
The International Center for Water Technology

*A collaborative venture between the
San Joaquin Valley Water Technology Cluster and
California State University, Fresno*



Business Plan

University Partners:

California Water Institute
Center for Irrigation Technology
Central California Futures Institute
University Business Center

October 15, 2001

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I. Executive Summary

Access to useable water is developing into the greatest challenge of this century. The world's ability to find, use, clean, recycle, transport, distribute, sell, tax, and conserve water will determine in large measure whether the world will progress or digress in the next 100 years. ***The technology to properly use and manage this precious resource is the critical tool to providing sufficient water supplies for the world's major uses, such as agricultural, municipal, and commercial applications.***

The San Joaquin Valley, one of the leading regions in the world for water technology manufacturing, has the opportunity to become the undisputed, global leader in water and flow technology, and, in the process, expand an industry with valuable, high-paying jobs in a region with chronic double-digit unemployment, attract and retain intellectual capital through research and development activities, inform the public and influence public policy in an area central to the success of our state and nation, and develop a regional identity for dominance in a knowledge-based industry. ***Through the development of the International Center for Water Technology on the campus of California State University, Fresno and in partnership with the San Joaquin Valley Water Technology Cluster, such opportunities can be realized.***

The International Center for Water Technology will leverage existing University and industry programs and capitalize on market opportunities to provide testing and certification services, community education, cooperative marketing services, technology demonstrations, and many other programs that benefit the University community and industry members. Envisioned as a part of the Center is a state-of-the-art physical facility that will house a permanent water and flow technology exposition, the only one of its kind in the world. The International Center for Water Technology will become the magnet for worldwide attention to water technology.

The two key ingredients for moving the International Center for Water Technology forward are (1) formal approval from the University and industry and (2) assignment of capital campaign and facility planning personnel to assist in the development of the capital project. ***The purpose of this business plan is to prove the concept of the International Center for Water Technology to University and industry partners in order to warrant that investment.*** The plan is intended to serve as the initial blueprint to catalyze action. As the project moves forward more specific financing and operational plans will be developed. Thank you in advance for your consideration.

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II. Vision and Mission of the International Center for Water Technology

A. Vision Statement: The International Center for Water Technology will be recognized by industry and academia as the world's leading center for state-of-the-art water and flow¹ technology and related applied sciences.

B. Mission Statement: The International Center for Water Technology will foster the growth of the water and flow technology industry in the San Joaquin Valley and facilitate advances worldwide in related technology through testing and certification services, research and development, collaborative marketing, technology demonstration, and education and outreach.

¹ "Flow Technology" refers to the equipment required to move, clean, measure, monitor and control liquids (e.g. water, oil, slurries, etc.) in management and processing systems.

III. Industry Analysis

A. San Joaquin Valley Water and Water Technology Industry

History: It is no surprise that the development of the Valley's water technology industry is tied to the area's rich agricultural heritage. In fact, the agricultural and water technology industries were completely intertwined and mutually dependent until the recent growth in landscape and turf irrigation markets, which have provided diversification opportunities for the water technology industry into the more broadly defined "flow technology."

The history of the San Joaquin Valley agricultural and water technology industries dates back to the construction of water delivery and power systems in the 1920s and 1930s. Once the state California Water Project and federal San Joaquin Valley Project were built in the 1950s and 1960s, the Valley became the most productive agricultural region in the world and the largest laboratory for the development and implementation of irrigation products. Pump products were developed to address the need to take water out of wells and water canals and apply it with enough pressure to reach entire fields. Valves were developed to control water pressure, and filters were created to screen sand and dirt out of well and canal water.

Over time, farmers began to realize the need to conserve water and reduce the cost of water inputs. Local manufacturers responded with water-saving technologies. Now the Fresno area and the state of California are world leaders in micro-irrigation manufacturing. The industry has diversified even further, and innovations in all aspects of the water technology industry have occurred as pressures to conserve water and energy have escalated worldwide.

