PLANNING SACRAMENTO'S CLEANTECH ZONE:
A CASE OF POLICY, PRACTICE, AND PLACE BRANDING

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Nicole M. Streegan
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COMMITTEE MEMBERSHIP

TITLE:	Planning Sacramento's Cleantech Zone: A Case Of Policy, Practice, And Place Branding
AUTHOR:	Nicole M. Streegan
DATE SUBMITTED:	June 2013
COMMITTEE CHAIR:	Dr. Umut Toker Associate Professor College of Architecture & Environmental Design Department of City and Regional Planning
COMMITTEE MEMBER:	Dr. William Siembieda Professor College of Architecture & Environmental Design Department of City and Regional Planning
COMMITTEE MEMBER:	Dr. Jonathan York Associate Professor Orfalea College of Business Center for Innovation & Entrepreneurship

ABSTRACT

Planning Sacramento's Cleantech Zone: A Case Of Policy, Practice, And Place Branding
Nicole M. Streegan

Clean technologies that create a positive impact on global climate change are developed in cities and regions throughout the United States. The City of Sacramento aims to capitalize on this market trend by building partnerships between regional actors such as universities and venture capital groups, as well as identify land, and subsequently specific land uses and development guidance, to support growth in this industry. This research paper uses the single case study methodology to identify the major dynamics working to build and sustain Sacramento's Cleantech Zone, as well as their relationship between urban planning and economic development tools.

Keywords: Clean Technology, Sacramento CleanTech Zone, Local Economic Development, Regional Economic Development, Business Clusters, Innovation, Place Branding

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1. INTRODUCTION

In August 2009, Elon Musk, CEO of the maverick electric powertrain and sports car company Tesla, announced it would lease a 350,000 square foot building on a 23-acre parcel in the middle of Stanford Research Park. Stanford Research Park is one of the oldest and well-known research and development facilities in Palo Alto, California. The Tesla complex is located minutes away from Stanford University's main campus and from the garage where Bill Hewlett and Dave Packard built their original audio oscillator. Stanford Research Park has always been thought of as a hub of technological discoveries and inventions. It is also the birthplace of the Silicon Valley, one of the most successful technology regions on the planet. "Silicon Valley and the Stanford Research Park are synonymous with innovation and entrepreneurship. It's an ideal place for a new car company trying to rethink many aspects of the traditional automotive business," said Musk in the press release by Tesla Motors. In the same press release, Palo Alto City Manager, James Keene, said, "Tesla's move is another indicator that Palo Alto is the place to be for the green tech and alternative energy companies that will help solve the daunting global climate challenges of the 21st century."

Not surprisingly, as cities in California are charged with planning for and adapting to climate change, an economic development opportunity can be found embedded deep in the regulation. Sacramento's CleanTech Zone, the East Bay Green Corridor, and Los Angeles CleanTech Corridor are examples of cities and regions capitalizing on an opportunity to enhance infrastructure, draw business, and draw talent to their areas. Founded on policy developments in Climate Action Plans, General Plans, and economic development strategies, each of these regions cite clean technology and the business support for and incubation of this industry as a priority.

Clean technology has been described as a catalyst for economic development, employment, new clusters of innovation, and the revitalization of cities (Apollo Alliance, 2008). The field itself is defined

as any low-carbon emitting technology; one that aims to improve overall environmental quality through the development of products, services, and processes for renewable energy generation, energy storage, energy efficiency, transportation, and waste management (Chapple, 2008, CleanTech Group, LLC, 2012). The zones and corridors cited above leverage economic development and planning tools to drive physical development, retain and recruit businesses, and establish incubation centers in their boundaries; all while working closely with local universities, research and development facilities, and business development professionals to orchestrate what could be the *center* of a trending industry. Palo Alto's City Manager and Tesla's CEO's are alluding to this kind of place; a center of innovation with the right infrastructure, talent, and other resources required to grow and develop a business in a cutting edge industry.

Sacramento aims to create this kind of center by establishing the CleanTech Zone. Sacramento's CleanTech Zone is a functioning Enterprise Zone, using economic incentives to draw tenants and development inside its 7.8 square mile boundary. Tax credits, business loan support, the establishment of a Foreign Trade Zone and Recycling Market Development Zone all provide financial breaks to tenants in this area. In addition to this package of economic development tools designed to retain and recruit new businesses to the area, five identified dynamics are spurring physical development as well as the homegrown incubation of technologies. Some of these dynamics are grounded by the Sacramento Center for Innovation Specific Plan, a plan for the physical development of 120 acres inside of the CleanTech Zone. Two other key factors play a role in development here. These actors include Sacramento Municipal Utility District, the regional public utility provider, and Sacramento Area Regional Technology Alliance CleanStart Program, a local business development and incubation program. These actors innovate products, build talent, and launch businesses in the heart of the CleanTech Zone.

Driving policy and initiatives from the state capital, the City of Sacramento's Mayor and Staff, and the demands of the market are all at play in CleanTech Zone phenomenon. The planning questions

embedded in this research are about how a city plans for a changing industry trend when the industry aligns so seemingly well with climate policy, what the relationships are between local economic development planning tools and their contribution to the development of clean technology, and who the actors are relative to their public/private and formal/informal position in the institutional framework of the city. The answers to these planning questions influence a great amount of stakeholders in the city and have potential to contribute to a thriving region.

A literature review was conducted to create a foundation of theory and understanding for analyzing the information through the data collection process. A review of literature ranging from place- and people-based economic development, sustainable and green economic development, local economic development planning tools, competitive advantage of business clusters, and place branding were researched during this process. Additionally, a review of documents from investment journals and investment associations support research to define the term clean technology. Little literature is published on the clean technology corridor and zone phenomenon, but a review of the websites and coalitions of cities, universities, and research and development facilities identifying a zone or corridor in their region was also conducted.

The case study methodology was employed to support this research in order to answer research questions pertaining to how and why a clean technology corridor or zone is formed, and what the relative implications are with regard to policy and practice. After several cases of clean technology corridors and zones in the State of California were reviewed, the City of Sacramento's CleanTech Zone was selected based on its clarity in development objectives, scale, and accessibility. Interviews were conducted based on network identification, an outline of the key actors involved in the clean technology development process throughout the Sacramento Region. Additionally, document analysis was performed in order to discover the driving ideas in Sacramento's existing planning documents, as well as existing studies and strategic documents from other institutional drivers in the city.

Content analysis of the interviews was conducted in order to produce findings. These findings identify that physical development is facilitated through a specific plan, a variety of economic development incentives, and also five dynamics: 1) Public-Private Partnership, 2) Location, 3) Testing and Prototyping, 4) an Ecosystem of Entrepreneurs, and 5) Key Champions. These dynamics reach beyond the city planning tools that have been identified in the literature review, and provide relevant discussion for policy and the implications of physical development. More than anything, however, they address the drivers from the side of the story belonging to the private market.

2. REVIEW OF EXISTING LITERATURE

2.0 Introduction

The theoretical context for this research is rooted in basic economic development principles, technology development, and place branding. This context illuminates a convergence of complex theory and practice leading to outcomes in practice that are not always founded on decisions made by urban planning and economic development professionals. Market drivers such as demand for technology, federal and state policies forging technological change, and trends in business are at play in this industry. The principal and contemporary thought behind each of these theoretical components is outlined below, supporting an analysis of the selected case study.

A general theoretical context under which this topic is further informed can be summarized in Figure 2.1.

Figure 2.1 Theoretical context for clean technology corridor and zone

2.1 Principles of Economic Development

The study of economic development starts from one basic assumption, that the key objective is business development and job growth. These things occur when new firms are created, existing firms expand, and new firms are attracted and retained (Moore, Meck, and Ebenhoh, 2006). According to a number of researchers, however, economic development is about more than just economic growth (Chapple, 2008, Blakely and Green Leigh, 2010). Economic Development is about creating a framework for growth, a basis from which an economy can thrive. The distinct difference between economic development and economic growth stated by Chapple (2008) is as follows,

Simply put, economic growth is an increase in output through the efficient use of resources, while economic development is a change in functional capacity that generates new resources for growth. Growth is quantitative change (in numbers of new businesses, jobs, per capita income, buildings, etc.), while development is qualitative, structural change that can help foster innovation and improve productivity. Growth can lead to development, if the new resources it generates are reinvested in businesses, people, or places. Likewise, development will likely increase growth – but only over the long-term (p.4).

This definition becomes increasingly important as the quality and longevity of a firm and its interests in a city are discussed through concepts of the recruitment and incubation of businesses. Businesses are grown or attracted to area where there are significant resources (infrastructure, capital, technology, etc.) available to access. Agglomeration refers to clusters of businesses that generate benefit to each other. This phenomenon is further discussed in Chapter 2.4 about Business Clusters.

Multiari, et.al (2012) distinguishes the influential factors between regional and local economic development, identifying factors such as natural resources, built space, labor, and transportation as more influential to regional economic development, while quality of life factors and local policy have a

more acute effect on local economic development. Regardless, there is a strong thread running through economic development at both the local and regional level, and the strength of that thread is dependent on the direct inputs identified in Table 2.1.

Table 2.1 Factors that impact economic development

Direct Inputs	Direct Factors Affecting Cost & Revenues	Factors Indirectly Affecting Cost
Natural resources	Location relative to supplies and markets	Amenity and quality of life factors
Built space	Infrastructure and utilities	Government policies
Labor	Business clusters	

Source: APA's Planning Advisory and Service Report Number 541 (2006)

Supply-side strategies require people with the correct skill and talent, land on which to development space for commercial and industrial needs, and the natural resources from which to design, engineer, develop, and create new products. Production factors, considered to be labor, material, energy, and availability and cost of land, are related to both direct inputs and the direct factors affecting costs and revenues (Multari et al., 2012). Further discussed in Chapter 2.4, the proximity of synergistic companies has a relative benefit in terms of competitiveness. This locational proximity has a significant impact in the technology field, which relies heavily on certain types of production needs.

Multari et al. (2012) also cites the infrastructure necessities and influences from regional planning to include developments such as ocean ports, airports, and highways. Infrastructure and utilities play an immense role when companies are considering headquartering in a city. Lower utility costs, as well as costs associated with moving goods from where they are manufactured to distribution centers, is a direct factor influencing costs and revenues.

Table 2.1 shows the factors indirectly affecting the cost of inputs and cites a city's quality of life and government policies. This indirect effect is a challenge to quantify but certainly has an impact on the

behavior of businesses in terms of locating to new areas or starting up in an area. With regard to quality of life, factors such as good schools, entertainment, and recreational pursuits influence the type of people that will enjoy the area and find opportunity in the place in which they live and work. This factor seems to be especially important to young families and people in the technology industries (Florida, 2012).

Another way of expressing the relationship between direct and indirect factors of economic development is by gauging how the city or region's capacity (economic, social, technological, and political capacity) and resources (natural resource availability, location, labor, capital investment, entrepreneurial climate, transport, communication, industrial composition, technology, size, export market, international economic situation, and national and state government spending) relate to one another (Blakely and Green Leigh, 2010).

While traditional economic development has evaluated resource capacity as it relates to raw materials, infrastructure, government spending and markets, size of markets, access to money, and access to communication, the capacity component of the equation is typically neglected. For example, location theories evaluate advantage or disadvantage that come with being close to existing markets, but they neglect to evaluate the indirect factors and even the direct factors as they relate to costs and revenues (Blakely and Green Leigh, 2010).

A variety of economic development theory exists, but a recognized dynamic between the theories has been determined as the following: economic development either occurs because of an augmented, existing industry within a city, or because of self-generated or self-innovated phenomena (Luger and Goldstein 1991, Blakely and Green Leigh, 2010). In relationship to the planning profession, the strategies that a city department might take differ based on these different phenomena. The Growth Center Dynamic and the Self-Generated Dynamic illuminate the concept of recruiting and drawing

versus incubating and growing. In the case of Sacramento's clean technology industry, both dynamics are at work.

2.1.1 Economic Development Theory: Growth Center vs. Self-Generated

2.1.1.1 Growth Center Dynamic

The Growth Center Dynamic supports existing and propulsive industries in a city or region. Propulsive industries are said to produce a trickle-down effect from regions to cities, and large cities to smaller ones, and subsequently large industry to small industry. Interdependent services, knowledge, and wealth are said to move along this chain. According to this theory, the "center" is the locus of industry and innovation – all else stems from this place (Luger and Goldstein, 1991).

The type of economic growth that is predicted by this theory is three-fold:

1. Existing firm expansion and new business formation
2. New business formation through the development of agglomeration economies
3. Increase in consumer services related to retail, trade, and residential based economic activities.

Anchor tenants in cities with a research and development focus such as Berkeley's Lawrence Livermore National Laboratory are said to encourage the development of related industry or clusters of firms associated with the research occurring here. This physical proximity, referred to as a business cluster, can develop around either a growth center or because of self-generated growth. The idea of an anchor, however, is important in this dynamic; that a seed already exists and other businesses and firms will flourish because of this seed.

In many industries today, however, a physical system need not exist. One argument is that ideas do not "trickle down" in a spatially systematic way, rather, the linkages between organizations account for the transaction of information (Higgins, 1983). Growth in the technology and communications industry

make it possible for and ideas and innovation burgeoning in Europe to reach somewhere in the United States.

According to Luger and Goldstein (1991), this theory does not offer much guidance with regard to the physical location of where industry should be located, only that investment should be made where the greatest competitive advantage exists and where the greatest amount of economic impact might occur.

Figure 2.2 shows the outputs as an effect of this dynamic, which emphasizes drawing industry to a region to create a center or “pole” for economic development. This dynamic assumes some sort of imbalance in the types of industries located in a city and is justified with traditional methodologies for economic analysis such as determination of economic base.

Figure 2.2 Growth Centered Dynamic
Source: Castells, M., & Hall, P. (1994)

2.1.1.2 Self-Generated Growth Dynamic

The intent of this theory is to foster growth from within a city or region. Places such as Boston's Route 128 Corridor and the Silicon Valley have been studied in order to determine their so-called "genetic make-up." Among the studies performed, it has been concluded that these areas uniquely foster creativity as a component of their success (Luger and Goldstein, 1991). In their book, "Technology in the Garden," Luger and Goldstein cite Economist Ake Andersson, who writes, "Creativity is a social phenomenon primarily developed in regions characterized by high levels of competence, many fields of academic and cultural activity, excellent possibilities for internal and external communications, widely shared perceptions of unsatisfied needs, and [synergies among local actors]" (p. 18).

In each of the clean technology corridors and zones evaluated for this case study, research and development facilities, as well as the opportunity to seed ideas and technologies, were identified as a key component in their strategic development. In the case of research parks, this theory can be applied as justification for their development because research parks stimulate an environment of innovation. This justification alone, however, is insufficient to many, since the quantification of creativity and innovation, when no new technology is patented or yet to commercialize, is a qualitative science. In a time of changing industry, and an emphasis on knowledge economies, innovation, and research and development, the science of quantifying creativity and innovation is difficult (Chapple, 2003).

Figure 2.3 shows the inputs as an effect of an economic development dynamic that emphasizes self-generation through creativity, innovation, and entrepreneurial pursuits.

Figure 2.3 Self Generated Growth Dynamic

Source: Castells, M., & Hall, P. (1994)

This theory translates nicely to the study of a clean technology corridor or zone because the emphasis on research and development is strong in each of these places. Paired with the resources that come with university support; the self-generated growth dynamic is a significant factor to be studied for the clean technology industry to grow.

2.2 Sustainable Economic Development

Sustainable economic development aims to look more comprehensively at issues that economic growth can cause, namely as they relate to environmental and social impacts. Blakely and Green Leigh (2010) emphasize that traditional economic development theory does not address the current

needs of our communities. They define traditional economic development as that which aims to create wealth and jobs, thereby increasing a city's tax base. In relation to this superficial definition, they argue for an expansion of the term because the consequences of thinking so narrowly neglect to evaluate the impacts on both the environment and equitable treatment of people. Blakely and Green Leigh's definition of economic development emphasizes sustainability. They write, "The blind pursuit of economic growth can destroy the foundation for economic development" (p. 74). A complete definition provided by Blakely and Green Leigh (2010) is,

Local economic growth is achieved when a community's standard of living can be preserved and increased through a process of human and physical development that is based on principles of equity and sustainability. First, economic development establishes a minimum standard of living for all and increases the standard over time. Second, economic development reduces inequality. Third, economic development promotes and encourages sustainable resource use and production (p. 75).

This concept resonates with Chapple's definitions of economic growth and economic development. The latter focuses on the institutional capacity of an area to adapt and be resilient. It aims to look long-term at the economic viability of an area. This idea is applied to industries such as the timber industry and the potential to over-extract a resource that is limited, or one-industry town's that see skyrocketing unemployment rates once an industry leaves or collapses. This concept can easily be applied to the clean technology industry when evaluating the environmental costs associated with producing and manufacturing clean technologies, the implications for the culture of business in a community, and the physical siting of new industrial and commercial areas. Outside or foreign interests often opt to locate where their infrastructure and utility costs are inexpensive, and where they have access to the right labor. Arguably, the interests between a firm that is recruited from outside of a city versus a home-grown firm can be different. This debate will be illuminated in the findings of this research.

Table 2.2 outlines the reformulation of old concepts of locality, business and economic base, employment resources (ie. labor), and community resources according to Blakely and Green Leigh. The new concepts highlight their working definition of economic development and emphasize economic quality, workforce development, and collaborative partnerships.

Table 2.2 A reformulation of the components of local economic development

Component	Old Concept	New Concept
Locality	Physical location (near natural resources, transportation, markets) enhances economic options.	A quality environment and strong community capacity multiply natural advantages for economic growth.
Business and Economic Base	Export base industries and firms create jobs and stimulate increased local business.	Clusters of competitive industries linked in a regional network of all types of firms create new growth and income.
Employment Resources	More firms create more jobs, even if many are minimum wage.	Comprehensive skill development and technological innovation lead to quality jobs and higher wages.
Community Resources	Single-purpose organizations can enhance economic opportunities in the community.	Collaborative partnerships of many community groups are needed to establish a broad foundation for competitive industries.

Source: Blakely and Green Leigh (2010)

When environmental objectives are emphasized in sustainable economic development, it is also referenced as green economic development. In a definition of the term *green economy*, Chapple (2008) states that the

green economy is the clean energy economy, consisting primarily of four sectors: renewable energy (eg. solar, wind, geothermal); green building and energy efficiency technology; energy efficient infrastructure and transportation; and recycling and waste-to-energy...it includes products, processes, and services that reduce environmental impact or improve natural resource use (p. 1).

Tracking and quantifying economic change in the green economy is difficult, however. Producers of green goods are more identifiable than others, but most producers, according to Henton, et al. (2008), “stem from the design and manufacture of conventional technologies and products. For instance, some of the largest producers of photovoltaic cells are semiconductor manufacturers” (p. 7). Henton, et al. (2008) also note, “Notably, as green products and practices permeate the reaches of the economy, the discussion is no longer about the emergence of a new industry; instead, it is about the transformation of the entire economy. This transformation is toward an economy that makes more efficient and sustainable use of our limited natural resources” (p. 7).

