for clean technology development. Wind and solar resources are more abundant in the eastern portion of San Diego County.
- Due to the limited amount of land under cultivation in San Diego County, it is not likely to become a major source of crops for biofuel production. However, there are distinct

opportunities for cleantech applications that support the current agricultural industry through natural pesticide development, plant propagation, and more efficient irrigation technologies.

- Cleantech helps San Diego's other technology clusters become more competitive through the supply of more efficient and environmentally-friendly products and services. For instance, ultra pure water is required by many biotechnology companies conducting research and development. Energy efficiency technologies and renewable power sources improve a business's bottom line, helping these firms become more competitive in a global economy.

San Diego's high technology industries are succeeding despite several challenges. In order for the potential of cleantech to be fully realized, the City and regional stakeholders will need to address the following:

- Unless a more holistic approach is taken, the patchwork of policies that regulate air, water, and energy will continue to complicate the development and adoption of clean technologies that span regulatory jurisdictions.
- The limited number of cleantech companies in San Diego that are attracting risk capital compared with other high technology industries in the region is a concern. However, opportunities for investment are likely to increase as regional support organizations develop targeted programs to link cleantech entrepreneurs with investors.
- The universities' strong research capabilities could be more explicitly focused on cleantech-relevant work. As funding agencies change their priorities, researchers will quickly seize the opportunity.
- Issues that affect San Diego's general business climate and competitiveness, such as housing affordability, traffic congestion, recruitment and retention, and other factors that make San Diego, and California, a high cost environment for high technology businesses, are ongoing challenges that need to be addressed by regional stakeholders.

With this assessment of San Diego's cleantech assets now completed, we recommend that San Diego benchmark itself against other developing cleantech hubs to determine best practices and the City's comparative advantages. In addition to learning more about the companies in these regions, this next step should look at public policy and efforts by regional utilities that support the growth of a cleantech industry. This information would be used to further inform the creation of an economic development strategy for cleantech in San Diego.

Introduction

In recent years, there has been an increasing amount of attention on the opportunities presented by “green” or “clean” technologies to simultaneously address environmental challenges and stimulate economic growth. Concerns about global issues such as climate change and high energy prices have helped to drive interest in these technologies, as have the efforts of companies to improve their competitiveness through more efficient operations that also reduce their environmental footprint. Venture capitalists are now investing heavily in companies focused on developing clean technologies. According to the Cleantech Venture Network, venture capital invested nationally in clean technology in 2006 totaled \$2.9 billion, making it the third largest category after software and biotechnology.¹

Many regions in the United States and other parts of the world view clean technology, or “cleantech”, as an emerging industry that will foster the growth of new companies and new high-wage jobs, with the added benefit of helping to improve the overall environment. Because cleantech is an emerging industry, no region in the US has clearly developed a cleantech cluster, with the possible exceptions of the San Francisco Bay Area and the Boston/Cambridge area. As such, the opportunity to become a leading region is essentially open.

This report has been commissioned by the City of San Diego and the San Diego Regional Economic Development Corporation (EDC) to determine the current assets in the San Diego region for the cleantech industry. This analysis is part of the Mayor of San Diego’s recently launched Cleantech Initiative to promote the expansion, attraction, and retention of businesses that develop products and technologies that provide environmentally sustainable solutions. The findings of this assessment will inform strategic efforts by the City, the EDC, and other stakeholders to cultivate the growth of a local cleantech cluster.

Report Overview

Because cleantech is an emerging industry, a definition of what technologies, products, and services constitute cleantech is presented at the beginning of this report for clarification purposes. This definition was used to guide the scope of the regional assessment. An overview of the cleantech companies identified by our research is presented in the next section, followed by a review of the business climate for technology companies in San Diego, relevant higher education programs and research efforts in the local universities, issues related to the accessibility of risk capital, state/locally funded incentives and initiatives that support cleantech development, a description of natural resources and weather that pertain to cleantech (e.g. solar radiation, wind, etc.), and agricultural resources and related opportunities for cleantech in the region’s agriculture industry. The report concludes with a listing of key findings and suggested next steps. The Appendix provides a directory of cleantech companies in the region, organized by the segment(s) in which they operate.

Methodology

Global CONNECT and its contributing partners relied on several different methods to collect information. Where possible, information from existing studies and market reports was used, such as those from the Cleantech Venture Network and the San Diego Regional Renewable Energy Study Group. Several databases were also mined for data on regional assets using search criteria provided by the Cleantech Venture Network. The databases include those

¹ Stack, James. *Cleantech Venture Capital: How Public Policy has Stimulated Private Investment*, Environmental Entrepreneurs (E2) and the Cleantech Venture Network, May 15, 2007.