Industry Segments: The San Joaquin Valley water and flow technology industry can be broken down into manufacturers, distributors, and dealers of: (1) irrigation and related components such as valves, sprinklers, and drip; (2) pumps and related equipment such as piping, valves, and tanks; (3) filters, water meters, and hydrants; and (4) electronic controls and flow measurement equipment, water quality measurement, and sensor technology components.

Size of the San Joaquin Valley Industry: The most current data available (1998) shows that the water and flow technology industry in the eight-county San Joaquin Valley consists of about 2800 employees in approximately 90 establishments. Employment in the industry grew by about 1% between 1993 and 1998, representing an average annual growth rate of just about .25%. The average firm size is about 33 persons per establishment. The industry is 1.2 times as concentrated in the San Joaquin Valley as in the nation, making water and flow technology a regional specialization.

Internal Factors Affecting the San Joaquin Valley Industry: Four primary factors are currently affecting the water and flow technology industry in the San Joaquin Valley. First, firms are seeking and finding new applications for their product lines in diverse markets, thereby sustaining their operations in spite of shrinking agricultural markets. Second, to compete against large, often public, companies, San Joaquin Valley firms are seeking partnerships with other firms located outside the region, which is leading to more and more industry consolidation. Third, San Joaquin Valley firms are more aggressively seeking international markets. Finally,

the San Joaquin Valley industry is working more collaboratively through the development of its own industry cluster, which is intended to create more acceptance of the technology worldwide and lead to expansion of the local firms.

External Factors Affecting the San Joaquin Valley Industry: The most significant external factor affecting the San Joaquin Valley water and flow technology industry is the growing recognition worldwide of the importance to conserve water and, when used, to apply it with maximum efficiency. The sentiment is strongly felt in the State of California by all sectors, whether agricultural, commercial, or municipal especially in light of the state's energy crisis. Increased demands on finite water supplies by population growth in other parts of the United States and the development of underdeveloped nations will also create tremendous opportunities for the water and flow technology industry. Other external factors include increased demands for automation controls and remote sensors to decrease labor costs and advances in materials, which present the industry with opportunities for cost-savings and quality improvements.

B. National and Global Water Technology Industry

Industry Segments: When considered in a broad context, "water" is the largest, single industry in the world. It encompasses virtually every activity of every life form and includes water sources and conservation, water use and reuse, the geography and policy of water, the economics of water, basic water technology, and water flow technology. Water flow technology, which is the focus of the International Center for Water Technology, can be broken down into the following categories:

- *Irrigation and Drainage for Agricultural and Turf Systems* – All of the 200+ crops produced here in the Valley and crops around the world utilize the Valley's manufactured equipment, including (valves, filters, pumps, sprinklers, Micro-drip, fittings, flow meters, backflow equipment). Additionally major golf courses, parks, street medians, sports fields, and entire cities have their turf and landscape irrigation needs supplied by Valley manufacturers.
- *Municipal and Rural Water and Waste Systems* – These systems include wells and related pumps, transmission and distribution systems (including valves, hydrants, fittings, connections, backflow equipment) and water treatment equipment and processes for obtaining desired water quality goals.
- *Industrial Fluid Applications* – Industrial systems include cooling towers, water filter systems, fire protection systems, mining systems, coolant systems, and oils along with wastewater distribution and treatment components.
- *Recreational and Waterscape Applications* – These systems include theme parks, water features at hotels, swimming pools, etc and their related components such as valves, piping, meters and other hydraulic infrastructure.

Size of the Industry: Estimates for each industry segment follow.

- *Irrigation for Agricultural and Turf Systems* – Estimated U.S. market size is \$2.75 billion, and total worldwide market is estimated to exceed \$6.0 billion (as reported in “*Economic Future of the San Joaquin Valley*” by Collaborative Economics).
- *Municipal and Rural Water and Waste Systems* - Estimated U.S. market size is \$25+ billion and \$40+ billion worldwide, excluding dams and reclamation projects.
- *Industrial Fluid Applications* - Estimated U.S. market size is \$8+ billion and \$14+ billion worldwide.
- *Recreational and Waterscape Applications* - Estimated U.S. market size is \$1 billion and \$2 billion worldwide.