Although the green economy seems to behave more like a gradual transformation than a major shift the repercussions for economic and workforce development are significant. New technologies require new skills in the workforce, and the application of new technologies has potential to revive slow-growing industries. An increased demand in green building practices, for example in statewide and local building codes, creates a new demand for construction activities in an otherwise impacted industry (Henton, et al., 2008). These trends in California play a significant role in clean technology development as cities and businesses adjust to changing demand for environmentally friendly products and practices.

2.3 Local Economic Development & Urban Planning Tools

Local economic development tools are wide ranging and influenced by expertise from other local agencies and organizations such as local economic development corporations, small business development centers, local universities and colleges, etc. (Multari, 2012). Although these entities should be coordinated and work together with a city planning department; city planning staff are somewhat limited in their scope and ability to influence economic development. Variables such as

availability and cost of land, size and space of parcels, local transportation facilities, visibility, proximity to amenities, proximity to needed business services, proximity to institutions, availability of public services, and proximity to an appropriate workforce are all relevant to the field of city planning (Multari, 2012). The ability to see businesses develop, grow, and sustain themselves seems to be a science with a variety of influences that include but are not limited to a city planning department.

The literature discusses eight core economic development strategies, as organized by Moore, Meck, and Ebenhoh (2006), and are discussed below:

1. Coordinate economic development programs and support services

The coordination of economic development programs can be performed through interregional coordination, the establishment of economic development institutions, or the streamlining of development review. Interregional coordination can occur on a formal or informal platform. At one end of the scale, a formal organization can perform planning, financing, recruitment, and retention activities on behalf of a region. At the other end of the scale, informal coordination might simply mean that jurisdictions talk with one another or meet on an as-needed basis to discuss some coordination of economic development activities. According to Moore, Meck, Ebenhoh (2006), "Interregional coordination can protect public revenue from being used for unnecessary financial incentives that would otherwise only affect the choice of location within the region" (p. 38). This enables a region to protect public revenue for important public services (eg. schools, parks) for community and economic development.

Another form of coordination includes the formation of an economic development institution, either through the formal appointment of a staff member on a city staff, the establishment of a department of community and economic development, the creation of a non-profit organization, or the organizational formation of a public private-partnership. According to the literature, a subscription to a single one of these is not necessarily an entity that oversees all economic development activities. The

circumstances vary from city to city (Moore, Meck, Ebenhoh, 2006). The benefits of creating an entity under local or regional government responsibility is the access to heightened coordination, while the benefits of creating a non-profit or separate entity lies in the ability for non-governmental entities to act quickly and protect sensitive information upon the prospect of making loans and grants (Wisconsin Economic Development Institute, 2003).

A series of formal and informal partnerships can be pared down to the following common organization and public entity types:

Local and Regional Economic Development Agencies and Organizations

- Local Government
- Redevelopment Agencies (RDAs dissolved in 2012)
- Chamber of Commerce
- Downtown Associations and Business Improvement Districts
- Economic Development Corporations
- Tourism Related Organizations
- Other Organizations to Support Special Industries (retail, agriculture, manufacturing, etc.)
- Private Industry Councils

State of California Agencies and Statewide Organizations

- State of California Economic Development Programs
- Other State Organizations
- Colleges and Universities

U.S. Government Agencies and National Organizations

- U.S. Economic Development Agency

- Other Federal National Organizations (U.S. Small Business Administration, National Mainstreet Center, National League of Cities and Counties

(Multari et al., 2012)

Noted earlier, the coordination of economic development partnerships and programs is paramount to any successful strategy (Moore, Meck, Ebenhoh, 2006). This organization can be as informal as identifying a department that applies for and administers funding and information for economic development, or as formal as actually establishing an economic development authority either in coordination with or stand along from the public or private sectors. The formation of a public-private partnership in this regard is often the case, as is studied in Sacramento's CleanTech Zone.

A third form of coordination includes the streamlining of the development review process. Under the purview of local government regulation are building, zoning, and environmental regulation. This regulatory framework impacts businesses and developers with a goal to protect businesses, workers, public health and quality of life in a community (Moore, Meck, and Ebenhoh, 2006). According to Moore, Meck, Ebenhoh (2006), "Over time, however, the development review process and regulations may present a series of lengthy and uncertain procedural hurdles for business" (p. 40). The consistent assessment of this process and the rapport established both internally as well as externally is key to successfully streamlining development review (Moore, Meck, Ebenhoh, 2006).

2. Business development

Business development is performed by creating a good business climate, cultivating entrepreneurship, supporting business skills and management training for small businesses, aligning financing opportunities, establishing small business development centers or incubators, and exploring a variety of programs to foster people, their business interests, and particular industries (Blakely and Green Leigh, 2010, Moore, Meck, Ebenhoh, 2006). Blakely and Green Leigh identify the *objective* of economic development as the driver behind an economic development strategy. These objectives,

shown in Figure 2.4, lead to the selection of a specific business development strategy or tool based on the needs and capacity of a community.

Figure 2.4 Objectives of business development strategies

Source: Blakely and Green Leigh (2010)

3. Development incentives and financing

Enterprise zones and financial incentives for business development comprise some of the development and financing incentives that aim to reduce the development costs for the private sector (Moore, Meck, Ebenhoh, 2006). Above all, these techniques include the direct provision of money as a grant or loan to development, the provision of in-kind services or resources (eg. environmental impact report), and the reduction of waiver of fees or taxes (eg. reduction of impact fees).

Cities can also offer financial incentives such as tax increment financing (TIF). This technique is widely debated in research literature and has demonstrated impact to cut into general revenue that would have otherwise been collected in the instance that TIF is leveraged in an area that would have been

developed (Moore, Meck Ebenhoh, 2006). Although conflicting evidence has been found, some research also sites a significant positive impact with regard to local employment (Man).

4. Business attraction and retention

Marketing and attraction of businesses is a task often achieved through a local or regional chamber of commerce, tourism bureau, or a department of community development. Sometimes these tasks are also better achieved through non-profit organizations or private firms. One of the main goals of marketing and attracting businesses is to target industries with growth potential (Moore, Meck, Ebenhoh, 2006). An analysis of the existing economy, as well as use of information from the North American Industrial Classification System (NAICS) enables professionals to make targeted projections for a community. Traditionally, these involve standard techniques of economic analysis, but a strong understanding of what retained businesses need is also an important component.

Business retention works together with business attraction to hang onto the existing businesses within a community. However, the goal with retention is to keep a pulse on the challenges and the needs of existing businesses. The literature cites active involvement with the business community as a way to stay tuned to the issues. Key business issues for businesses include infrastructural concerns and the challenge of adhering to development codes (Moore, Meck, Ebenhoh, 2006).

5. Workforce education and training

Workforce development is essential to many economic development strategies simply because an educated and properly trained labor force are a main engine in economic development (Blakely and Green Leigh, 2012). Human resource programs are developed to include Workforce Investment Boards (WIB), specialized training, and youth enterprise programs. WIBs vary in composition, but include representation from local firms, local government, state government, unions, and education

institutions in order to provide a comprehensive picture of the needs and direction of an area. All of these programs bridge the gap between employment and training efforts and economic development.

Additionally, the literature states that education is foundational to human resource development. Moore, Meck, Ebenhoh, and Blakely and Green Leigh agree that a quality education leads to quality employment. Quoted by Blakely and Green Leigh (2010) is the estimate that “every year of education increases a worker’s earnings by 10%” (p. 314). According to this literature, quality of education also relates to the increase of attractiveness and quality of life in an area. Blakely and Green Leigh emphasize this in relationship to their contemporary definition of economic development; raising the standard of living for all people, not simply workers with college or advanced-degree educations. With regard to low-income places, high-quality education systems lead to high graduation rates for disadvantaged and at-risk youth, leading to reduced crime, incarceration rates, and welfare dependency (Blakely and Green Leigh, 2010).

6. Land supply

Local government can impact land supply and subsequently economic development by accounting for available land, restoring and repurposing brownfield sites, assembling land through legal techniques, or establishing industrial, technology, or business parks. The acquisition and assembly of these places is foundational to development because it sets a strategy and vision for where cities will grow.

Commercial, industrial, and residential land uses have the potential to make an immense impact with regard to the stability or volatility of a city’s financial composition. A strong commercial and industrial composition means that the income from transactions that occur from products made and sold on the land are recuperated by the city. Research and development parks may see backing from private investors or foundational giving, with the hope that these technologies spin-off to form successful local businesses. A strong residential composition means a city’s income is predominantly comprised of property tax revenue.

A comprehensive inventory of land and its uses is the foundation for assessing land supply and good local policy development. Without an account of this information, local policy has potential to regulate land rigidly and lead to major impacts to the cost of land. Impacts also occur to the development and provision of public infrastructure. Its extent and size are affected by policy decisions and the needs of the community. A good land market monitoring program creates a means to assess and determine if and where land is adequate to build upon. Moore, Meck, and Ebenhoh state, "Land market monitoring will help a community determine when to make changes in the allocation of different types of land use to respond to changes in the local or regional land market" (p. 48).

Brownfield development differs from greenfield development in that it repurposes abandoned, idled, or underused industrial and commercial areas where perceived environmental contamination has occurred (Moore, Meck, and Ebenhoh, 2006). Federal and state regulatory agencies are often involved during the development process of a brownfield site, often costing time and money. However, there is tremendous benefit in creating this supply of land, at times, convenient to housing and transportation.

Technology and industrial parks are characterized by 1) their campus-like physical environment, 2) a mixture of ownership and management between the private and public sector, 3) association with a university or research institution, 4) low-density development and high quality buildings, and 5) qualification within a specified criteria in order to ensure compatibility between the businesses and activities occurring in the park (Moore, Meck, Ebenhoh, 2006). This economic development tool is related to the development of a clean technology zone because it encompasses the deliberate provision and assembly of land for the single purpose of developing a particular industry. There is risk in this strategy in that the development of the industry relies upon a variety of market factors, the quality and geographic draw of labor, as well as the physical design of the park.

The assembly of land can occur through a few means. The public sector might acquire the land through eminent domain or by purchasing the land outright. It might also repurpose land that is already under its ownership and dedicate it for economic development. In whatever manner that it is assembled, the land is likely done for the support of land-intensive businesses rather than service-oriented businesses. Several cautions lie in this strategy because the purchase of land can be expensive, and the market analysis for a growing industry could be flawed. More and more, city's are attempting to evaluate how to grow sustainable businesses; ones that will last and rely upon a cluster of businesses and services in order to thrive. This phenomenon, discussed later in this research, is often developed into a business cluster analysis in order to determine linkages and dependencies among firms within a local economy.

7. Infrastructure

According to Moore, Meck, and Ebenhoh (2006),

Communications infrastructure, water supply, sewers, roads, sidewalks, parks, public transit, and airports are critical components of an area's development capacity and long-term competitiveness. Businesses rely on infrastructure to conduct their work and transport their goods and services. Also, a well-maintained city looks good, making it a pleasant place in which to live and work. Local government is responsible for most of these infrastructure components and can therefore exert significant influence on development type and pattern (p. 51).

Capital Improvement Programs, the essential guide for repairing and replacing infrastructure, expanding its capacity, coordinating development, and pacing development, are the catalyst for this type of development.

The literature emphasizes not the quantity of infrastructure, but its quality and timely development.

According to Moore, Meck, and Ebenhoh (2006), "Infrastructure provision is less effective when

government is too far ahead of the market, putting infrastructure in areas of little interest to the private sector. In nearly all cases, though, the private market is clamoring for infrastructure improvement well in advance of any government decision to provide it” (p. 53).

8. Quality of life conducive to business innovation

Business innovation and firm location relate to quality of life because the environment in which workers live and work must be attractive to them. In today’s competitive market for the right labor force, this factor becomes an important one when deciding to locate a firm. Depending on the demographic of a firm’s labor force, quality of life factors may be different.

Quality of life can be defined as a measure of livability based on income level, education level, housing costs, healthcare access, climate, and arts and entertainment. These factors that define quality of life play a role in economic development according to a variety of sources of literature (Deller et al., 2001, Moore, Meck, Ebenhoh, 2006, and Florida, 2012). An extensive amount of research has been performed in order to develop indicators of enhanced economic activity in relationship to quality of life, but varying degrees of what livability means lead to a rather subjective interpretation. This makes it challenging for local government to justify quality of life strategies that intend to produce economic benefits for a place. This leads to the idea that the development of amenities and quality of life is a task tackled through both private and public leadership, and partnership between them.

Richard Florida is a contemporary researcher whose theory of economic development lies in the emphasis of the “Four Ts,” which include Talent, Technology, Tolerance, and Territorial Assets (Florida, 2012). He argues that creative people, those who may carry the ability to drive an upswing in the economy, desire a place that is diverse and open to innovation and ideas. He has developed a series of indices that look for relationships between groups such as the over- or under- representation

of homosexual, artist, and foreign-born populations. Specifically, this research is linked to evaluation of the high-technology sector and large metropolitan areas.

Florida takes the expression, “Quality of Life” and pushes it slightly further, to define something broader, “Quality of Place.” In an Urban Land article he writes,

Quality of place can be summed up as an interrelated set of experiences. Many, like those provided by the street-level scene, are dynamic and participatory. You can do more than be a spectator; you can become a part of the scene. But while the street buzz is there to be found if you want it, you can also retreat to your home or some other quiet place, chill out in an urban park, or even set out for the country (2012).

According to Moore, Meck, and Ebenhoh (2006), the concepts that are raised by Florida “[do] not fit easily into conventional economic development or city planning. They imply, however, that such planning should work to create vibrant communities with rich ethnic, educational, cultural, and lifestyle environments, and opportunities for human interaction” (p. 56).

2.4 Business Cluster Development

The phenomenon of clustering businesses in order to foster synergy and productivity is an important one to illuminate, since clean technology zones and corridors thrive on this concept. Some economists believe that clusters of firms that prosper within the same industry and require similar services tend to have a competitive advantage over other firms. Business clusters are defined as a geographic concentration of businesses that share associated institutions (e.g. universities, standards agencies, trade associations), suppliers, or talent, and are considered to increased productivity because of these factors (Porter, 2000).

According to the Harvard Economist, Michael Porter (2000), location does matter when it comes to competition, especially in the context of cluster theory. He writes, “The most enduring competitive advantages in a global economy seem to be local” (p. 32). Businesses in a cluster not only aim to compete, but they also cooperate with one another (Porter, 2000). The connection between associated industries is fundamental to competition, productivity, and innovation. Porter also challenges the use of traditional economic groupings like companies, industries, SIC codes, and sectors, arguing that an analysis of the economy by cluster is a better unit, which accounts for “important linkages, complementarities, and spillovers in terms of technology, skills, information, marketing, and customer needs that cut across firms and industries” (p. 18). This becomes inherently important for government to recognize because of the impact their policy decisions have on these industries. Subsidies and tax breaks afforded to locating industries can support or diminish competition evaluated from the broader cluster context.

Many cities have strong existing relationships to industrial clusters. Classic examples include the Silicon Valley and high technology, Los Angeles and fashion, Detroit and the automotive industry, and New York and Charlotte and finance. A prototypical business cluster is the wine industry in California. There is a network of growers and processing facilities supported by educational, research, and trade organizations such as UC Davis, the Wine Institute, and culinary institutes. State government agencies also support production. Products for growing, harvesting, and irrigating grapes play a role. Winemaking equipment such as barrels, bottles, corks, and the facilities to process the grapes are a part of the cluster. Marketing and design firms that build brands for wineries and vineyards also play a role. And tourism and the food service industry play a secondary but vital role. Figure 2.5 shows the relationships between these industries and illuminates that a similar map of relationships can be made between an industry like clean technology.

Figure 2.5 Relationships in California's wine industry

Source: Porter (2000), based on research by Harvard M.B.A. students R. Alexander, R. Arney, N. Black, E. Frost, A. Shivananda

Cluster analysis differs greatly from traditional ways of analyzing economic information. According to Blakely and Green Leigh (2010),

Many cities and regions have well-identified and highly visible clusters, but the promise of cluster analysis is to help identify clusters in places where they are not so visible and to help any place become aware of potential sets of industries that can be nurtured as a cluster. The proximity of multiple industries (or what economists call *agglomeration*) means that they gain benefit from their common location in addition to whatever each firm might be able to do by itself (p. 192).

Although a cluster analysis is not designed to project economic growth industries, but rather identify potential, the technique is widely debated, but used by agencies like the United States Department of Commerce, Economic Development Administration. According to the Economic Development Administration, there are five imperatives that contribute to successful cluster-based development:

1. Recruit highly committed leadership
2. Develop a strategy to ensure adequate resources throughout the process
3. Choose the right geographic level of focus
4. Find tools to sustain momentum between stages
5. Engage potential implementing institutions from the earliest stages of the process

These imperatives are said to support the competitive advantage that businesses and leaders strive for while developing regional economies.

A cluster analysis is performed in a few ways; through data analysis and statistical technique, and also through surveys of business and community leaders. The former can obfuscate the underlying

relationships that are central to cluster analysis, and therefore a qualitative analysis is typically performed (Blakely and Green Leigh, 2010).

2.5 Clean Technology And High Technology Hubs

In order to explore the rise of clean technology it seemed appropriate to review literature concerning another popular and related industry – high technology. Literature with regard to high technology and economic development abounds, examining areas such as California’s Silicon Valley, Boston’s Route 128 Corridor, and North Carolina’s Research Technology Park, in addition to cities all over the world that tout specialized labor and firms in high technology. These places are often studied based on their ability to drive city and regional economies, and remain on the cutting edge of innovation in their field. The way that high technology hubs are studied, in order to recreate or “garden” them in another locale, is akin to the study of clean technology. In concept, if cities can stay on the leading edge of this industry, and seed and foster its development, they could find themselves as a clean technology capital, and a magnet for talent and investment.

High technology hubs like the Silicon Valley are global technology centers that have made a major mark on the city and regional economies dependent upon them. These places are also referred to as technopoles, identifying regions with successful high technology industries (Castells and Hall, 1994). Castells and Hall (1994) define a technopole as, “various deliberate attempts to plan and promote, within one concentrated area, technologically innovative, industrial-related production: technology parks, science cities, technopolises and the like” (p. 8). Castells and Hall suggest that the features of a technopole incorporate the following elements: 1) some form of generation of or access to new, valuable technological information, 2) a highly skilled labor force, and 3) capital ready to take the risk of investing in innovation (p. 237).

Amidst a variety of economic theories that explain why regional economic development occurs the way it does, some guidance is offered with regard to the general factors spurring development in high tech regions. These factors are explained in Figure 2.6 and identify national and regional government policy as one of the drivers, from a top-down perspective. Noted in the graphic, other factors like historical coincidence, the right type of skilled labor, and bottom-up concepts like venture capital and entrepreneurial spirit play a role as well (Sternberg, 1996).

Castell and Hall offer a supplemental opinion with regard to the genesis of technopoles. They identify two, core divergent factors as “the logic of the market” and “some form of institutional entrepreneurship, either government, non-profit or private,” which intervene in the process (p. 237). These concepts are shown in Sternberg's graphic, though market factors seem to play a subsidiary role to that of institutional entrepreneurship. This is shown with heavier weighted arrows in Figure 2.6, which also emphasizes a top-down focus, starting with institutional influence.

Figure 2.6 Genesis and Development of High-Tech Regions

Source: Sternberg (1996)

An *innovation milieu* is also discussed in the context of a network or ecosystem of factors that work synergistically to give rise to the innovation process. Cities are interested in this because renewed economic growth spurs the health of a regional and local economy by creating employment centers, lowering the unemployment rate, and increasing quality of life (Castells and Hall, 1994). An innovation milieu can be thought of as another theory that supports economic growth by self-propulsive means.

In the milieu approach, innovations and innovative firms are the result of a collective, dynamic process involving many agents within a region that together form a network of synergy-producing interconnections. According to this approach, the milieu, that is the socio-economic environment of a region, is produced by the interactions of firms, institutions and workforces which, through a common process of cooperative learning, reduce uncertainties during changes in technological problems (Sternberg, 1996).

This phenomenon is apparent in the Silicon Valley, with well over 330,000 high-technology workers, and a history steeped in Stanford Industrial Park since the 1950s, the growth of microelectronics in the 1960s, military contracts pushing the envelope for technology development, a consolidation of semiconductor producers and the development of the personal computer in the 1970s, and the domination of the computer industry and international impact, is a paradigm for high technology development (Castells, 1989).

The milieu approach works together with the theory that a network or ecosystem of players has an influence on growth. It has been found that spatial proximity enhances the effect of the milieu (Sternberg, 1996). Applied to regional growth, the actors within the milieu are defined as firms, R&D institutions, universities and higher education, local government, and the financial sector.

Sternberg suggests the following conditions are necessary for an innovation milieu to emerge: 1) the 'raw materials' of information technology which can be acquired from leading universities and educational institutions, government R&D institutions, private/public research institutes, and networks of R&D institutions; 2) a sufficiently large pool of mobile employees (scientists and technicians); 3) the availability of investors who are prepared to finance plans that are fundamentally risky in the sphere of

new technologies. These ideas generally reflect similar thought from basic economic development principles, citing direct factors for economic development to occur.

In 2005, a report was issued by the Sacramento Area Regional Technology Alliance to explore the feasibility of the proposed McClellan Technology Incubator. Figure 2.7 depicts the process flow for successful development of a clean technology firm. The study divided the necessary resources for successful development into five categories, established as follows: intellectual capital resources, human capital resources, financial capital resources, entrepreneurial activity resources, and business environment and infrastructure resources. Noted in the report, "...the process of building a bridge from these concepts to the marketplace is not so widely understood, or even simple." The process diagram is meant to provide a hypothetical representation of the conversion of an invention into a product that can be produced and delivered to customers.

Figure 2.7 Process Flow Diagram for Clean Technology Business

Source: McClellan Technology Incubator Feasibility Study (2005)

2.5.1 Defining clean technology

Clean technology is a relatively new term, developing from advancements in technology that support the responsible use of natural resources and environmental quality. According to the literature, defining the term “clean technology” is murky territory. The investment and research firm, Cleantech Group, formerly CleanTech Venture Network, broadly defines the word in terms of products, services, and processes that reduce or eliminate negative environmental impacts and improve production to include the responsible use of natural resources (www.cleantech.com, 2012). UC Berkeley’s Center for Community Innovation, a non-profit that has researched fostering the green economy, includes clean technology within its broad definition of the green economy. Their research defines the green economy as an economy that encourages the reduction of energy use and improves environmental quality. Within this broader context, clean technology is cited as an industry that researches and develops products for energy generation, energy storage, transportation, nanotechnology, and smart production¹ (Chapple, 2008).

The City of San Diego’s Clean Technology Initiative cites the following as its definition of clean technology,

Clean technology is an emerging sector of a range of products, services and processes that harness renewable materials and energy sources, reducing the depletion of natural resources and reducing or eliminating pollution and waste to create sustainable and secure energy sources. Clean technology encompasses advancements in solar power, wind power, hybrid vehicles, fuel cell technology, tidal and wave power, bio-diesel, green building materials and water treatment systems.

¹ Nanotechnology refers to the manipulation of molecules and atoms. Its application to clean technology is often used to advance battery and electric vehicle technologies. Smart production is about innovative processes, products, and services that reduce impacts on the environment. Research, development, and commercialization of solutions that enable a transition to the production of goods that are significantly less resource intensive.

All of the sources mentioned above emphasize the increased performance, productivity and efficiency of a product or process while decreasing environmental impacts as a key component of clean technology. The process and products are enhanced to generate environmentally friendly alternatives.

In 2009, the USPTO established a pilot program to expedite the processing of clean technology patents. The U.S. Commerce Department's Patent and Trademark Office (USPTO) classified inventions under the pilot program in the following categories: Alternative Energy Production, Energy Conservation, Environmentally Friendly Farming, Environmental Purification, Protection, or Remediation (United States Patent and Trade Office, 2009).

The USPTO classifications seem relatively broad in their definition of clean technology, and since the most comprehensive typology in the available literature seems to come from the investment group, Cleantech Group, their taxonomy, shown in Table 2.3, shows a summary of the technologies, products and applications of clean technology as they relate to industry sectors.

Table 2.3: Taxonomy of Clean Technology Sector

Sector	Technology/Product/Applications
Ag & Land Management	Land Management, Natural Pesticides, Crop Yield, Sustainable Fertilizers, Precision Agriculture
Air & Environment	Emissions Control, Cleanup/Safety, Monitoring/Compliance, Trading & Offsets, Clean Coal, Carbon Emissions
Biofuels & Biochemicals	Biodiesel, Biomass, Grain Ethanol, Cellulosaic Ethanol, Biogas, Algae Biodiesel
Energy Efficiency	Monitoring, Building Envelope and Insulation, Lighting, Building Automation, HVAC, Appliances
Energy Storage	Advanced Batteries, Fuel Cells, Other storage technologies
Recycling & Waste	Recycling, Waste to Energy, Mixed Wastes, Waste Treatment, Metals, Plastic/Rubber
Smart Grid	Energy Infrastructure, Transmission Management
Solar	Systems, Cells and Modules, Thin Films, Concentrated PV, Concentrated Solar, Thermal

Transportation	Vehicle Components, Transportation Infrastructure, Transportation Software
Wind	Gearboxes and Components, Turbines
<i>Source: Cleantech Group, LLC (2012)</i>	

2.5.2 Defining clean technology corridor and zone

Clean technology innovation and commercialization of the ideas and products that are generated in these places are, indeed, cited in each definition of a corridor or zone. While local policy makers refer to these places broadly as Opportunity Areas or Business Innovation Zones, local economic development professionals seem to be using the term to leverage development and siting in an existing Enterprise Zone or Foreign Trade Zone, offering incentives for locating on the land, as well as an array of tools for business development (City of Sacramento General Plan, 2009 and www.cityofsacramento.org, 2012, Blakely & Green Leigh, 2010). Urban planning professionals with an interest in local economic development, however, will be interested in the potential physical development of the land, existing and future uses of the land, impacts on people and the workforce, and the brand created in this place (Blakely & Green Leigh, 2010).

Table 2.4 outlines the reviewed clean technology corridors and zones that were evaluated for the single-case study for this research. They include Los Angeles CleanTech Corridor, East Bay Green Corridor, Sacramento CleanTech Zone, and the San Diego Clean Technology Initiative. Captured in this matrix are similarities and departures with regard to the following factors: approximate size, identified public and private partnerships, anchor firms or catalyzing business developments, known planning or economic development tools, guiding policy documents, and current developments.

According to the Los Angeles CleanTech Corridor website, the corridor was created to “establish Los Angeles as the global leader in research, commercialization, and deployment of clean technologies” (2011). The identified area is a four-mile long corridor (shown in Figure 2.7) in central Los Angeles that

aims to create an opportunity to meet sustainable economic growth and environmental initiatives. Partnering with research institutions such as University of California at Los Angeles, University of Southern California, and California Institute of Technology, training the next scientists and engineers who will create the technology that supports clean fuels, energy generation, waste management, and more. With the support of the City of Los Angeles, Jet Propulsion Laboratories (NASA), Los Angeles Department of Water and Power, the Port of Los Angeles, and a variety of other city agencies and business organizations.

Sacramento's CleanTech Zone is designed similarly to the Los Angeles CleanTech Corridor. It follows the existing boundary of an expired Enterprise Zone that streamlines the provision of economic incentives for businesses that locate in that area. Similar to Los Angeles, the zone also incorporates the support of university and research institutions, the local utility, and an organization known as Sacramento Area Regional Technology Alliance. This organization has a primary mission to incubate businesses in the clean technology industry under its CleanStart Program, and has secondary initiative to foster the network and ecosystem of players that it takes to propel the industry.

Figure 2.8 Map of Los Angeles Clean Technology Corridor

Source: Los Angeles CleanTech Corridor Website

The East Bay Green Corridor seems to have a broader vision, not only capitalizing on the potential for research and development out of existing institutions such as University of California at Berkeley, Lawrence Berkeley National Laboratories, California State University, East Bay, and Peralta Community College District, but also building the policy framework clean technology and a generally more environmentally friendly practices for business, government, and the community. This corridor comprises the cities of Oakland, Richmond, Emeryville, Alameda, El Cerrito, and San Leandro and has a loose boundary, unlike Los Angeles and Sacramento. Action for the corridor is directed by three committees; each specializing in an aspect pertaining to business development, labor and workforce development, and policy guidance.

According to the Technology Matrix, Los Angeles and Sacramento seemed to have made space in their zoning code specific to the types of needs a new firm might need. These include commercial and industrial space to test and prototype some technologies at a small scale, and also house the handful of workers it takes to start a business. This latter use is generally something as simple as office space. Sometimes, incubation centers such as SARTA CleanStart Venture Lab provide office space and a small clinical lab area to test ideas and innovations.

Table 2.4 Clean Technology corridors and zones evaluated for case study research

Technology Area	Approximate Size	Partnerships	Anchor Firms or Business Developments	Known Planning Tools (eg. Incentive Zoning, Permit Streamlining)	Known Planning Documents with Key Policies	Other Incentives	Current Development
Sacramento Cleantech Zone	Sacramento Center for Innovation Specific Plan covers 120 acres, designated Cleantech Zone covers the Power Inn Alliance Property Improvement District (PBID), over 4 square miles large	SMUD, Sacramento State, Sacramento Area Regional Technology Alliance, Sacramento, Sacramento Area Commerce and Trade Organization, City of Sacramento, County of Sacramento	SMUD	Expedited permitting, Land use amendment (Industrial to Employment Center),	2030 Sacramento General Plan, Economic Development Strategy Cluster Analysis, Sacramento Center for Innovation Specific Plan	Enterprise zone, Foreign Trade Zone, Recycling Market Development Zone, Green Technology Small Business Loan Program, Specialized Business Financing Programs	Infrastructure (sidewalk improvement and streetscaping at Ramona Extension)
San Diego Clean Technology Initiative	No “zone” noted, rather, policy directive.	San Diego Economic Development Department, UCSD, San Diego Regional Economic Development Corporation (EDC)	San Diego Mayor’s Cleantech Initiative, UC San Diego’s William J. von Liebig Center for Entrepreneurism and Technology Advancement	None noted.	Cleantech Industry Assessment of Assets and Capabilities Report	Enterprise Zone, Foreign Trade Zone	None noted.
Los Angeles Clean Tech Corridor	Four mile long “corridor”	UCLA, USC, Caltech, LADWP, City of Los Angeles, Port of LA, LA Business Council, LA Economic Development Corporation, LA Chamber of Commerce	Cleantech Manufacturing, La Kretz Innovation Campus (Cleantech Research Center)	Land use amendment in Specific Plan,	Cornfields Arroyo Seco Specific Plan (new zoning to support mixed-use development and compatible residential uses)		None noted.
East Bay Green Corridor	Regional collaborative, extends through several cities, no firm continuity among the location of industry development	Cities of: Alameda, Albany, Berkeley, El Cerrito, Emeryville, Hayward, Oakland, Richmond, San Leandro. University of California, Berkeley, Lawrence Berkeley National Laboratory, California State University, East Bay, Peralta Community College District	Lawrence Berkeley National Laboratory, UC Berkeley	Too large of an area to identify.	No regional, enforceable planning document among collaborative; however, strong policy presence in individual cities (See Green Policy Matrix))	A variety of incentives offered by different cities include Business Incentives (Industrial Development Bonds, TIF Financing), Special Zones (BID, Foreign Trade Zone, LAMBRA), Transportation Amenities, and Financing Programs)	Too large of an area to identify.

2.6 Place Branding

The literature suggests that place branding treats cities as products, a concept that is not new to the field of city and regional economic development. Two themes run through the literature on place branding. A city is branded to 1) be profitable for business and 2) to be a good place to live (Gustavsson and Elander, 2012).

In California, support for the clean technology industry has the potential to forward some of the environmental goals established by the legislative act, Assembly Bill 32 (AB 32), the California Global Warming Solutions Act. In addition to a range of goals, AB 32 aims to increase the state's renewable energy portfolio to comprise 33% of its energy sources as well as improve efficiency standards (California Air Resources Board, 2011). Because the technology needed to generate renewable energy is considered a clean technology, this statewide policy driver is considered a catalyst for the development of firms in cities that may brand themselves as a clean technology leader.

Business development is one strategy that has been explored and implemented by coalitions of cities and counties in order to draw economic activity and establish a business friendly environment for prospective entrepreneurs. With the states of California, New York, Michigan, and Texas leading the way in terms of clean technology investment and development, the phenomenon of drawing business within this industry in order to foster development is occurring. Concerted efforts in the cities listed in section 2.5.2, and their respective initiatives, provide geographic designations under which the clean technology industry can grow. Under the purview of local planning; local policy, land use designations, as well as economic development tools can be leveraged from local planning departments to govern these designations. A key question to pose in this section of the literature is, *Other than business development efforts and the mere creation of a marketing label for land, what else contributes to the brand identity of these areas?*

Place branding is the application of product branding to places, which begs the question, *what is product branding?* A summary of a product brand from Kavaratzis and Ashworth (2005) is the following,

A brand embodies a whole set of physical and socio-psychological attributes and beliefs which are associated with the product (Simoes & Dibb, 2001). It is more than the shaping of distinctiveness: it is the forging of associations. '[A] brand is a product or service made distinctive by its positioning relative to the competition and by its personality, which comprises a unique combination of functional attributes and symbolic values' (Hankinson & Cowking, 1993, p. 10). Branding is a deliberate process of selecting and associating these attributes because they are assumed to add value to the basic product or service (Knox & Bickerton, 2003). From this value stems a series of consequential and important attributes about the nature of the product, of its marketing and of consumer behaviour towards it (p. xx)

Regional identity is understood as a concept that can be used to analyze the links between social actors and the institutionalization process (Passi, 2001). Passi (2001) suggests that the conceptual model for place branding consists of three dimensions: Symbolic, Territorial, and Institutional. They are further described as follows,

1. A territorial shape – boundaries that emerge in various social practices and distinguish the region and identity discourses from those of other regions. The functions and meanings of boundaries vary in the sense that some spatial practices are bounded/exclusive while others are not (Paasi, 2001).

2. A symbolic shape that manifests itself in practices such as the economy, culture/media and governance and is used to construct narratives of identity. This shape includes the name of the region and numerous other symbols.

3. A number of institutions, needed to maintain the territorial and symbolic shapes, and while they usually produce and reproduce distinctions between regions and social groups ('us'/'them'), these institutions may just as well be located outside the region. (p. 140)

Consumers, or the people who actually use, encounter, and make sense of the city take this experience in by way of physical experience, symbolic understanding, or other ways of assessing a place (Gustavsson and Elander, 2012). It is assumed that businesses undergo this same experience as they decide where the best city is to locate. A typical model, where the factors in product brand include the product itself, the producer, and the consumer, can be thought of in the following way for a city, shown in Table 2.5.

Table 2.5 Analogous Relationship Between Product Branding and Place Branding

Product =	The City or Region
Producer =	Public & Commercial Institutions
Consumer =	Businesses, Workers, Residents, Investors

An interesting part of this model is the Producer. Guidance and organization of this component is embedded in institutional entities, but the organization of these entities does not seem to be well researched. The actors and players identified in Chapter 4 comprise much of this institutional framework, lending to the idea that these players should play a role in the place branding of Sacramento's clean technology industry.

Place branding, without entirely knowing how a city or region actually quantifies the performance and delivery of these claims, is a hard promise to make. Excessive confidence can be placed in a brand and the risk of exaggerating successes is a possibility (Gustavsson and Elander, 2012, Pasquinelli, 2010). With regard to environmental place branding, several small cities in Sweden have been studied based on their rank in a list of environmentally friendly cities working towards climate adaptation practices. The cities were indexed in a ranking of 288. One of the studied cities ranked as number four in the index, and leveraged this rating (based on criteria including environmental and climate change mitigation and adaptation strategies, transportation policies, procurement, energy efficiency, and waste disposal) to market itself as the greenest city in Sweden. *How can a claim like this stand?*

Brands operate on a few theoretical premises. Identity plays an important role and fosters socio-economic development, as part of the meaning and experience that people gain from being in a city (Castells, 2004). A place brand can foster identity building (Pasquinelli, 2010). Additionally, formal and informal institutions can support the characterization of a place. This could be performed through political leadership or through a less formal mechanism. Finally, the role of governance and its ability to produce and implement the necessary steps to create the desired results remains a factor (Pasquinelli, 2010).

These ideas were tested in the city of Tuscany's Arno valley, the region of an abandoned place brand in the high-tech industry. The main thrust behind the lost brand was identified as fragmented governance and incapacity to cooperate beyond local administrative borders. In short, the formal and informal institutions required upholding a place brand that was dysfunctional (Pasquinelli, 2010). The clean technology zones and corridors identified for this study do not seem short on vision. Feasibility studies, vision plans and implementation programs abound. Vision is not lacking. But the ability for the formal and informal institutions to cooperate and maintain an open dialogue; and as Pasquinelli (2012) emphasizes, making the process iterative, is a factor in question.

3. THE RESEARCH PROBLEM

3.0 Study Focus

After reviewing the existing literature with regard to fostering economic development specific to clean technology and designating land as a clean technology corridor or zone, it is clear that this phenomenon is young and requires more in-depth study. A fair amount of literature in the study of economic development identifies models for economic growth centered in the community, as well as economic growth stimulated by the recruitment of firms to a community. Substantial literature links technology with economic development strategies; focused on “gardening” an industry in order to observe its benefits with regard to jobs, wealth, and quality of life (Luger and Goldstein, 1991). The phenomenon of development research parks seems to be related to clean technology corridors and zones, but proves to have a more formal structure rooted in the research and development process, a key component in the technology development process.