Growth Opportunities: The growth opportunities for these market segments are extensive. All markets will focus on water reuse, conservation, energy efficiency, and lower cost innovations. Water quality (salt to fresh) and water exploration technology will also be in the forefront of development.

Competitive Regions: The strongest competition for the San Joaquin Valley’s water technology industry will be from international sources. This is true for manufacturers in other parts of the state and nation, as well. Israel and Australia compete strongly in irrigation. Europe, Canada and Pacific Rim countries are leaders in municipal and industrial water and waste water systems. China, Mexico and other third world countries will play an increasing role in each segment as their low cost commodity capabilities allow them to become more cost effective.

Factors Affecting the National and Global Water Technology Industry: Not surprisingly, the issues affecting the national and global markets mirror those affecting the San Joaquin Valley industry, such as increasing pressures for water conservation due to environmental concerns, population growth, and development of underdeveloped areas. Water policy and politics will be at the forefront of factors affecting future technology as water becomes more precious. The prospects of significant drought in the next few years will further exacerbate the problem, as well as the trend in treating marginal quality water and having more stringent water quality regulations.

IV. Description of the International Center for Water Technology

A. Divisions and Services of the Center

The International Center for Water Technology will serve the San Joaquin Valley water and flow technology industry and facilitate advances in related technology worldwide through four major functions: (1) industry testing and certification through partnership with the Center for Irrigation Technology at Fresno State, (2) public policy and education, (3) cooperative marketing of the San Joaquin Valley water and flow technology industry, and (4) applied research and development. The International Center for Water Technology will join forces with Fresno State's already established California Water Institute to apply its expertise in the public policy arena as appropriate. In addition, it is likely that the International Center for Water Technology would become home of the Irrigation Association's western regional office.

To deliver services in the areas listed above, the International Center for Water Technology will be organized into four programmatic divisions with one administrative division. Each is described below.

1. Testing and Certification Division (i.e., Center for Irrigation Technology): The purpose of the Testing and Certification Division will be to provide the water industry with state-of-the-art testing and certification facilities and to conduct testing and certification on water technology equipment and applications in a timely and unbiased manner. The division will then communicate the results of conducted tests to water users, policy makers, manufacturers, contract customers, and other interested parties.

- ***Equipment Testing and Evaluation*** – The Center for Irrigation Technology (CIT) is the only independent laboratory in the United States specializing in testing and evaluating irrigation equipment. CIT will continue its testing and certification services for a wide variety of irrigation equipment, such as sprinklers, valves, drip emitters, micro-sprayers and sprinklers, drip hose, filters, pressure/flow regulators, backflow prevention devices, water meters, pipes, fittings, air and vacuum valves, soil moisture sensing devices, valve actuators, irrigation controllers, and specialized irrigation machinery. CIT also designs and implements non-standard testing procedures to meet specialized needs, provides large project product evaluation test services for selected end-users, and evaluates new technologies. Target customers for CIT's equipment testing and evaluation services include manufacturers (makers of irrigation and agricultural products, backflow prevention equipment, soil moisture monitoring and control systems, water filtrations testing, and water measuring and control devices) consultants, end-users, governmental organizations, and educational institutions.