In reviewing literature on clean technology, it seems that the nation and the state of California see the industry as a place of growth and one possible solution to economic recovery. Clean technology has been portrayed as a catalyst for economic development, employment, new clusters of innovation, and the revitalization of cities (Apollo Alliance, 2008). In some city policy documents, it plays a role in the vision toward moving cities in a new strategic direction. Dynamics within both public and private institutions are driving this industry, a concept further explored in the case study of Sacramento’s CleanTech Zone. As other cities aim to draw investment and clean technology firms to within their boundaries, a case study of Sacramento’s CleanTech Zone seems not only important, but a timely study.

Venture capital investment in clean technology in California is at a high since 2005, reaching \$3.5 billion in 2011, slightly more than the \$3.1 billion in investment in 2009 when the recession was beginning (Henton et al., 2008, Cleantech Group, 2012). Of the states registering what the U.S. Patent and Trademark office calls, “green technology” patents, California leads this charge with 910 patents registered between 2008 and 2010, followed by New York with 475, Michigan with 469, and Texas with 293 (Baker, 2012).

Business incubators and linkages to research and development at the university level are also focusing on clean technology. In countries like Canada, the development and commercialization of clean technology has been studied with regard to special accelerator or incubation projects. Private investment groups or non-governmental organizations that see a bright future for clean technology lead these efforts. A 2012 study from a series of Vancouver research institutions published an analysis of Canadian Clean Technology Commercialization Accelerators, identifying core factors for Canada's leadership in this field as the following: a strong local market, high R&D capacity, and private clean technology ventures (Malek, et al., 2012). The study explores strengthening this advantage by finding improvements in business model operations and best business practices to accelerate the industry. Cities like Sacramento have a similar organization; the Sacramento Area Regional Technology Alliance (SARTA) and its CleanStart Venture Lab. A big component of SARTA's CleanStart Program is to incubate and create homegrown clean technology firms and activate the network of business professionals and executives that can turn a clean technology innovation into self-sustaining companies.

Government policy plays an inherent role in the outcome of economic development initiatives (Porter, 2000). State and local economic policy drive a lot of the clean technology development in the Sacramento Region making it important for regions to consider the value of remaining competitive, and anticipating the right conditions to foster economic development. In line with regional coordination,

cities and regions are putting together competitive economic strategies in emerging sectors like the clean technology industry grow. This trend seems to be continuing and cities aim to reach environmental goals set forth by Climate Action Plans and other documents oriented toward enhancing environmental quality.

Although largely driven by the research and development process, the land that is needed to support these sectors can be a determination that is anticipated and envisioned by local planning and economic development departments. The ability to zone and designate land for a specified use, in this case an industrial or commercial use, is coordinated at the local level through zoning and Specific or Master Plan development. The policy to guide development in these industries can be set through the General Plan or local economic development strategies. Additionally, the infrastructure that creates the character of a city or place can also be supported through local city planning (Blakely & Green Leigh, 2010).

It is unclear, however, in the case of Sacramento's CleanTech Zone, what the relationships are between the designation of this area, the local economic development tools leveraged to successfully meet the needs of the clean technology industry, and the relative success of the CleanTech Zone as it relates to the provision of jobs and economic growth. The role players involved in Sacramento's clean technology industry have not formally been identified, nor their contributions in fostering its growth. Mapping the network of these players is a key focus in the case study of Sacramento, along with an assessment of how the Zone has changed and transformed as industries lay roots in Sacramento.

3.1 The Research Question

The objective of this research is to articulate the linkages between local economic development planning and the designation of Sacramento's CleanTech Zone. Literature indicates there are tools and strategies adapted in local economic development planning that may contribute to the

development of the clean technology industry. These tools and strategies range from developing policy guidance, all the way to creating a physical plan for an area leveraging master and specific planning as a technique to guide future development. With regard to the relative success of these places, the literature also discusses indicators of development such as revenue and sales, facility space requirements, and employment (McGrath and Vickroy, 2003). The literature also discusses indicators of new technology and innovation, a difficult phenomenon to quantify, but relative to the number of patents registered with the Department of Commerce (Baker, 2012). The objective of this research, therefore, is to see how these tools and strategies relate to these indicators.

The research questions that have been developed for this study are outlined as follows:

Research Question 1: What are the relationships between local economic development planning tools and their contribution to the development and growth of clean technology?

Sub-Research Questions:

SRQ_{1.1} Where is clean technology being pioneered in California, and on what economic development and planning premise are other relative clean technology corridors or zones founded?

SRQ_{1.2} What are the benefits of clustering clean technology research, development, and expanding firms in an area?

SRQ_{1.3} How have lessons from other efforts, such as attempt to “garden” technology through research parks, related to growing the clean technology industry?

SRQ_{1.4} What are the conditions under which clean technology has developed, and how has Sacramento leveraged this opportunity in the CleanTech Zone?

Research Question 2: Who are the actors involved in the public and private, formal and informal, institutions throughout Sacramento and how have they spurred economic development relative to the clean technology industry in the city?

Sub-Research Questions:

SRQ_{2.1} How do local government policies promote and guide the growth of clean technology in the case of Sacramento's CleanTech Zone?

SRQ_{2.2} What planning tools and strategies are employed to grow the clean technology industry in Sacramento's CleanTech Zone?

SRQ_{2.3} What are the monitoring mechanism for identifying growth or success in Sacramento's CleanTech Zone, and what is its relative success?

4. RESEARCH METHODOLOGY

4.0 Introduction

This study uses the single case study methodology as a main approach to research. The case study was designed to identify the history, context, and current state of Sacramento's CleanTech Zone. Using this methodology is a preferred strategy when asking "how" and "why" questions, in addition to studying contemporary phenomenon within a real-life context (Yin, 1989). A core "how" and "why" question proposed in this research is associated with Research Questions 1 and 2, and could be restated as "How did the CleanTech Zone come to be and what were the factors that led to this unique designation?" This core question is broken down into sub-research questions, and answered using further methods in order to reach conclusions.

Other cases were considered in this research, including the East Bay Green Corridor in the San Francisco Bay Area, the Los Angeles Clean Tech Corridor, and San Diego's Clean Technology Initiative. The case of Sacramento's CleanTech Zone was selected based on the following factors: 1) the economic conditions such as reported growth within the clean technology industry 2) the strength of local politics pursuing this particular development 3) influence of existing research and development resources such as educational and research institutions 4) length of time the corridor has existed 5) if the corridor was developed under a public and private partnership and 6) the influence of existing or base clean technology industry. Upon advisement, the thesis committee supported the selection of Sacramento's CleanTech Zone.

Approached from an exploratory perspective, the study shows the key factors that support the development of Sacramento's CleanTech Zone as it relates to planning policy, land use plans, and

other factors. The study asks how a city ventures to designate a “zone” for clean technology businesses and identifies the actors involved in the process. Subsequently, the broader question about why the phenomenon of clean technology zones and corridors are even showing up on maps is achieved by evaluating city policies as well as studying the research and development process and the spatial impacts associated with this phenomenon.

Noted by Johansson (2003), selected case study subjects must have an object of study that should “be a complex functioning unit, be investigated in its natural context with a multitude of methods, and be contemporary” (p. 2). The main unit of study in this case is Sacramento’s CleanTech Zone, but additional units of study are explored through a variety of methods aim to reach all answers to the research questions. Johansson (2003) writes, “One major feature of case study methodology is that different methods are combined with the purpose of illuminating a case from different angles: to triangulate by combining [methods]” (p. 3). This study triangulates information from archival research, in-depth interviews, and a site analysis in order to draw conclusions.

A basic narrative of Sacramento’s CleanTech Zone was developed through the review of archival documents and the identification of key role-players and organizations who worked to create the CleanTech Zone, and also those who comprise an extensive network of public and private entities that foster the clean technology industry in Sacramento. After these players were identified, typified, and their roles told in narrative, a policy analysis was performed in order to identify the local planning document drivers furthering the industry.

4.1 Study Area

Figure 4.1 Map of Sacramento's CleanTech Zone

Source: City of Sacramento Community Development Department (2013)

The study area encompasses a four square mile area of the City of Sacramento, located on industrial and commercial zoned land. The area shares a boundary with a local Property Based Business Improvement District, also known as a PBID, that refers to themselves as the Power Inn Alliance. The boundary reflects an old Enterprise Zone Designation, which offered tax incentives and other benefits to businesses choosing to locate in this area. The PBID itself provides tremendous benefit to the area, playing a role in local planning processes, supporting transportation and circulation planning efforts, and providing beautification and crime abatement programs to make the area a reputable and safe place in which to site a business. The Power Inn Alliance is also responsible for instigating the process to create industrial design guidelines for the upcoming Sacramento Center for Innovation, located on a 120-acre property in the northwestern corner of the PBID boundary, owned by Sacramento State University.

4.2 Methods

A complete matrix summarizing the research questions, associated research method, and associated instrumentation can be found in Table 4.2 at the end of this section.

4.2.1 Archival Research

In order answer questions 1.0, 1.1, and 1.4 a selection of newspapers, professional magazines, press releases, blogs, and the websites and strategic planning documents for respective clean technology corridors and the Sacramento CleanTech Zone were studied. It became paramount to generate a firm definition of “clean technology” and “clean technology corridor” or “zone” in order to identify and understanding of the phenomenon. Additionally, questions 1.2, 1.3, and 2.1 were answered by reviewing economic development strategies that have been adopted through documents such as the City of Sacramento’s Economic Development Element in its General Plan, and feasibility studies and reports that have been generated in order to identify the potential success for this industry in Sacramento.

4.2.2. Network Identification

In order to answer Research Question 2.0, conducting preliminary interviews with city staff in the Community and Economic Development Departments generated an initial interview list. These initial interview subjects, ranging from leaders with the local PBID, staff members in the Mayor’s office, and business incubation organizations were developed into a network map based on their level of influence, key mission, and expertise. The list was expanded and refined based on the archival research process, and the most influential subjects have been captured in the in-depth

interviews. The subjects range from individuals to organizations, each serving a unique role with regard to their influence on the phenomenon.

4.2.3. In-Depth Interviews

Answers to Research Questions 2.0, 2.2, and 2.3 were achieved by conducting in-depth and standardized interviews in person and on the phone with the key group of players identified in the network map. The answers to these questions were tabulated in a matrix in order to identify common themes in the answers, leading to a series of conclusions that support application of a framework for a clean technology zone designation in another city. This framework reflects much of the literature reviewed on research park design and high technology gardening discussed in Chapter 2 of this study.

4.3 Instrumentation

4.3.1 Instruments for Archival Research

All documents used for the policy analysis were captured in a matrix identifying their key objective and relative importance in making the CleanTech Zone designation. Other sources used to define and analyze the clean technology corridor and zone phenomenon were captured in narrative form, identifying similarities and departures with regard to the following factors: approximate size, identified public and private partnerships, anchor firms or catalyzing business developments, known planning or economic development tools, guiding policy documents, and current developments. These are summarized in Table 2.4 in Chapter 2.

4.3.2 Instruments for Network Identification

A network graphic was created with a target list of interview subjects. The graphic started with contacts in the public sector and developed into a map of public, private, non-profit, and local agency support for the clean technology industry. Data with regard to the roles and importance of the network was found through the interview process as well as the archival research process.

4.3.3 Instruments for In-Depth Interviews

A standardized survey was developed and administered in person and over the phone with the players identified in the network graphic. Interviews were used to further understand the conditions in locations where a CleanTech Zone had been initiated. The purpose of the interviews was to enter into the stakeholder's perspective, with considerations for their unique knowledge, expertise, contribution, as well as opinion and perception about the future of clean technology in Sacramento.

Data from these interviews was recorded via MP3 during in-person interviews and transcribed into a PDF form. Interviews conducted over the phone were typed directly into the PDF form. Questions were designed in order to receive mainly open answers, with an emphasis on a conversational experience for the interviewee.

Table 4.2 Matrix of Research Questions and Associated Methods

Question	Methodology	Method 1	Method 2	Instrument
RQ ₁	Archival Research	Document analysis		Books, Scholarly Articles, Professional Journals, Press Articles, Websites, and Theses/Dissertations
SRQ _{1.1}	Archival Research	Document Analysis		Same
SRQ _{1.2}	Archival Research	Document Analysis		Same
SRQ _{1.3}	Archival Research	Document Analysis		Same
SRQ _{1.4}	Case Study	Document Analysis	Interviews	Same; and also interviews to be conducted using a standardized survey, recorded on MP3 and transcribed into PDF form, or typed into PDF form
RQ ₂	Case Study	Interviews	Network Identification	Interviews to be conducted using a standardized survey, recorded on MP3 and transcribed into PDF form, or typed into PDF form
SRQ _{2.1}	Case Study	Document Analysis	Interviews	Review of existing policies; Interviews to be conducted using a standardized survey, recorded on MP3 and transcribed into PDF form, or typed into PDF form
SRQ _{2.2}	Case Study	Interviews		Interviews to be conducted using a standardized survey, recorded on MP3 recorder if conducted in person, recorded into a Word Document template if conducted over phone
SRQ _{2.3}	Case Study	Interviews	Secondary data	Interviews to be conducted using a standardized survey, recorded on MP3 recorder if conducted in person, recorded into a Word Document template if conducted over phone

5. Research Protocol

5.0 Research Design

The research project began in August 2012 and was completed in June 2013. The work began with a review of literature on the topics of planning local economic development, sustainable economic development, research and development parks, business cluster analysis, regional branding, and the clean technology industry. The literature review continued from the onset of the project until the end, as a variety of iterations and supplemental review occurred. After a complete research proposal was drawn, data collection began in December 2012 and was complete in early April 2013. The data analysis section of the thesis, summarized in the following chapters, began in March 2013 and concluded in late May 2013.

After an initial review of literature, the first phase of data collection, consisted of a review of archival documents. This review was conducted using websites, blogs, newspaper articles, as well as strategic planning documents, economic studies, and policy documents. This process was largely complete by March 2013, but ultimately concluded in May 2013.

A site visit was also conducted in January 2013 to do a simple observational analysis of the land uses and business types in the CleanTech Zone. A site visit specifically to the 120-acre site for the Sacramento Center for Innovation Specific Plan was also conducted, with a variety of observations made with regard to infrastructure improvements such as road improvements, sidewalks, bike lanes, and streetscaping in anticipation of future development. These observations were mainly used to confirm an existing land use inventory for the Specific Plan site and to get a feel for the area, and the notes and photos taken during this visit are largely found in Appendix C with some reference to them in the analytical portion of this research.

In anticipation of the interviews conducted with the key role players and organizations involved in the CleanTech Zone and clean technology industry in general, a standardized survey was designed using indicators from the literature review. Telephone interviews were conducted beginning in February 2013, and an additional visit was conducted in March 2013 for four in-person interviews with city staff, Sacramento Area Regional Technology Alliance, and the Sacramento Area Commerce and Trade Organization. Final phone interviews were conducted in by late March 2013. Findings from these interviews were coded into five main themes, which serve as the threads of evidence reflecting existing literature and the unique attributes of Sacramento. These themes capture the factors that enable Sacramento's CleanTech Zone, and the industry in general, to be fostered in the city.

Finally, the findings were written between April 2013 and May 2013 with the complete analysis incorporated all collected data from the archival research, network identification of the players and organizations, and the detail and story told from the interview processes. The interrelationships between each of these methods have been strung together in order to provide a strong sense of context and history, and a well-captured story answering the posed research questions.

6. FINDINGS

6.0 Sacramento's Cleantech Ecosystem

Sacramento's economy is varied, supporting different jobs in government, health care services, social assistance, administrative support services, hospitality, wholesale retail and trade, manufacturing, professional, scientific and technical services, and more. The clean technology sector can be categorized into two categories identified in Figure 6.1 below. Those sectors include manufacturing and professional scientific, and technical services, accounting for 14% of the jobs in the City of Sacramento. Of this percentage, the numbers are not clear exactly how many jobs fall under the definition of a clean technology job. The CleanTech Zone and the emphasis by the city's Mayor on green economic development has created some stir around creating these job opportunities, and according to the interviews summarized in this Chapter, confirming an exact definition is a different science for research and policy organizations around the country. One thing was made clear from the interviews below; the jobs, without influence from regulatory agencies, account for a relatively small amount in the city.

Figure 6.1 Industries in Sacramento

Source: U.S. Census Bureau; 2007 Economic Census Industry Series, Geographic Area Series; Retrieved June 15, 2013 using American FactFinder;

http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_00A1&prodType=table

The City of Sacramento has created a CleanTech Zone with the goal of creating a successful business environment in which renewable energy, energy efficiency, and other clean technologies can be fostered. The zone itself shares boundaries and designations with a few other economic development authorities and covers 5,000 acres, containing more than 2,000 businesses. Its technical boundary is adjacent to Sacramento State University and the Sacramento Municipal Utility District Headquarters.

The Power Inn Alliance, the Property and Business Owner Improvement District authority, has worked to transform the area into a more attractive place for businesses to settle, integrating mixed-use areas, flexible land use designations, transportation measures, and supporting other developments that enhance the overall image of the area. A complete map of the area can be found in Figure 4.1 in Chapter 4. Figures 6.1 and 6.2 on the following pages detail the 120-acre Specific Plan site for the

Sacramento Center for Innovation, a project piloted with the support of the Power Inn Alliance and the landowner, Sacramento State University. Additionally, an extension of Ramona Ave now connects Sacramento State to the site of the Center for Innovation and SARTA has relocated its CleanStart incubator into the area.

The study area encompasses a 7.8 square mile area of the City of Sacramento, located on industrial and commercial zoned land. The area shares a boundary with a local Property Based Business Improvement District, also known as a PBID, that refers to themselves as the Power Inn Alliance. The boundary reflects an old Enterprise Zone Designation, which offered tax incentives and other benefits to businesses choosing to locate in this area. The PBID itself provides tremendous benefit to the area, playing a role in local planning processes, supporting transportation and circulation planning efforts, and providing beautification and crime abatement programs to make the area a reputable and safe place in which to site a business. The Power Inn Alliance is also responsible for instigating the process to create industrial design guidelines for the upcoming Sacramento Center for Innovation, located on a 120-acre property in the northwestern corner of the PBID boundary, owned by Sacramento State University.

SACRAMENTO CENTER FOR INNOVATION SPECIFIC PLAN AREA

Figure 6.2 Sacramento Center for Innovation Specific Plan Area
 Source: City of Sacramento Community Development Department (2013)

SACRAMENTO CENTER FOR INNOVATION AREA - EXISTING ZONING

Figure 6.3 Sacramento Center for Innovation Specific Plan Existing Zoning
Source: City of Sacramento Community Development Department (2013)

A number of organizations, individuals, and stakeholders play a role in setting the vision for success for the CleanTech Zone as well as lead the development of the clean technology industry. Several interview subjects referred to this network as the *cleantech ecosystem*, referencing the interconnected and interdependent web of factors, individuals, and organizations that make the clean technology industry tick. The core players identified in Figure xx comprise the ecosystem and were interviewed in order to inform this research. These players span city department staff members, property and business owners, policy makers, political leaders, and leaders in business development, media, academics, and entrepreneurs.

Figure 6.4 Sacramento CleanTech Zone Network Identification

6.1 The Public Sector & Public Constituents

Sacramento's CleanTech Zone designation is a term used predominantly by the City Economic Development and Community Development Department in order to identify a strategic area that symbolizes a vision for Sacramento. This vision is set with policies and strategies that identify the development of clean technology as one of the city's future economic drivers. The vision identifies Sacramento as a leader in the clean technology industry. The CleanTech Zone is a predominantly industrial area that borders Sacramento State University to the north, Sacramento Municipal Utility District to the northwest, a residential district to the west, Highway 50 to the south, and more industrial and commercial land to the east. The Zone itself contains mainly industrial and commercial land use designation and is home to a military warehousing facility, materials and light manufacturing businesses, waste management facilities, and city offices.

According to the Economic Development Department the movement to create a CleanTech Zone began in 2007 when the department was going through an Economic Development Strategy Update. The City Council set forth a sustainability plan, driven by the trends in sustainability. Target business attraction in high-value industries was established as a core policy. Passage of the California Solar Initiative, studies from Business Week and UC Berkeley contributed to the importance of moving forward on a step towards packaging an economic development tool to support clean technologies. The Economic Development Department evaluated the pieces that were in place and moved forward with providing a new label for the area.

The Zone shares the boundary of what was known as the Florin-Perkins Enterprise Zone; a designation that expired in xxxx. Noted in the literature review, an Enterprise Zone focuses economic development policy and provides financial breaks to businesses, bundling benefits like sales tax

credits, wage tax credits, and other financial incentives. In the case of Sacramento, Table 6.1. outlines the package specific to the CleanTech Zone:

Table 6.1. Benefits of siting in Sacramento's CleanTech Zone

Benefit	Description
Enterprise Zone	Sales tax credits on qualified property, wage tax credits for five years for hiring eligible employees, 100% net operating loss carryovers for up to 15 years, rapid depreciation of equipment, hiring assistance through <i>Sacramento Works!</i>
Foreign Trade Zone	Duty-free treatment for items that are processed in FTZs and then exported, duty payment deferred on items until they are brought out of the FTZ for sale in the U.S. market
Recycling Zone	Below-market-rate revolving loan program for RMDZ-eligible activities, free product marketing
Green Technology Small Business Loan Program (Grow Sacramento Fund)	Industry-targeted SBC 7(a) loans available through Grow Sacramento Fund, Zone allocated SBA 504 loans available through Greater Sacramento Community Development Corporations, Community Development Block Grant funds
Specialized Business Financing Programs	City-issued industrial development bonds pursued on a case-by-case basis

The Community Development Department's initiatives predominantly apply to a 120-acre area site where a Specific Plan is being developed. The Department works to ensure their plan is consistent with other policies and strategies adopted by the city and partner organizations. However, the city's primary role is focused on completing a Specific Plan for a 120-acre site in the Zone that supports an innovation and technology center. The Sacramento Center for Innovation Specific Plan has a vision that reads:

The City, in partnership with Sacramento State University, the Power Inn Alliance, and the Sacramento Municipal Utility District (SMUD), is preparing a specific plan for a new

center for innovation and clean technology in the 65th Street area south of the University and near Sacramento Area Regional Technology Alliance's (SARTA) new Venture Lab. The goal is to create an environment that fosters the exchange of technical knowledge and expertise between students, faculty and private sector business enterprises. With connections to U.S. Highway 50, light rail and its proximity to the University, SMUD, UC Davis Medical Center and Granite Park, the area is well positioned to transform from an older industrial area into a future hub for clean energy, green technology, and medical technology in the Sacramento region (City of Sacramento Economic Development Department, 2012).

Although the draft plan has not yet been released to the public, the policy considerations and objectives in Table 6.2. have been outlined over the course of the planning process.

Table 6.2. Key policies and objectives outlined in City of Sacramento's General Plan

Key Policy	Objective
Establish a shovel-ready area	Target public and private investments to ensure infrastructure and facilities that meet the needs of business.
Transform an under-utilized industrial area	Transform an under-utilized industrial area to create a hub for clean, green and medical technology.
Streamline review and provide incentives	Employ a range of development and business incentives for the Innovation Center. Streamline development regulations and entitlement procedures.
Promote quality design	Revitalize the industrial area by encouraging high quality design standards.
Retain and attract new businesses and workers	Attract and retain innovative businesses that employ Sacramento's workforce. Provide opportunities for local residents and graduates in the new economy.
Build on partnerships	Forge dynamic public-private partnerships to support and

	nurture the Innovation Center. Foster an environment of collaboration that links university research with private enterprise.
Create a center for the exchange of knowledge	Creates a center for the exchange of knowledge and know-how between students, faculty and business.

The Community Development Department's aim in this regard is to create a predictable environment in which applicants can plan a compatible development with the desires of the community. The "community" referenced here comprises a key stakeholder – the local property owners. In particular, the stakeholders constitute a Property Based Business Improvement District (PBID) referred to as the Power Inn Alliance. Important to note, the boundary of the PBID also reflects the boundary of The CleanTech Zone.

The Power Inn Alliance, the namesake of Power Inn Road, the main road running through the Zone, aims to provide the following: planning and zoning oversight, economic development, security and crime abatement, beautification, transportation management, advocacy, and networking. The PBID has been described as one of the most active and organized in the Sacramento Region, boasting a membership of over 1,000 property owners and businesses. The PBID has a twelve percent vacancy rate; what their Executive Director refers to as one of the best in the state.

In an interview with the Power Inn Alliance, it was found that the PBID initiated the specific planning process and has played a major role throughout its duration. The organization saw potential in the area and went through a public process with city council to begin a specific plan. In an interview with the Power Inn Alliance's leadership, they are working with the city and other stakeholders to create Industrial Design Guidelines for the area that provide the right needs for businesses requiring industrial and office land use needs. Also noted in the interview, land use designations in this area are not so prescriptive that firms not in the clean technology industry are pushed out from locating in the Zone.

According to the City's Department of Community Development, the specific plan has been in development since 2009. Sixty acres of this area are developable and twenty-five acres in the middle of the planning space are owned by Sacramento State University, a key property owner in the initiative. The Specific Plan, slated for release in mid-2013, includes design guidance, land use, and flexible zoning designations from industrial zones to those that are more conducive to employment centers.

The zoning for the Specific Plan does not explicitly shift land uses. After a land use survey, current example uses include a mini storage site, waste disposal collection company, offices for social service providers, parking lots, and some homes. When the city creates zoning that is flexible, that means anticipating a range of uses. For example, in the office and social service provider area, this office space might transition from its current use to a space where small start-ups could develop.

Additionally, allowing for office uses that support prototyping is an important and subtle shift in the zoning. Eventually, research and light manufacturing needs might arise, and so the type of zoning that is conducive to this sort of development is created in the Specific Plan. Range and flexibility between office and light industrial is important. The zoning designation used in the Specific Plan is referred to as Manufacturing, Research, and Development, or MRD. Currently the designation is Light to Heavy Manufacturing, or M2. MRD is already in the city code, but the definition must be amended in order to accommodate the new, proposed uses.

According to the City's Department of Economic Development, the specific plan has a number of benefits. It will streamline development, entitlement processes, create the foundation for which policy and infrastructure funding is allocated, and create and prioritize opportunity areas. In an interview with the Economic Development Department, it was found that when there is a concentrated effort and investment within one area, it allows potential developers or businesses to look at additional incentives or tools that can be used to leverage the number of dollars that are already going into an idea or

business. The City's Economic Development Department leverages a number of tools to support these firms; however, does not explicitly omit economic development support for firms that are not in the clean technology industry. All of the tools leveraged to develop clean technology are also leveraged to develop other industry types.

From an Economic Development perspective, having an active and supportive PBID involved in the process has been a tremendous added value because they represent a core constituent group in the area. They have truly vetted the specific plan process. One big factor identified by both the Community Development Department and Economic Development Department is the following: buy-in from property and business owners has been crucial to the process. Funding opportunities that can leverage the PBID dollars wait in the wings; while tools like Melos-Roos, industrial bonds, special financing, and federal, state or local grants will be needed to supplement infrastructure investment.

The utilities play an equally large role as a public service provider in the case of the Sacramento Municipal Utility District (SMUD), and the Investor Owned Utility, Pacific Gas & Electric Company (PG&E). SMUD has a unique responsibility as a public utility, and according to an interview with its Economic Development Department, has the ability to influence the composition of the region's energy portfolio and has an interest in local research and development.

In an interview with SMUD, it was found that their sights have been set high with regard to stewarding the clean energy movement. SMUD has invested in renewable energy for over three decades. They were the first municipal utility in the nation to develop large-scale solar, beginning with a retrofit and redevelopment of the former nuclear power facility known as Rancho Seco, decommissioned in the 1980s. SMUD is also the single largest landowner in Solano County, a county outside of their jurisdiction. Their interests in this county, known for its wind power generation potential, lie in development of this renewable resource. Since these developments, SMUD has continued to invest in

alternative energy generation, including investments in bio-digesters, biogas, and hydro-facilities. These developments led SMUD to be the first large-scale utility to meet the Renewable Energy Portfolio Standards set by California's legislators in 2002.

SMUD has a strong relationship with the Sacramento Area Commerce and Trade Organization (SACTO), which works to attract and recruit firms to the Sacramento Region. As SACTO obtains leads, SMUD works with SACTO to fulfill Requests for Information that outlines potential rates and a bill projection for interested firms.

Interestingly, SMUD's Sacramento facility is home to an internal Research and Development Department that provides opportunity for emerging businesses and technology. Currently, over 90 active projects are being prototyped in a clinical lab setting. According to the utility's Economic Development Department, the Research and Development Department has a direct relationship with seeding clean technology companies, including firms like Numonyx (now owned by Mircon Technologies), N Solar, and Bloo Solar, and adding over 650 new jobs to the region and expanded manufacturing facilities, all since 2010. Additionally, on an annual basis, SMUD invests over \$200,000 in financial support for specific sector development work through SACTO, the Sacramento Area Regional Technology Alliance (SARTA), UC Davis Energy Efficiency Center, California State University Sacramento Smart Grid Center, California State University Center for Small Business, and the Green Capital Alliance.

It was also found that SMUD participates in the Sacramento Center for Innovation Specific Plan process. The utility believes that the plan is young, to the extent that needed infrastructure has a long way to go before development is seen there. As a neighbor within one mile of the Specific Plan boundary, SMUD plans to continue to work with the city as the area develops.

6.2 System of Support for Entrepreneurs

The meaning of the CleanTech Zone is different if you begin to talk with those who are actually working with entrepreneurs and leaders incubating, inventing, and commercializing technologies. The conversation turns away from public policy and land use planning, and instead to the kernels of good ideas and talent that seed the industry. The regional experts in this regard are the Sacramento Area Regional Technology Alliance (SARTA), a coalition of business leaders and entrepreneurs fostering technology development in the Sacramento Region. Seeded by \$400,000 in initial investment, the majority of which came from SMUD, SARTA has developed a CleanStart Program, specifically focused on clean technology development. The non-profit has an interest in networking, sharing ideas, and bringing qualified team members to the table to incubate and support a network of local firms. The mission of the CleanStart Program is to empower entrepreneurs with the knowledge, capital and connections that are critical to creating a successful new business. Their long-term objective is to create a self-sustaining clean technology industry. The CleanStart Venture Lab is situated in the CleanTech Zone and is home to three business start-ups who are using the facility to prototype ideas and develop business plans.

In an interview with a SARTA co-founder, it was found that the term “CleanTech Zone” is off their radar. The development of the industry itself has roots that start back in the 1970s, not from new policy or current planning trends.

The start of the industry has roots beginning at California’s establishment of the California Energy Commission (CEC) in 1974. Workers left the CEC to lead companies in the clean technology industry. These individuals started twenty-nine core businesses identified in the 2006 CleanStart Feasibility Study. The industry has grown to well over that now, but these companies are considered the seeds

for clean technology in Sacramento. The businesses shown in Figure 6.4 include the original 29 firms cited in a feasibility study for the clean technology industry, written in 2005.

- Supporting Agencies**
1. Allen Capital
 2. American River Ventures
 3. California Air Resources Board (CARB)
 4. California Clean Energy Fund (CCEF)
 5. California Energy Commission Sacramento
 6. California Solar Energy Industries Association
 7. California Storm Building Association (CASBA)
 8. CalSTRS Alternative Investment Management
 9. CalSTRS Alternative Investment Management
 10. Capital Valley Ventures
 11. City of West Sacramento
 12. COWAB
 13. CSUS
 14. DSI Frontier
 15. Geothermal Resources Council
 16. Golden Capital Network (GCN)
 17. Independent Energy Producers Association
 18. McCloud Technology Incubator
 19. Renewable Energy Institute International
 20. Renewable Energy Marketing Board (REMB)
 21. Sacramento Angels
 22. Sacramento Entrepreneur Academy
 23. SARTA
 24. Sierra Angels
 25. SNO Sacramento
 26. Technology Development Center
 27. UC Davis CFAI Program
 28. UC Davis Graduate School of Business
 29. UC Davis Institute of Transportation Studies
 30. UCED Connect

Figure 6.5 Top 29 Clean Technology Industries cited in 2005 Feasibility Study
Source: Clean Energy in the Capital Corridor: Making the Region a Green Powerhouse Report

Business competitions held in the 1980s and 1990s, hosted by UC Davis' MBA program also are a key part of this story. These competitions focused on entrepreneurship and were known as The Big Bang, a competition still hosted today. The Big Bang is one way, as SARTA puts it, “to get people out of the woodwork.” Driven by prize money, the competition lures teams from the Business School and from across disciplines to come up with great ideas and even better business plans.

With any growing industry, investment plays a major role in the history of clean technology development in Sacramento. The high water mark occurred between 2005 and 2007 when the economy was booming and local investment was steady. Companies like General Electric and military contracts helped to identify Sacramento as a place for investment, but soon a recession hit. Since then, the industry has seemed to be gaining attention from the policy-making side of the story, but solid investment remains weak. Funding types that have spurred interest include a Department of Energy Clean Agriculture Grant, Energy Efficiency Loan Fund through the Mayor's Greenwise Project, California Energy Commission Grants for research and development, federal grants to upgrade energy efficiency in buildings, and funding from the Sacramento Municipal Utility District. Although these investments are necessary, they elicit skeptical notions of the industry staying propped up on federal and state funding instead of flourishing on its own.

In an interview with SARTA, it was found that talent and labor play one of the biggest roles in the development of this industry. The interviewee posed the relative importance of the following things to me: team, technology, and business plan. He asked, “What's the ranking of what contributes to a businesses' success?” I listened, “Study after study, the team ranks the highest. The second most important is the business plan and model. The last thing on the list is the technology. What SARTA took from that is we need to work on the *team*. That's when we began doing the courses on entrepreneurship, connecting with people that had courses, and establishing networking events with people who have been successful.”

6.3 Cheerleading For Headquarters

The Sacramento Area Commerce and Trade Organization (SACTO) has a mission to develop new markets and support existing markets for economic development in the Region. Recruiting businesses to headquarter in the region is a key objective in their activities. Increasing the visibility of Sacramento and helping industry grow achieves this mission. Communicating the benefits of things like leveraged employment training panel dollars, incentives from utilities, and the Enterprise Zone designation are some key selling points used by SACTO.

SACTO keeps an open line of communication with local utility providers, policy makers, investors, and those who can aid in siting companies. With the growth of clean technology, SACTO has seen a surge of interest from companies all across the globe, including Germany, Netherlands, and Austria, strong global leaders in solar energy generation. With lots of infrastructure, the right climate for solar, and legislation pushing for clean energy, the Sacramento Region and the State of California are good investments for solar developers.

SACTO maintains a good relationship with utilities such as Pacific Gas & Electric Company and the Sacramento Municipal Utility District. Utility costs for firms siting in Sacramento can reach up to 30% less than the rest of the state, making a location in the Sacramento Region an attractive investment. SACTO works with the utilities to put together competitive rate packages and model utility bill amounts for interested companies.

Sacramento's location puts it at a place where there may be more runways within 10-miles than any other metro. SACTO touts that the logistics of moving people and products are a huge asset to the region, with one international airport, several county airports, military airports, a major highway, railway

route, and port access via the Sacramento Delta and River. These factors play a big role in marketing the region.

In the eyes of SACTO, state government is part of the lure to the area, for better or for worse. In an interview with SACTO leadership, it was found that being the state capitol comes with a stigma; that this is a government town. Those who look past this image, however, find deep and lasting private-public partnerships as a big part of their success. Companies are now requesting that they be a part of that conversation taking place, whether with the California Air Resources Board or state legislature. This is found to be relatively important to firms in the region.

Companies tend to flock where there are like companies. It's rare that you find companies that want to do large scale development and be on the frontier. The Specific Plan is on the right track. If they get the right anchor tenant, like a research institution, then they'll see more companies start to be in that area. Land use doesn't drive anything. It drives the technical issues that arise after you have an interest of being there. Example: Emeryville and the Gallo Institute and its 100,000 square feet has grown to 100% occupied 1M square feet of biotech.

6.4 Integration Of Policy And Strategic Vision

The City of Sacramento, under the leadership of Mayor Kevin Johnson, has taken great strides to brand itself as a leader in the clean technology industry. Marketing itself as the Emerald City, Mayor Johnson continues to push for sustainability practices in many of the city's policies. The Mayor's Greenwise Joint Venture project has played a role in several clean technology projects based on its mission to engage constituents in practices that support growing the economy and protecting the environment. The organization has developed the Greenwise Sacramento Regional Action Plan identifying three broad goals:

1. Create a Self-Sustaining Economy
2. Become the Greenest Region in the Country
3. Brand the Region as the Emerald Valley

Greenwise Join Venture carries out these goals by supporting SARTA and clean technology development, by designing networking opportunities among clean technology leaders, and implementing programs for energy efficiency, local food, waste reduction, alternative transportation, conservation, and sustainability education and outreach to schools and business owners. This organization is the conduit through which the Mayor implements his vision.

Additionally, through several visioning and strategic planning processes such as the 2010 General Plan, 2007 Economic Development Strategy, and the 2012 Climate Action Plan, clean technology is cited as a sector of businesses to attract and develop in the city. Relevant policies can be found in Appendix B and are identified below based on common themes and programs that were found through a review of these documents. The themes identified here are organized similarly to the 2010 General Plan, identifying Business Climate, Workforce Development, Participation and Leadership, and Physical Place as common areas where policies and programs are designed. An analysis of how each of the documents reviewed for this research, as they relate to the four themes, can be found in Table 5.3.