Through the ICWT, the Center for Irrigation Technology will expand its services to include equipment testing and certification for municipal and wastewater, industrial and commercial, drainage, erosion, watershed applications, water treatment and process evaluation. Target customers for the expanded services include:

- All pump manufacturers and dealers for certification of pump performances that are required by some specifications and the Hydraulic Institute,
 - ISO standard testing for irrigation and general water/waste water components,
 - IAPMO testing services for approval agencies,
 - Backflow certification testing,
 - Contract certification project testing by end-users and governments,
 - Process performance evaluation.
- ***Development of National and International Standards*** – CIT conducts industry reviews of draft International Standards Organization (ISO) standards, summarizes results, and drafts the United States’ positions for transmittal to ISO. CIT also develops standardized testing procedures for equipment evaluations where applicable standards are lacking. Target customers for CIT’s Standards Development services are the Irrigation Association, American Society of Agricultural Engineers (ASAE), American Society of Civil Engineers (ASCE), and American Water Works Association (AWWA).
 - ***Project Consulting*** – CIT enjoys an international reputation for excellence and expertise in the irrigation industry. Principals from CIT will be available for individual consulting projects through ICWT. Demand for such consulting services is increasing in foreign markets, and few organizations exist that can respond to the demand with the depth and breadth of CIT’s experience. Target customers of consulting services include manufacturers, industry consultants, governmental organizations, international export centers, trade associations, and other educational institutions.

2. Public Policy and Education Division: The Public Policy and Education Division will inform the public and policy makers of the technical aspects of water issues and resulting consequences; educate governments, end users, designers, lending institutions and others in the proper design of water application systems in irrigation, municipal, and industrial water applications; and provide a center for continuing education for water industry personnel.

- ***Public Policy*** - Water policy impact studies and associated technical reports will be developed to provide policy makers with technical overviews of the wisdom and probable affect that potential water policy may produce. The expertise and technical consulting services will provide public policy makers with a water “think tank” resource to provide technical guidance in developing public water policy.
- ***Community Education*** – Through the already established Central Valley Water Education Center, the ICWT will provide general workshops and outreach sessions on water-related topics. Key constituencies for outreach will include civic leadership groups, other education entities (especially secondary grade levels), local government, and diverse industry groups. The Water and Flow Technology Exposition Center (see description below) will provide an excellent medium to educate varied groups on water and its related technology.

- **Academic “For Credit” Programs** – For-credit, executive-style programs will be developed to provide intense “water” education to laypersons and political practitioners who require an in-depth understanding of water from a technology and policy perspective.
- **Industry Professional Development, Training and Education** – A full spectrum of non-credit workshops, seminars, and courses will be offered through the International Center for Water Technology such as training in state-of-the-art water-related equipment, applications, design, and water and power conservation techniques.

The Center will also offer non-credit training opportunities for industry employees such as Irrigation Association certifications, backflow testing requirements, and other “certified tester” programs. The Center may also become a coordinator for industry apprenticeships and internships for municipal water and wastewater plants and distribution systems and agricultural and commercial irrigation systems.

In addition to industry-related training and education, the ICWT will also partner with other University colleges and institutes to offer general business seminars targeted towards the water and flow technology industry. For example, short courses on e-business and exporting would leverage University expertise and provide tremendous benefit to the industry. Assistance with CAD and CAM training offered by the College of Engineering and Computer Sciences would also be a great value to the industry.

- **Digital Learning Capacity** – The International Center for Water Technology truly anticipates a global reach for its programs and services. To facilitate education and learning opportunities worldwide, the Center is committed to leveraging University resources and, when necessary, acquiring state-of-the-art technology for video-conferencing and “web-ed” programs for anywhere, anytime learning.
- **Publications** – Through each of its activities, ICWT principals will seek publishing opportunities in both academic and industry publications. The published articles will be one source of content for ICWT’s Public Policy and Education Division.

3. Cooperative Marketing Division: A major function of the International Center for Water Technology will be cooperative marketing activities that primarily benefit the San Joaquin Valley Water Technology Industry by increasing water and flow technology usage worldwide. The marketing function will include four major strategies: development and operation of the Water and Flow Technology Exposition Center and on-site trade shows, development and implementation of an international advertising campaign targeting major customer groups, public relations and communications, and export assistance (see descriptions below). The Marketing Division will also be responsible for promoting the ICWT and the services it offers to target groups.