The 2007 Economic Development Strategy states that business development and climate is arguably the most important because it serves as the engine for economic well-being, stimulating and generating wealth for people and the region. The strategy states,

A city may have a reputably strong workforce pipeline producing a well-educated population with a low level of income disparity, it may be committed to a livable

environment, and it may be well-adept at leveraging the resources of other organizations and agencies in order to get things done, but if none of these positive actions are being harnessed and directed toward the creation and constant renewal of a core of competitive industries—both exporting and locally-serving—then a city will not generate wealth for itself (p. xx).

The 2012 Climate Action Plan identifies strategies that rely on vehicle and fuel technology that reduce greenhouse gas emissions, relying on the local development of technologies. The plan weights the inevitable development of more energy efficient technologies because of the predicted amount of demand for energy that will be placed on the city. With SMUD responsible for providing energy to the city, exploring and implementing technology to reduce demand now will slow future increases. Energy controls and automation that responds to usage and other factors can largely impact demand.

Table 6.3 Policy Themes Identified in Sacramento's Planning Documents

	Business Climate	Workforce	Participation and Leadership	Physical Place
2010 General Plan	Policies set direction to building economic development partnerships, incentives, create a climate to retain and expand existing and new businesses.	Policies to educate a skilled and competitive workforce.	Policies set direction for leadership, network and rapport with business community, public/private partnership, and regional marketing.	Identifies Opportunity Areas such as the CleanTech Zone
2007 Economic Development Strategy	Emphasis with regard to business retention, expansion, formation, attraction, and recruitment.	Sets action for building a strong workforce and increasing wealth for everyone.	Emphasizes regional leadership and networking.	Identifies Opportunity Areas such as CleanTech Zone for potential, as well as the need for capital infrastructure projects.
2012 Climate Action Plan	Sets actions to improve the development of technology and promote a climate-resilient economy.	No specific measures.	No specific measures.	Sets actions to increase building energy performance, as well as addresses transportation related issues and low emission vehicles.

Other measures cited in the 2012 Climate Action Plan that are specifically linked to clean technology include vehicle technology, building energy efficiency, effective waste reduction strategies, and the use of organic processes to reduce waste in landfills and use this to produce renewable energy. The citation of these technology-types makes this document a good lever for funding support, programs, and promotion of the businesses that support these efforts locally.

The Climate Action Plan also identifies the need for a sustainable economic development plan that is resilient in the face of a climate change. It states, “The most effective ways to prepare the economy for the effects of climate change is to improve technology, develop new skills, and keep residents and businesses informed of what can be expected. Sustainability strategies also help to strengthen the economy for climate change by improving efficiency, encouraging businesses to conduct ventures more sustainably, and creating new jobs through training and research programs” (2012). This statement harkens to a comment made in an interview with Greenwise Joint Venture, and something that reflects the Mayor Kevin Johnson’s views; good economic policy is good environmental policy.

Additionally cited in these documents is an emphasis on workforce and its development. The 2007 Economic Development Strategy sets action for building a strong workforce and increasing wealth for everyone. It cites a measure of equality, something Blakely and Green Leigh emphasize in their revised definition of economic development. The production of a well-educated population with “low level income disparity” is one way of emphasizing that clean technology jobs are not just about high-paying tech jobs for the highly educated. These policies emphasize that the industry should be developed in a sustainable way, reliant on a variety of skilled worker levels, and designed to support training the right skills. Although no substantive interview questions focused on workforce development, there are resources in the city for this kind of initiative. Entities like the local Workforce Investment Board (Sacramento Employment Training Agency, SETA) and the local university system seem poised to match the skills of workers with regional business needs. The collaboration of

workforce development agencies, the local university systems, and economic development initiatives is paramount to wealth creation and equality, as cited by Moore, Meck, and Ebenoh and Blakely and Green Leigh.

Collaboration is a common theme throughout this body of work. What several interview subjects refer to as the cleantech ecosystem, is a direct link to the leadership and network building cited in several policies. In this regard, policies set direction for leadership, establish network and rapport with the business community, encourage the development of public/private partnership, and help to define regional marketing strategies. This network is developed largely because of events initiated by SARTA, GreenWise Joint Initiative, and Green Capital Alliance. Each player seems to play an important role in the ecosystem, bringing to light that any endeavor worth achieving requires the support of a community, and in the case of Sacramento, the support of a region.

Finally, these plans site physical space and buildings as areas for either targeted greenhouse gas emissions reduction or areas where redevelopment, rebranding, and recruitment of clean technology firms can occur. The 2012 Climate Action Plan looks towards green building codes, transportation, and waste management to achieve these goals. Targeted energy efficiency for the performance of buildings is an important measure for a city's portfolio of reduction efforts. Requirements to conserve energy or create less energy demand for maximized efficiency are levers for inducing new technology. The same is true for new vehicle technology and waste management. It is the city's hope that if they are a policy leader in this regard, ideas and innovation may follow suit.

The CleanTech Zone is sited in all of these plans as an Opportunity Area in which to develop these ideas. Not only does the Sacramento Center for Innovation serve as an anchor in the CleanTech Zone, but in concept, the space is a stage for industrial and commercial development.

7. ANALYSIS OF SACRAMENTO'S CLEANTECH ZONE

7.0 Introduction

From the findings in Chapter 4, the CleanTech Zone appears to have little influence above serving as a branding mechanism for the PBID boundary and Enterprise Zone. Given definition by the public sector, the CleanTech Zone offers a variety of economic incentives that are not unique to the industry, creating no barrier of entry for industries or firms outside of clean technology to locate in this area. Interviews regarding the CleanTech Zone drifted toward an analysis of the clean technology industry in Sacramento, in general, when speaking with individuals outside of city staff. These varied responses create some disconcert with regard to the proposed research question, but also open an entirely new realm of research, discussed in the literature under Place Branding. Recommended for further study, Place Branding is a technique at play with regard to creating awareness around the benefits of living and doing business in an area. This finding is chronicled in this analysis section, and supplements the identified dynamics found to be at work in creating and establishing the CleanTech Zone and fostering development of the clean technology industry in the Sacramento Region.

Figure 7.1 shows the existing number of clean technology firms in the Sacramento Region. This graphic is not limited to the CleanTech Zone but depicts the amount of firms that have started in the area as compared to 2005.

In order to organize all of the interview subjects' responses, as they pertain to both the CleanTech Zone and the clean technology industry, Table 7.1 was created to display a complete analysis of the dynamics or factors driving this industry in Sacramento.

1	8minutenergy Renewables LLC	35	Granite Bay Energy Group, Inc.	68	Peak Demand Automation
2	Advanced Energy Products	36	Green Energy Management	69	Premier Power Renewable Energy, Inc.
3	Airco Mechanical	37	Green Planet Solutions	70	PureAire Technologies
4	Altergy Systems	38	Greenleaf Power LLC	71	REC Solar
5	American River Packaging	39	Greenlight Solid State	72	REO Mechanical
6	Arcadia Biosciences	40	GreenTraks	73	RCS Technology
7	Atlantis Energy Systems, Inc.	41	GridSense Inc.	74	RIOS Solar Energy, Inc.
8	Battery M.D., Inc.	42	Henwood Associates, Inc.	75	Siemens Mobility
9	Beutler Corporation	43	Hydrovolt Energy Systems	76	Sierra Energy
10	Bloo Solar	44	Ice Energy	77	SIGNa Chemistry
(Alternate Energy Div.)
11	Blue Oak Energy	45	Innertech	78	SMA America
12	C2esoft	46	Inspired Solar Technologies	79	Smart Grid Billing, Inc.
13	California Sunlight	47	Integrated Comfort	80	Solar Depot, Inc.
14	Capital City Solar	48	JLM Energy, Inc.	81	Solar Power, Inc.
15	Carbon Sequestration, LLC	49	JMJ Natural Lighting	82	SolarRoofs, Inc.
16	Cardinal Glass	50	Jadoo Power	83	Springboard Biodiesel LLC
17	Cha Corporation	51	Jerico Energy	84	SunOne Solutions
18	Clean Energy Systems, Inc	52	Johnson Controls Inc.	85	Sunoptics Skylights
19	Clean World	53	Marrone Bio Innovations	86	SunTechnics Energy Systems
20	Clipper Creek	54	Meca Solar	87	Sustainable Energy Group
21	CNFBiofuel	55	Micromidas	88	SVV Technology Innovations, Inc.
22	Cybo Energy	56	Mobius Technologies, Inc	89	SynapSense Corp.
23	D3 LED	57	Mounting Systems-US	90	Synterra Energy
24	DAE Technologies	58	NLine Energy	91	System 3 Inc.
25	Davis Energy Group	59	Novozymes, Inc.	92	T3
26	Draker	60	Octus Energy	93	Talbot Solar & Radiant Homes
27	Efficient Drivetrains	61	Onsite Power Systems, Inc.	94	Technikon, Inc.
28	Electric Vehicles International	62	Opticlanes	95	TNT Lighting and Solar
29	Energy Exemplar	63	Organic Energy Corporation	96	Woodland Biomass
30	Ennetix	64	Pacific Ethanol, Inc.	97	Worley Parsons
31	Envirocycle USA	65	Pacific Power Management, LLC	98	Youil Solar
32	eZESystems	66	GreyRock Energy	99	ZETA Communities
33	Frontier Wind		(was Pacific Renewable Fuels, Inc.)		
34	Glide Cruisers	67	Paramount Energy Solutions		

Figure 7.1 Sacramento's Clean Technology Companies 2013
Source: SARTA (2012)

Table 7.1 Sacramento CleanTech Zone Role Player and Relative Identifying Dynamic

Interview Subject	Economic Incentive	Idea Exchange	Test & Prototyping	Key Champions	University Connection	Enabling Plans & Policies
Community Development Department	Public Infrastructure Development				Sacramento State is a property owner in the CleanTech Zone and in the key property owner in the 120-acre study area for the Specific Plan.	Streamlined permitting for e-vehicle station development, Sacramento Center for Innovation Specific Plan, Climate Action Plan
Economic Development Department	Tax credits, Foreign Trade Zone, Enterprise Zone, Recycling Market Development Zone, Business Loan Support	Facilitates discussion between the business and potential workforce, local utility provider, and potential investor or source of financing.				General Plan, Economic Development Strategy
SARTA (Sacramento Area Regional Technology Alliance)	Business development, emphasis on entrepreneurship	Networking is a big part of SARTA programming, including roundtables and events to promote idea exchange.	SARTA CleanStart Venture Lab	Founders of SARTA	UC Davis and Sacramento State are home to the research and development centers that are creating and patenting ideas. Commercialization of them regionally can be seen as a challenge.	
Power Inn Alliance (PBID)				Property Owners		Well-organized participant in the planning process.
Sacramento Greenwise Initiative		Related case studies include the beneficial exchange to create Clean World Partners and Takecharge.org.	Wireless Thermostat and Takecharge.org testing.	Mayor Kevin Johnson		Being in the state capital makes a difference. The General Plan, Economic Development Plan, Climate Action Plan, and even plans like the Greenwise Regional Action Plan, enacted by Mayor Kevin Johnson, have to be consistent. Those who carry out these plans must work together. The "ecosystem" of players is crucial to the development of the industry.
SACTO (Sacramento Area Commerce & Trade Organization)	Enterprise Zone designation administered by SACTO	Private-public partnerships are a strong link.				
Sacramento Municipal Utility District			SMUD R&D facility on campus (90 active projects in clinical/lab environment)	Customer of clean technology, key funder, and unique participant.		
Green Capital Alliance		CEO Roundtables between business leaders, policy people, workforce leaders, colleges. Themed around energy efficiency, solar, SmartGrid, alternative fuel vehicles			Works with universities and community colleges to discuss curriculum, certifications for upcoming labor force.	The Next Economy, Greenwise Regional Action Plan

7.0.1 Economic Development Incentives at Work

There is little doubt that the Community and Economic Development Departments have leveraged key planning and economic development tools to support clean technology development in the CleanTech Zone. The Sacramento Center for Innovation is a clear step in the direction of physical development, along with existing public infrastructure that creates a gateway for future development interests. Paired with the provision of tax credits, business loan support, and establishment of the Foreign Trade Zone and Recycling Market Development Zone, these are good incentives for business to locate in the area. These are also proven economic development strategies, as shown in the literature review.

Following guidance from Moore, Meck, and Ebenhoh, the City of Sacramento has leveraged nearly every tool suggested in the literature review. City departments have worked to coordinate efforts, namely through Mayor Kevin Johnson's driving vision, but also through the production of planning and strategy documents reflecting changing demands for the industry. Business development is clearly a priority as a regional, state, and global opportunity has presented itself to the area. The encouragement of new business start-ups, attraction of new firms, sustained support for existing businesses, and the increasing attempt to spur innovation and entrepreneurship are all relevant to the city.

With the state's removal of redevelopment agencies, development incentives are scarce, but the city's dependency on organizations outside of their control is apparent. Tax increment financing, for example, is an unlikely solution to support any development in the CleanTech Zone. The combination of the fees assessed from the PBID, SACOG's funding support for infrastructure improvements, and the sheer momentum of market demand are likely to be the framework of funding when it comes to development.

The region does not seem to be short on affordable land supply, and offers affordable rents for firms looking to relocate in the Sacramento Region. One interview subject was clear about how affordability was not the barrier with regard to industry development in either the CleanTech Zone or other parts of Sacramento. The Sacramento Center for Innovation is a good example of the assembly of land for a specific economic development goal. While it is not characterized specifically as a technology or industrial park, it will provide a campus-like setting, a mixture of support from the public and private sector, an obvious association with Sacramento State University, and organized development with regard to surrounding uses and compatibility.

There are already indicators of public infrastructure development, provided through transportation funds administered by the Sacramento Area Council of Governments. A \$3.2M project was developed, which included a widened roadway for the addition of the new signalized intersection with Ramona Ave., the addition of bike lanes and a replaced sidewalk on the south side of Folsom Blvd. with an ADA-compliant sidewalk, the extension of Ramona Ave. from Brighton Ave. to Folsom Blvd., and a 2-lane roadway with class II bicycle lanes to include a new at grade crossing of a rail line. Some of these improvements can be found in Figures 7.2 – 7.3 below.

Figure 7.2 Infrastructure improvements along Ramona Ave.
Figure 7.3 Bike path linking Ramona Ave. to Sacramento State University

The infrastructure improvements align with the Power Inn Alliance's goal to provide well-maintained and attractive properties within their boundary. Noted in the literature review, quality and timely development are indicators of infrastructure development appropriateness. The timeline of these improvements seem to align with the adoption of the Sacramento Center for Innovation Specific Plan, which is adjacent to these improvements, and used as a linkage to the Sacramento State University Campus and the Sacramento Municipal Utility District office.

Figure 7.4 Landscaping and streetscaping along Ramona Ave. (1)
Figure 7.5 Landscaping and streetscaping along Ramona Ave. (2)

7.0.2 Shift in Economic Development Thinking

The concepts of economic growth in Table 6.4 were identified as part of Chapter 2 in a discussion about the new ideas surrounding approaches to economic development to promote sustainability and resiliency of businesses and industry.

Table 7.2 Identified New Concepts of Economic Growth

Component	Old Concept	New Concept
Locality	Physical location (near natural resources, transportation, markets) enhances economic options.	A quality environment and strong community capacity multiply natural advantages for economic growth.
Business and Economic Base	Export base industries and firms create jobs and stimulate increased local business.	Clusters of competitive industries linked in a regional network of all types of firms create new growth and income.
Employment Resources	More firms create more jobs, even if many are minimum wage.	Comprehensive skill development and technological innovation lead to quality jobs and higher wages.
Community Resources	Single-purpose organizations can enhance economic opportunities in the community.	Collaborative partnerships of many community groups are needed to establish a broad foundation for competitive industries.

Source: Blakely and Green Leigh, 2010

The new highlighted concepts were identified during the data collection process, cited specifically by city staff, Sacramento Area Regional Technology Alliance, and the Sacramento Area Regional Trade Organization as concepts that illustrate a deliberate shift city leaders are making in order to create long-term and lasting industries.

Cluster analysis has been adopted by city and regional planning professionals in Sacramento in order to capitalize on the synergistic connections between existing and future industries in the region. As noted through the development of the clean technology feasibility study and Table 6.4, these concepts are designed to link industries in order to increase regional competitiveness. An new concept that has been illustrated through the findings includes the shift from single purpose organizations to collaborative partnerships in economic development. These are illustrated through the network of actors that have been identified throughout this process, and the distinctive and important roles they play in supporting clean technology development in Sacramento.

7.1 Core Dynamics

Through the data collection process, a series of dynamics or relationships between the actors and the resources available to them have surfaced. These dynamics create a map of reasons why the clean technology industry has been growing in the Sacramento Region, and why some attention has been drawn to the CleanTech Zone. This section summarizes the following dynamics, which have been identified as: 1. Public-Private Partnership, 2. Locational, 3. Test and Prototype, 4. Ecosystem, and 5. Key Champions.

7.1.1 Dynamic 1: Public-Private Partnership

As shown by the selection of interview subjects and their role and expertise, a public-private partnership dynamic appears to drive the industry. The public sector creates policies and process , while at the same time private and non-profit interests respond to market needs and aim to stimulate the momentum of the industry. According to the findings, it seems that the private entities move at a quicker pace, while the city departments react, reflect and align.

Uniquely, SMUD plays an exceptional role in this dynamic. They seem to walk the line between public-private partnership within their own operations. As a public utility they aim to serve their constituents, offering competitive utility rates while also appealing to business needs. Their focus on economic development, through the existence of a research and development facility on their campus, sends a clear sign that the utility is committed to piloting and accelerating new technology in the region. Additionally, the utility is held to the same environmental standards that statewide investor owned utilities are held to. The utility must invest in renewable energy and reduce greenhouse gas emissions in order to comply with state regulation, and so it spurs this sort of development, not only through investment in renewable energy, but also by pushing their in-house research and development.

7.1.2 Dynamic 2: Location

A second dynamic is the importance of Sacramento's location. SACTO, SARTA, and the Mayor's Greenwise Joint Venture Program all noted the importance of the accessibility of legislators and state agency leaders. Leaders in the industry are able to interact face-to-face with important decision makers. This proximity enables a strengthened understanding of the administration of statewide regulation and the funding sources that help to support the industry. Since Sacramento is the state capitol, several of the interview subjects identified the importance of upholding a perception of the city as a steward for the state and an early adopter of clean technologies. With one of the most progressive green building codes in the state, one interview subject noted a new technology that functions like a chameleon-like skin for a building; responding to temperature and climate in order to adjust the coolness and warmth of the interior. Although certainly a concept technology, entertaining these sort of building energy efficiency innovations is buzzing in Sacramento.

Location; however, works to Sacramento's detriment, as noted in several interviews. The culture and perception of Sacramento as a government-only city dissuades talent and therefore dollars from coming to the area. A lack of venture capital investment was noted, not because the technology is not being developed, but because the best talent and ideas for developing and managing the business team and business model are drawn elsewhere in the state. Seeking and drawing this talent; however, does not seem like an impossibility. The Sacramento Region is strewn with quality of life attraction factors like affordability, proximity to airports, proximity to recreation activities, good schools, and a variety of other amenities like a professional sports scene. These quality of life factors have great potential to lure the right talent, but as one interview subject noted, a groundswell is needed to move the industry in a self-sustaining direction. According to SARTA, 25,000 jobs in the clean and high technology sectors should put the Sacramento Region in a self-sustaining position. Current research shows different numbers of clean technology jobs, depending on how you define the term. The

Brookings Institute, in a calculation of 35,000 green jobs, includes government organizations and agencies like SMUD, California Energy Commission, California Air Resources Board, and California Environmental Protection Agency. NextTen excludes government jobs, but includes workers from roofing companies that install solar panels, and has come up with 14,000 green jobs. There is one major difference here, and that is the definition between a green job and a clean technology job. By SARTA's standards, the definition of a clean technology job one in which the workers are researching, developing, and commercializing the technology. By this definition there are 3,200 in the region. When SARTA says they need a groundswell of 25,000 jobs, this is the apples-to-apples comparison to the 3,200 jobs they have now. In order for Sacramento to see the groundswell they need, attracting people and investment will be a challenge if industry leaders cannot find a successful way to draw talent to the region.

7.1.3 Dynamic 3: Testing and Prototyping

The third dynamic is the opportunity to test and prototype innovative ideas. SARTA's CleanStart Venture Lab currently houses four new business start-ups and resides in the CleanTech Zone. According to the cycle of innovation, incubation is a preliminary step in the process; however, not a place where investors are yet willing to take major risk. North Shore InnoVentures CleanTech Incubator near Boston's MIT campus has graduated three businesses and currently houses another eight. SARTA aims to build up to this type of incubation, but many businesses are still in an ideation phase. In order for the Sacramento Region to see a greater amount of businesses to accelerate and incubate, the opportunity to test and prototype ideas must be provided to inventors and entrepreneurs.

There are some success stories in Sacramento, however. Greenwise Joint Venture has successfully linked the developer of a wireless thermostat to prototyping opportunities in Sacramento schools. Through an existing local food program administered by Greenwise Joint Venture, the Executive Officer of the Initiative leveraged their existing relationship with school facility professionals to pilot a

new and more energy efficient thermostat. As this small business gathers information about the effectiveness of their product, finding a willing investor could become an easier process.

The universities also play a clear role in this dynamic. For example, Sacramento State University houses the Smart Grid Center, which has a mission to research secure ways to communicate and transmit information managed through energy infrastructure. This includes communication involved with energy distribution and transmission, and sensor and home area networks (<http://www.ecs.csus.edu>, 2013). At its core, the Smart Grid Center is a statewide resource developing ways to manage the system controls behind delivering energy to users. The center researches and pilots technologies, making it an invaluable resource for not only the region but the state.

Additionally, the University of California, Davis has seen tremendous success in a company called Clean World Partners. Clean World Partners provides a waste management product based on anaerobic digestion, a technology that converts waste to energy and as well as creates a by-product from waste to create soil enhancement products. Developed by a UC Davis researcher and faculty member, this technology has flourished into a company in the Sacramento Region, selling their ability to manage and support organic waste disposal (www.cleanworld.com, 2013). The development and commercialization of this technology was born out of research work performed at UC Davis. After developing a good business model, recruiting a good team of executives, and securing investment, Clean World Partners launched in 2010 and has since been recognized by regional and state leaders as a business with great potential.

Greater support within the clean technology ecosystem for prototyping and testing serves as one of the foundations for developing an industry. If the Sacramento Region can continue to support the cycle of innovation at the testing and prototyping level, it can realize growth in this sector. With the Sacramento Center for Technology and Innovation slated for development in the future, the city has a

great opportunity. Guidance from this specific plan, and a few anchor businesses in this area, could spur industry growth for the region.

7.1.4 Dynamic 4: The Ecosystem of Entrepreneurs

The fourth dynamic is the network or ecosystem in which the clean technology industry thrives. The ecosystem operates in a formal institutional framework, with each unit playing a distinct and significant role, assuring that their responsibility and focus complements and does not compete with the other.

The balance that is achieved between local government, local economic development agencies, the private sector, and the stakeholders is performed through communication, coordination, and also through strategizing, visioning, and creating plans for success. This is not only done through formalized meetings, roundtables, and networking events, but it is also achieved informally. Noted by one interview subject, a personal rapport and the ability to connect the dots between existing programs and upcoming initiatives is something that can only be done by truly knowing the moving parts and people in Sacramento's network of professionals. These ways of knowing are not always formalized or facilitated through scheduled events. The relatively small size of the city enables professionals to run into one another in coffee shops, on the way to meetings with elected officials, and discuss new innovations, ideas, and policy drivers that may stimulate another set of initiatives. In this sense, these unique and smaller interactions in Sacramento can create small sparks that may turn into big ideas.

Another interview subject alluded to the fact that more of these interactions should occur in order to reach a tipping point. Not only must the number of jobs in the industry increase, but also the number of these small interactions. Theoretically, if more talent could be drawn in the area, and if more sparks could occur through informal interaction, greater opportunity for success could develop. This phenomenon, which could be thought of as the germination of ideas, is one type of momentum that must gather in order to develop the industry.

7.1.5 Dynamic 5: Key Champions

A fifth dynamic in the development of the clean technology industry in Sacramento is the amalgam of champions. According to the interviews, it was found that there was not a single champion in the industry, but instead seemed to be a combination of leadership at SARTA, Mayor Kevin Johnson, SMUD, and the collaborative and engaged nature of the Power Inn Alliance. These groups work together by working collectively on vision documents, economic strategies, and targeting the key areas of business development cited in the literature review: creating a good business climate, cultivating entrepreneurs, supporting business skills and management training, aligning financing opportunities, and developing opportunities for incubation.

Two unique actors stand out in this group. SMUD and the Power Inn Alliance are less traditional economic development participants. However, the nature of this particular industry draws the attention of the public utility. Clean technology is simply good business for the public utility, because their customers and clients are looking to use and provide more efficient technology. Additionally, with legislative pressure on statewide utilities to reduce greenhouse gas emissions, SMUD is creating opportunities for itself to become a leader in efficiency and renewable energy. Additional pressures is placed on SMUD because it resides in the state capitol and has an obligation to champion state legislation. The support of the PBID is somewhat an anomaly. An additional question asked during the Power Inn Alliance interview was, *How have the property owners been convinced that this industry is a good way to draw attention to their part of the city? Why are they so engaged?* The business and property owners obviously see their turf as an investment in their local properties and businesses as good in the long term, and they are willing to utilize fees assessed as part of their district to create an attractive place for more businesses and investors. Prioritizing development in the northwestern corner where the Sacramento Center for Innovation Specific Plan likely came at the hands of pressure from two key members of the PBID: Sacramento State University and SARTA. The pressure; however, is applied based on solid and unembellished economic research and forecasting from SARTA, as well as

having a willing property owner; Sacramento State University. As the owners of the land on which the Sacramento Center for Innovation Specific Plan is occurring, the investment of Sacramento State University probably carries the greatest weight.

SARTA is also a strong member of the Power Inn Alliance, aligning its mission with interests of the PBID; namely interest in a thriving business community. Power Inn Alliance is also a member of SARTA. These entities appear to work to maintain strong communication and align objectives as they both have strong economic development goals built into their missions.

7.2 Measuring Influence

The relationships between the identified planning and economic development tools and dynamics provide a framework of approaches for the City of Sacramento. This framework aims to create economic development opportunities, and also prioritizes strategies for harnessing the economic development potential in new industries. Table 7.2 combines the tools and dynamics in order to demonstrate their relative influence on five environments or factors. These include the political environment, physical environment, factors of workforce development, the research environment, and factors that influence direct investment or financial support.

Table 7.3 Relationship Between Planning and Economic Development Tools, Identified Dynamics, and Environments or Factors of Economic Development

		Political	Physical	Workforce	Research	Financial
Planning and Economic Development Tools	Policy foundation	•	•	•		
	Sacramento Center for Specific Plan		•		•	
	Manufacturing, Research and Development (MRD) Zoning Change		•			
	Infrastructure Improvements		•			•
	Economic incentives					•
	Loan Support					•
	Business Development					•
	Business Incubation					•
Identified Dynamics	Public-Private Partnership	•	•	•	•	•
	State Capital Effect	•				
	Testing & Prototyping				•	
	Defined Ecosystem			•		
	Key Champions	•			•	•

If the factors and environments were equally weighted in terms of their influence or ability to catalyze economic development, then a policy foundation, public private partnerships, and key champions could be viewed as some of the most influential tools or dynamics in the City of Sacramento. Two of these are dynamics draw capital or financial resources to the industry, which according to many of the business development professionals in the interviews is a key barrier to growing and supporting any industry. Investment was consistently emphasized as one of the most important factors supporting clean technology. Additionally, public private partnerships are weighted with the greatest amount of influence, touching on each factor or environment because of the opportunities for collaboration and ability to reach broadly. Collaboration between public entities like Sacramento's Community and Economic Development Departments and the Sacramento Municipal Utility District with business incubation professionals, venture capital interest, existing business, advocates for potential business interest, and existing property owners are very influential. It seems that the more these entities engage each other and plan together, the greater the influence over the capacity for economic growth.

Clearly the universities, although not represented in the data collection process, play a significant role in this matrix, serving as the core of the testing and prototyping dynamic and one of the main reasons why research and development continue to thrive in the Sacramento Region. Additionally, their influence likely reaches factors of investment and financial interests because of the significant amount of funding drawn to research.

It is important to note that these environments and factors may not be equally weighted, and in fact, probably are not. A further review of literature identifying the relative importance of these categories would have to be performed in order to definitively identify a ranking or value system. Even then, however, the conditions of cities and regions vary greatly and are likely to see a wide variety of conclusions.

8. CONCLUSION

8.0 Research Questions Answered

The study of economic development tactics, the designation of the CleanTech Zone, and the policies and actors involved, have been illuminated through the case study methodology and, to an extent, have answered the research questions. Through information gathered from archival research, network mapping, and interviews, this chapter presents a concise summary of the answers to the research questions initially proposed, and also identifies areas of departure from these questions.

8.1 Applying Economic Development Principles to Clean Technology

Research Question 1: What are the relationships between local economic development planning tools and their contribution to the development and growth of clean technology?

Common local economic development strategies have been outlined in the literature review of this research, and as indicated in the findings, these strategies have been employed, to an extent, by the public and private actors in the City of Sacramento. Through preliminary research of other cities in California with clean technology branded areas, similar strategies have been employed with the same framework. This framework typically requires participation from universities and research and development entities, opportunities to accelerate and incubate businesses, financial incentives for firms as well as investment potential, policy guidance in the form of local environmental or economic initiatives, and a network of innovators committed to working collaboratively.

The intersect between economic development and clean technology has not specifically been researched, likely because the growing field of clean technology is relatively new. With venture capital investment on the rise and California capturing 29% of this investment (Robbins, et al., 2005), cities in the state are eager to capitalize on the growing trend. As research pertaining to economic growth in this field occurs, evaluating the actual impact of these efforts will be much more clear.

A changing business climate is one indicator of an economic growth trend (McGrath and Vickeroy, 2008). Currently measurable, is the economic and business climate for clean technology. It is clear that the City of Sacramento is developing a climate, or to borrow a term from Castells and Hall, a milieu in which the clean technology industry can grow.

SRQ_{1.1} Where is clean technology being pioneered in California, and on what economic development and planning premise are other relative clean technology corridors or zones founded?

The core areas evaluated for this research were limited to San Diego, Los Angeles, the East San Francisco Bay Area, and Sacramento. All of these efforts were founded on the opportunity to pioneer and lead California in the wake of a clean energy economy. These geographic areas appeared to be the only ones in the state with identifiable designations of land for clean technology development, with the exception of San Diego. San Diego's program is only a policy directive at this point, with economic development programs outlined to support the growing industry, but no specific zone or corridor defined to corral clean technology businesses.

With regard to the planning premise at work, the business cluster, or agglomeration effect aims to be achieved through defining where clean technology industries can grow. In the case of the East Bay Green Corridor, the identified area has no firm continuity, while both the Sacramento CleanTech Zone and Los Angeles CleanTech Corridor are defined and extensively mapped areas. Additionally, there

are plans in place such as specific and master plans, directing industrial design guidance and providing a vision for the form and function of these areas.

The typical land uses in these places are restricted to industrial and commercial land uses, and although it was found that land use is one of the lessor influences on clean technology development, these land uses must be preserved if an industry of this nature is going to be incubated and accelerated. In both the Los Angeles and Sacramento cases, industrial and commercial land is either vacant or being repurposed in order to accommodate a laboratory setting, small scale manufacturing, and simple office space.

SRQ_{1.2} What are the benefits of clustering clean technology research and development, and accelerating firms in an area?

Through the work of Michael Porter and review of literature on the competitive advantage of business clusters, the benefits of providing a defined space to encourage new business at a local and regional scale are great. Historically, this has been intentionally done through the development of research parks with application to a broad number of industries such as bio-medical and high technology. Founding an industry like clean technology in a single area seems a different scale than a research park, and this difference is important in the study. Sacramento's CleanTech Zone and the other areas around the state are designed to create a cluster with regional influence. This is one of the reasons why firms that are not specifically developing clean technology are not kept out of the defined corridors and zones, and also why the zones and corridors have relatively undefined boundaries, as is the case in the East San Francisco Bay Area.

SRQ_{1.3} How have lessons from other efforts, such as attempt to “garden” technology through research parks, related to growing the clean technology industry?

The City of Sacramento case studied Cal Poly Pomona’s Innovation Village as part of their research in the development of the Sacramento Center for Innovation Specific Plan. Cal Poly’s Innovation Village, which began development in 1995, is a prototype for the type of development that can be linked with university backing. The Innovation Village is 65 acres, has five developments in 376,000 GSF, and houses 13 companies and 1,248 employees ranging from biomedical to energy technologies. The Innovation Village also houses a technology incubator.

Innovation Centers might be a repackaged version of research or technology park. According to the UC Berkeley report, Leveraging LBNL’s Second Campus for Regional Economic Development, by Adler et al.,

The research park at Stanford University is the oldest university-affiliated research park in the world and remains one of the most successful. It had a crucial role in supporting the emergence of Silicon Valley as the world’s leading region for technological innovation. By facilitating collaboration with students and faculty and offering access to the University’s resources, Stanford remains very attractive to growing and established research, science, and technology firms (p. 65).

The study of innovation and entrepreneurship is growing tangentially with clean technology as indicated by the creation of the Sacramento Center for Innovation Specific Plan. The Specific Plan was designed to create an anchor tenant in the CleanTech Zone, providing development guidance for a willing and ready property owner and future developer. This Specific Plan has signs and signals of a research and development park; a seed or anchor in the CleanTech Zone.

Gardening technology through the development of the Sacramento Center for Innovation will, according to the City of Sacramento website,

create an environment that fosters the exchange of technical knowledge and expertise between students, faculty and private sector business enterprises. With connections to U.S. Highway 50, light rail and its proximity to the University, SMUD, UC Davis Medical Center and Granite Park, the area is well positioned to transform from an older industrial area into a future hub for clean energy, green technology, and medical technology in the Sacramento region (2012).

Functionally, these are very similar concepts, perhaps with a new label to match changing trends and ideas.

SRQ_{1.4} What are the conditions under which clean technology has developed, and how has Sacramento leveraged this opportunity in the CleanTech Zone?

Sacramento has made a big investment in the future of clean technology because the state has developed higher environmental quality standards and practices across the board. Green building practices, cleaner fuels, and renewable energy are all becoming standards with regard to the rules regulating cities and regions. It was identified in the interviews that Sacramento is obligated to set the bar high when it comes to walking the talk. This means that Sacramento must be a leader in the clean technology field.

Sacramento is also looking to capitalize on as much market share as possible when it comes to clean technology. The recruitment or incubation of firms brings investment dollars, jobs, and revenue into the region. As clean technologies continue to development, Sacramento welcomes the businesses that commercialize those technologies with welcome arms. The CleanTech Zone is one area that some of

these businesses can call home if they choose to take advantage of the economic incentives, business climate, and other resources available to them in this area.

8.2 Inside the Zone

Research Question 2: Who are the actors involved in the public and private, formal and informal, institutions throughout Sacramento and how have they spurred economic development relative to the clean technology industry in the city?

This research unveils the clear actors involved in both the designation of Sacramento's CleanTech Zone and the broader development of clean technology in the city. These actors have been divided into public and private entities, working in partnership toward a rejuvenated and resilient economy. The public entities involve the role of the Mayor and the Greenwise Joint Venture Initiative, a taskforce specifically looking to bridge the gap between both clean technology and other sustainable practices and the greater community. Other public actors include staff from the Community Development Department and the Economic Development Department who align their actions and long-range planning priorities with a broader vision established by both the Mayor and the community.

The private actors involved in Sacramento play the most critical role. Their action to drive business development, business recruitment, and find investment in the industry is crucial to allowing the industry to flow with a natural market economy. Without spurring ideas, invention and creation, testing and prototyping, financial investment, business development, and the inevitable commercialization of technologies, the effort to develop the clean technology industry is not worthwhile. These actors from the private market include SACTO and SARTA.

Two special public actors remain to be acknowledged. These special actors include the public university system and Sacramento Municipal Utility District (SMUD). The public university system is a hotbed for learning, ideas, and innovation. The greater the collaboration that occurs between the university system and outside entities, the greater the chance that Sacramento can become known for bringing good ideas to fruition in terms of developed businesses and industries. If clean technologies are being researched and developed within the university system, the resources to incubate and accelerate these ideas into funded and shaped businesses are available locally. Although university leaders were not interviewed as part of this research, their role could be further defined as part of a Further Study measure.

SMUD was also identified as a unique actor. As the regional public utility, they have tremendous influence in relation to clean technologies and the provision of electricity. All utilities in the state of California have been mandated through state legislation to dramatically reduce greenhouse gas emissions. Situated in the state capital, the public utility aims to uphold its reputation as a true leader in the state. SMUD's proprietary research and development facility develops and pilots clean technologies, and emphasizes real-world application, including the demonstration of lighting technologies, building envelopes, heating ventilation and air conditioning (HVAC) systems, and other technologies. This unique resource could enable local economic development with regard to clean technology.

A final actor in this story has been the Power Inn Alliance and its membership. Well-organized and engaged, the Power Inn Alliance has a mission that emphasizes economic development, transportation management, planning and zoning oversight, and the overall improvement of their properties and the welfare of their business members.

SRQ_{2.1} How do local government policies promote and guide the growth of clean technology in the case of Sacramento's CleanTech Zone?