- **Water and Flow Technology Exposition Center and Trade Shows** – Envisioned as a state-of-the-art physical facility within the International Center for Water

Technology, the Water and Flow Technology Exposition Center will be a permanent, year-around trade show that displays the latest water technology equipment, applications, and services. Industry members will pay an annual fee to display their technology in the exhibit space, which will include special sections for:

- Industrial equipment and applications;
- Municipal water and waste water exhibits;
- Irrigation, agricultural, turf, and mining applications;
- Drainage and erosion control technology;
- Water, energy-related, and environmental conservation and preservation; and
- Recreational and waterscape exhibits.

The Water and Flow Technology Exposition Center will be the *only location in the world* where every component of water and flow technology is displayed in one location. Visitors will be able to view the various technological devices and understand how each component works together in integrated water systems. Such an exhibit will be a magnet for attracting worldwide attention to the San Joaquin Valley's water and flow technology industry, especially considering the increasing need for public and private entities to implement water-conserving technologies.

In addition to accommodating tour requests from various external groups, the Marketing Division will proactively seek and coordinate special engagements with targeted client groups (see description of Export Assistance below).

When ICWT is operating at full capacity, it will host two, semi-annual trade show-conferences, which will include highly visible plenary speakers, technology demonstrations, and educational workshops. The Save Mart Center would serve as an ideal location for such events.

- ***International Marketing Campaign*** – On behalf of the San Joaquin Valley Water Technology Industry, the ICWT will oversee the development and implementation of an international print advertising campaign that brands and promotes San Joaquin Valley water and flow technology. Industry publications will primarily be targeted, but for maximum effectiveness several, more general business publications will be used to communicate to a broader audience the capabilities of the Valley's water technology industry.
- ***Public Relations and Communications*** – The ICWT will rely heavily on public relations and communication strategies to add value to its member firms and provide maximum awareness of the ICWT, the San Joaquin Valley Water Technology Industry, and in general, the benefits of water technology.

The primary public relations and communications activities will include:

- Development of major web presence that includes (1) an online clearinghouse of information related to water technology, such as industry publications,

academic papers, and potentially a database of patents related to water technology products; (2) a database of member firms' products; and (3) general information about water technology and the industry.

- Development of a media relations program that provides a continuous stream of water news to interested media outlets and governmental entities worldwide.
- Participation in targeted association trade shows and development of related collateral materials.
- Development of a member communications program (primarily electronic) that updates members of ICWT activity and opportunities.
- **Export Assistance** – The ICWT will provide two forms of export assistance to member firms. First, the ICWT will initiate and coordinate trade and reverse trade missions through the Water Technology Exposition Center. Second, the ICWT will partner with other business assistance programs in the San Joaquin Valley such as the Fresno City College Export Center and the University Business Center to deliver technical assistance in exporting to member firms. Technical assistance will include both one-on-one consulting, as well as group workshop formats. General assistance will be provided for free to members. Specific consulting services, such as market research and development of company-specific export programs, will be provided on a fee-basis.

4. Applied Research and Development Division: The R&D Division of the ICWT will incorporate current research activity of the Center for Irrigation and Technology, as well as expand its focus to include research and development for municipal and industrial water systems. All of these activities will focus on the water/energy conservation, availability, and recycling aspects of water usage.

Additionally, the R & D Division will provide the services to facilitate new private and public innovations. Other University resources such as the College of Engineering and Computer Science, its Engineering Technology Transfer Center, the Lyles Center for Innovation and Entrepreneurship, and the Central Valley Business Incubator can be leveraged to provide technical and engineering assistance to industry members wishing to take a new product concept from the idea stage to commercialization.

Several of CIT's current research projects are described below.

- **Integrated Management of Irrigation and Drainage Systems** – On the west side of the San Joaquin Valley, CIT is conducting research to confront the issue of saline drainage water containing selenium, boron, arsenic, and other potentially toxic elements.
- **Evaluation of Lagoon Buffers** – CIT is conducting research to evaluate lagoon buffers as the best management practice for dairy effluent streams. The purpose of

the study is to improve the health of the lagoon water by managing pH and oxygen levels.