A relationship between local government policies was simply found to establish a vision, set policies, establish and encourage programs, many of which are led by entities outside of the city's purview, and simply enable prioritization of actions. Many of the city-led policy documents such as the General Plan, Economic Development Strategy, and Climate Action Plan align with existing efforts by the private sector to spur clean technology. This is not to say that these city documents are not forward-thinking or necessary. They simply are not the driver, especially with regard to the challenges identified by the interview subjects. Local government policies have therefore been identified as guiding documents, a role that is foundational to economic development strategy.

SRQ_{2.2} What planning tools and strategies are employed to grow the clean technology industry in Sacramento's CleanTech Zone?

The greatest tool leveraged by the Community Development Department is the current development of the Sacramento Center for Innovation Specific Plan. This plan appears to be their kernel. Clean technology might be moving at a fast pace in terms of capitalizing on investment opportunities, but the Sacramento Center for Innovation is a sustainable and long-term development choice, in which the City, Sacramento State, and the community at large are making an investment in their future.

It is clear that Sacramento has identified an area of land that is conducive to clean technology development. The CleanTech Zone is primed to host office uses, and a variety of industrial uses. The land use designations require little changes, only that they are flexible enough to accommodate the different stages in which businesses might evolve through the development and commercialization of technology. The Sacramento Center for Innovation supports flexible zoning by shifting one of its

current land uses from light and heavy manufacturing to a designation called Manufacturing, Research and Development (MRD). In terms of process, MRD already exists in the city's zoning code; however, the application of this new zoning designation will require an amendment to their existing implementation document.

Other planning strategies contributing to the development of clean technology are related to the economic development discipline of the field. These strategies include the establishment of formal network partnerships created to develop clean technology, business development initiatives, development incentives, some workforce education, the identification of an appropriate land supply, and the development of infrastructure.

One strategy that was less recognized in this study was improving quality of life measures. Since attracting the right talent and workforce to the city is an imperative, these measures seem to be occurring more slowly and steadily. This concept is explored in the Further Study measures section of this paper.

SRQ_{2.3} What are the monitoring mechanism for identifying growth or success in Sacramento's CleanTech Zone, and what is its relative success?

A certain amount of skepticism regarding measuring the impacts of this industry is certainly at the forefront of urban planner thinking. Literature on research park development shows that sometimes the forced construction of technology centers fail, namely because they cannot remain financial feasible, but also because the literature shows they have been converted to other uses (Luger, Goldstein, 1991). Success is mainly measured by comparing employment growth, but an inherent weakness in this research is that regions with developed technology parks vary dramatically with regard to their age (Visser, 1992).

At the local level, few studies have been done to identify and explain what the core indicators are for successful local economic development (McGrath and Vickroy, 2003). However, research from Pennsylvania's Greater Johnstone and Cambria County area has attempted to address the challenge of the dearth of available information. A project was designed by McGrath and Vickroy (2003) to provide feedback in local economic development in four key areas. These areas are:

1. Gross revenue and sales projections. "The study addressed this need in terms of a current-year estimate as well as a projection for one year into the future (p. 257)."
2. Facility space need projections. "The study addressed this need by identifying the percentage of businesses anticipating expansion, contraction, or no change in their facilities (p. 257)."
3. Employment projections. "The study addressed this need by identifying the percentage of businesses anticipating changes in full-time and part-time employment for the current year and one year into the future. Employment changes were documented by type (white-collar skilled versus support and blue-collar skilled versus support) as well as by the number of positions gained or lost (p. 257)."
4. Issues affecting the local business climate. "The study addresses this need by identifying the most pressing issues affecting local businesses, ranging from infrastructure projects to political and legal factors (p. 257)."

Most of the interviewees cited employment growth as the number one indicator of clean technology development. Sacramento's CleanTech zone is too young to use these measures of analysis, with only a handful of firms located there currently. Although there are many more within the Sacramento

Region, these measures will be useful as the industry grows and the Community Development and Economic Development Departments, and organizations like SARTA measure the impact of their efforts.

8.3 Identified Challenges

Several challenges were identified through the interview process, illuminating some of the barriers that stand in the way of further development in the CleanTech Zone and the clean technology industry in general. These challenges vary from the loss of state programs leveraging public dollars to support economic development, to privately driven factors.

Staff members from both the Community and Economic Development Departments cited the loss of redevelopment dollars and the general slow in construction as one of the reasons for weak development in the CleanTech Zone. Sacramento boasts relatively affordable rents in comparison to other parts of the state. In light of this, clean tech industries are not clamoring for affordable space, but instead run into other barriers.

These other barriers, as noted by SARTA, SACTO, and Greenwise Joint Venture, include financial investment and unwilling venture capital interest. The industry is young, and because of the newness of the industry and a slow-growing market for products, the risks associated with investment are high.

Finally, the culture and perception of Sacramento was cited as a major barrier. This is barrier associated with the newly discovered concept of place branding, and more importantly a tenant of local economic development that has the capacity to draw talent, entrepreneurs, and investors.

9. AREAS OF FUTURE STUDY

Several areas of future study were developed in order to accommodate a variety of concepts not outlined in the prospectus and additional ideas. These ideas illustrate the interdisciplinary nature of this study, identifying the complex forces and factors at play in the City of Sacramento as well as economic development in general.

- Investors play a large role in the success of any industry. Their behavior, financial conditions, and interest in supporting a business idea and model are a factor for any business. Several interview subjects identified the challenge of drawing investment interests to the city. It was identified that if entrepreneurs are primed with solid business models and an experienced executive team, and can grab the attention of investors, a greater amount of venture capital and other investment interest may come to Sacramento. Identification of the core dynamics preventing this from happening is a good area of future study, likely information drawn from investors themselves and perhaps entrepreneurs who seem to be lacking the capital to pursue their business start-ups.
- There is no shortage of literature exploring the correlation between the activities driving research at universities and the eventual deployment of a product, process, or service. The linkages between these activities are related to research, the creation of a product, process, or service, relationships between the local or regional business and investing community, and economic development initiatives. This literature was not reviewed because although this has proven to be a significant factor in the City of Sacramento, the sheer amount of research and analyze how much influence and importance is given to this factor was not feasible under the guidance of the original research proposal. If explored further, the actions or dynamics that drive greater support or influence from universities could prove to influence the amount of businesses that decide to remain homegrown in the region and the type of labor and workforce that remain in the region.

- In an interview with the Sacramento Area Regional Technology Alliance (SARTA), the concept of talent retention and the ability to bring together the right team of leaders and talent was identified as a barrier to business development. Figure 8.1 below illustrates the relative importance of factors that influence investors and the profitability of a company. The order of their relative importance, from smallest to largest, is illustrated by the size of the circle to the right of the factor: Technology, Team, and Business Plan. In light of this idea, SARTA identified that it would focus its efforts on bringing together the right team. This concept of finding the right people could be related to a variety of factors, including training and workforce development, education, or quality of life measures. One area of future study might study the relative influence of education, training, and quality of life measures on the ability of Sacramento to retain the type of workforce it needs to grow the clean technology industry.

Figure 9.1 Relative importance of team in business development

Source: Interview with SARTA

In addition to these areas of future study, the challenges and merits of the single case study methodology are important factors to address if further research were pursued. The context of this study is relatively narrow, as is the nature of the single case study. With an inability to confidently apply the findings to other areas, or simply duplicate these findings in another region, the study is somewhat incomplete without multiple cases to benchmark it against. Although there is great depth provided in a single case study, and in the case of this research, was a reasonable method to select

based on the timeframe of the project, the findings might be significantly different with comparisons and relationships identified in different cities. This challenge is to be considered as a measure for future study if an opportunity to conduct a multiple case study should arise. Above all, however, the merits of the single case study provide value because of the in-depth analysis and familiarity with the issues that perhaps might not be attained through a multiple case study.

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Appendix A: Reviewed Policies

2010 General Plan

Several of the policies outlined in the Economic Development Element of the 2010 General Plan address the Business Climate, Workforce, Place, and Participation & Leadership. The relevant policies are outlined below.

Business Climate

Policies in this section support a healthy and sustainable economy, which enables the City to achieve many of its financial and economic goals. Businesses are an important source of the city's economic well-being, and policies provide for economic development partnerships, incentives, and a supportive business climate to retain and expand existing and attract new businesses.

Goal ED 1.1

Business Climate. Maintain a supportive business climate and a healthy, sustainable economy that increases the City's ability to expand existing businesses and attract and retain new businesses.

Policies:

ED 1.1.2 Economic Development Strategy. The City shall maintain and implement an Economic Development Strategy to support the city's prosperity and long-term fiscal competitiveness.

ED 1.1.3 Market Trends. The City shall monitor industry and market trends and regularly provide current information to City policymakers and the business community.

ED 1.1.4 Economic Development Partnerships. The City shall partner with economic development organizations and businesses seeking to expand or locate in Sacramento.

ED 1.1.5 Small and Startup Business Assistance. The City shall provide incentives to existing small and startup businesses, including minority- and women-owned businesses, to facilitate their expansion and job creation.

Workforce

Policies in this section seek to facilitate workforce skill development by coordinating with educators and leaders from the business community to meet the workforce demand of the region. In a knowledge-based economy, the skills of the local workforce are a region's greatest competitive resource and advantage.

Goal ED 2.1

Workforce. Assist in preparing an educated, skilled, and competitive workforce to match the employment needs of the region and its businesses.

Policy ED 2.1.1

Higher Education and Local Economy. The City shall work with local organizations such as Linking Education and Economic Development (LEED) in developing links between public and private providers of primary, secondary, and post-secondary education and with local businesses and industries to develop and promote educational program

Place

Policies in this section ensure that there are suitable areas and sites with adequate infrastructure throughout the city for new and expanding businesses including cutting edge technology and sustainable businesses. This includes proactively identifying and marketing areas of the city for economic growth and ensuring adequate infrastructure is in place to facilitate economic growth.

Goal ED 3.1

Land, Sites, and Opportunities. Provide opportunities for expansion and development of businesses by ensuring availability of suitable sites, appropriate zoning, and access to infrastructure and amenities.

ED 3.1.2 Opportunity Areas. The City shall strategically market key opportunity areas identified in the City's Economic Development Strategy and the General Plan.

ED 3.1.5 Businesses Working on Cutting Edge Technology. The City shall work with universities, Sacramento Area Commerce and Trade Organization (SACTO), and other groups to encourage businesses working with cutting edge technology to locate in Sacramento.

ED 3.1.7 Infrastructure and Public Facilities. The City shall continue to identify, construct, and maintain infrastructure systems and facilities required to promote and sustain a positive economic climate.

ED 3.1.8 Infrastructure Investments. The City shall anticipate needs and coordinate City infrastructure investments with economic development opportunities.

Participation and Leadership

Policies in this section seek to leverage resources of entities throughout the city and region to support and implement the goals of the 2030 General Plan and Economic Development Element. This includes the integration of City departments to meet Sacramento's economic goals, as well as the City assuming a prominent leadership role in implementing key regional initiatives.

Goal ED 4.1

Leadership. Provide leadership in the city and the region in order to achieve the city's and the region's economic goals.

ED 4.1.2 Strong City and Business Relationship. The City shall maintain a strong customer service orientation toward businesses.

ED 4.1.3 Public/Private Partnerships. The City shall support and encourage public/private partnerships and other efforts to implement the key development projects that meet the City's revitalization and redevelopment goals.

ED 4.1.4 Regional Marketing Activities. The City shall actively participate in regional marketing activities by coordinating its efforts with SACTO and other economic development agencies in the region.

ED 4.1.6 Foreign Trade Zone. The City shall assist the Port of Sacramento in becoming a Foreign Trade Zone.

2012 Climate Action Plan

The City's Climate Action Plan identifies several measures that rely on clean technology in order to accomplish successive objectives and programs. The relevant policies in the City's Climate Action Plan are outlined here:

Strategy 2: Mobility and Connectivity

Measure 2.5: Low Emission Vehicles

Strategy 3: Energy Efficiency and Renewable Energy

Measure 3.2: Increase Building Energy Efficiency

Strategy 4: Waste Reduction and Recycling

Measure 4.3 Greenwaste and Composting

Strategy 6: Climate Change Adaptation

Measure 6.5 Promote a Climate-Resilient Economy

2007 Economic Development Strategy

The City's 2007 Economic Development Strategy is reflected in the Economic Development Element, updated and adopted three years later. It identifies four themes and the inputs that will contribute to achieving the economic goals set forth by the City. Producers, Places, Participation, and People are the organizing themes in the plan.

Other Strategy Documents Available

Additionally, an initiative known as The Capital Region Next Economy is being led by 400+ business and public sector representatives and is managed and coordinated by a joint partnership between the Metro Chamber, Sacramento Area Commission and Trade Organization, a non-profit called Valley Vision, and the Sacramento Area Regional Technology Alliance. The focus of this initiative is to come out of the economic slump as one united region, and create a direction that the region can move in together. The City of Sacramento is synchronizing their efforts with The Next Economy.

Appendix B: Site Visit Notes and Photographs

The intent of a visit to the Sacramento CleanTech Zone was to get a feel for the scale and land use types that existed inside the approximate 4 square mile site, and to identify and walk parts of the 120 acres where the City of Sacramento is completing the 2013 Sacramento Center for Innovation (SCI) Specific Plan.

On February 9, 2012 I conducted a site visit to understand the location and context of the Sacramento Center for Innovation, Power Inn Alliance Property and Business Improvement District (PBID), SARTA Venture Lab Office, Sacramento Municipal Utility District, and Sacramento State. Using the city-owned Granite Regional Park as a starting point I traveled the length of Power Inn Road, Elder Creek Road, Fruitridge Road, Florin Perkin Road, Folsom Boulevard, and West Railroad Avenue on the edge of the train tracks that bound the western part of the Zone and form the western boundary for the SCI Specific Plan.

The land uses in the CleanTech Zone are predominantly industrial but also include office and public facility uses. The industrial uses are comprised of businesses in the construction and materials industry. Lumber, steel, and concrete companies line many of the streets, to name a few of the materials types. The City of Sacramento has offices for their Public Health Department around the Granite Regional Park area, which seems to be designed to facilitate lots of public use. Soccer fields, a skate park, and a pond with a fountain are developed in this area. The City seems to be “walking the talk” and setting an environmentally friendly standard for this zone with public parking shaded by solar panels at the rear of the buildings.

Depot Park is an area at the southwest end of the PBID and is comprised of businesses that require call center space, storage and truck yards, and data centers. It is also home to a Packard Bell office,

Waste Management waste transfer facility, and a dairy facility. The Depot was originally a staging area to consolidate, pack, and ship war supplies during World War II. After the war, the site was used to repair and maintain high-tech military hardware and electronic equipment.

A 3MW solar development project called the Depot Park Solar Project was built in 2010, supporting an important part of renewable energy development in the City of Sacramento.

Additionally, a U.S. Marine and Naval Reserve facility is on the southern end of Depot Park.

Appendix C: Human Subjects Consent

Informed Consent Form for Cal Poly Research

INFORMED CONSENT TO PARTICIPATE IN A RESEARCH PROJECT, Planning for Clean Technology

A research project on Planning for Clean Technology is being conducted by Nikki Streegan in the Department of Department of City and Regional Planning at Cal Poly, San Luis Obispo. The objective of this research is to articulate the linkages between local economic development planning and the development of the clean tech industry. Understanding how tools and strategies are adapted in local economic development planning, and contribute and relate to the development of clean tech industries is a key focus.

You are being asked to take part in this study by participating in a standardized interview. Your participation will take approximately 30 to 45 minutes. Please be aware that you are not required to participate in this research and you may discontinue your participation at any time without penalty.

The possible risks associated with participation in this study include disclosing the economic strategy behind the development of Sacramento's CleanTech Zone. Your confidentiality will be protected by publishing your comments anonymously, however, disclosing your affiliated organization. Example: "An interview subject from the Community Development Department with the City of Sacramento stated..."

Potential benefits associated with the study include furthering the interest and development of the clean technology sector in other cities, and enabling planning and economic and development professionals to pursue this type of development in their own cities and regions.

If you have questions regarding this study or would like to be informed of the results when the study is completed, please feel free to contact Nikki Streegan at 530.863.0455 or the Thesis Advisor, Dr. Umut Toker, at 805.756.1592.

If you have questions or concerns regarding the manner in which the study is conducted, you may contact Dr. Steve Davis, Chair of the Cal Poly Human Subjects Committee, at (805) 756-2754, sdavis@calpoly.edu, or Dr. Dean Wendt, Interim Dean of Research, at (805) 756-1508, dwendt@calpoly.edu.

If you agree to voluntarily participate in this research project as described, please indicate your agreement by signing below. Please keep one copy of this form for your reference, and thank you for your participation in this research.

Signature of Interview Subject

Date

Signature of Researcher

Date

Appendix D: Survey Instrument

SACRAMENTO CLEAN TECH ZONE STAKEHOLDER SURVEY

Name

Affiliated Organization

Title

[INPUT]

1. What has your professional role been in establishing Sacramento's CleanTech Zone?

2. What sorts of partnerships were forged in order to designate Sacramento's CleanTech Zone? Who took the lead?

3. Why was this particular area of land selected in order to develop the clean technology industry in Sacramento?

4. Can you provide insight into the economic modeling or feasibility study that was performed in order to establish the location of the CleanTech Zone?

[PROCESS]

5. Through my research I have come across some economic development and planning techniques. Which of these, if any, were employed to select the physical location of the CleanTech Zone:

- ☐ Landbanking
- ☐ Zoning Regulation
- ☐ Land Use Regulation
- ☐ Public Infrastructure Development
- ☐ Funding source such as a Business Improvement District

Follow-up: Elaborate on your knowledge of the use of these techniques.

6. Which of these have been used (or will be used) to kick start business development in the CleanTech Zone:

- ☐ Entrepreneurship Development

- ☐ Business Assistance (Development and Financing)
- ☐ Industry-specific development such as R&D facility
- ☐ Enterprise Zone Designation
- ☐ Financial incentives for business development such as Tax Increment Finance District or Industrial Development Bond

Follow-up question: Elaborate on any business or community development initiative that has played a role in the process.

7. What sort of workforce development programming has occurred (or will occur) in light of the economic growth and development in the CleanTech Zone?

8. Attracting businesses to locate in the CleanTech Zone seems like a big part of the strategy. How is this done?

[OUTCOME]

9. Describe your agency or organization's vision for the CleanTech Zone – what's going to happen in this place?

Follow-up question: How is this vision checked and monitored? In other words, how do you keep your vision in scale?

10. Through my research I have come across some factors that measure the outcome of planning and economic initiatives. What measures of success, if any, have been established in order to determine how implementation of the CleanTech Zone is progressing? Examples include:

- ☐ Employment growth
- ☐ Business start-ups
- ☐ Regional income and income equality
- ☐ Employment opportunities for women and minorities
- ☐ Occupational mix and local wage structure
- ☐ Research capacity of local university
- ☐ Business climate and political culture
- ☐ Attracting new firms

Follow-up question: Has the CleanTech Zone achieved any of these objectives yet?

11. Describe one major challenge in establishing the Sacramento Cleantech Zone.

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