- **Rapid Assessment of Canal Seepage** – This project utilizes electro-magnetic inductance instrumentation (EM) to “look” below the surface of the soil for wet spots down to 20 feet. The project hopes to develop cost/benefit options for canal and reservoir lining in order to promote water conservation.
- **Wastewater Treatment** – This project is designed to monitor and utilize wastewater outflow from a food processing plant.
- **Air Injection** - The project is designed to inject air into a buried drip irrigation system to improve plant health. Preliminary results indicate yield increases exceeding 30 percent.

ICWT’s research and development will be both academic and commercial in its pursuit. The ICWT will annually support academic studies on topics of interest to the water technology industry through internal and/or grant funds. In addition, ICWT will seek sponsored research opportunities within the industry.

5. Finance and Administrative Division: Finally, the ICWT will include a financial and administrative division that will provide the executive management and operating control for the ICWT and its divisions. The Finance and Administrative Division will be responsible for grant/fund development and related administration, coordination of annual business plans for each division, operational budgets and other financial controls for each ICWT division, and personnel administration.

B. Key Stakeholders

Collaboration is a key theme in the development of the concept of the International Center for Water Technology. Discussions for the Center began with industry members who were looking to compete more effectively in the global marketplace by working together to address common problems and opportunities, such as development of a strong workforce, industry advocacy, collaborative marketing and technology development. Successful development and operation of the ICWT will require collaboration among several primary stakeholders.

1. Industry Stakeholders: The San Joaquin Valley Water Technology Industry Cluster is the driving force behind the development of the ICWT. It consists of approximately 25 businesses from Kern, Fresno, Madera, and San Joaquin Counties. The Cluster meets on a regular basis and has convened a working committee to further develop the concept for ICWT and provide progress reports to the larger group. The Cluster will provide invaluable insight on the effective development and deployment of all of the services described above, will be one of the primary customers of the Center, and will play a major role in the initial and ongoing fundraising efforts for the Center.

Another key industry stakeholder is the Irrigation Association, the international trade association for irrigation. The San Joaquin Valley Water Technology Industry Cluster will partner closely since most cluster members are also IA members. The ICWT and IA are likely to co-sponsor and mutually endorse events. ICWT will also work closely with

other trade associations to represent the San Joaquin Valley Water Technology Cluster and accomplish its objectives. Such associations include the California Irrigation Institute, Hydraulic Institute, Urban Water Use Council, Ag Water Management Council, Farm Water Coalition, American Water Works Association, American Society of Sanitation Engineers, American Society of Civil Engineers, American Society of Agricultural Engineers, American Society of Testing and Materials, American Society of Irrigation Consultants, American Society of Landscape Architects, and other professional organizations.

2. **University Stakeholders:** ICWT will rely heavily on partnerships with Fresno State colleges and institutes such as CIT, the California Water Institute, College of Agricultural Sciences and Technology, College of Engineering and Computer Science, the Engineering Technology Transfer Center, Sid Craig School of Business, University Business Center, Lyles Center for Innovation and Entrepreneurship, Central California Futures Institute, Central Valley Business Incubator, Interdisciplinary Spatial Information Systems, San Joaquin Venture Partners, and the California Agricultural Technology Institute. We believe that ICWT will be able to offer substantial benefits to industry members through its own expertise and through the leveraged expertise of each of the above campus entities. In addition, we believe that ICWT will expand opportunities for each of its campus partners.

The ICWT will seek partnerships with other academic partners such as the other agriculturally-based California State University campuses (Humboldt State, Cal Poly San Luis Obispo, and CSU Chico), UC Riverside, UC Davis, and UC Merced.

3. **Regional/Community Stakeholders:** The ICWT will provide both economic and environmental benefits to the San Joaquin Valley. There are numerous economic and community organizations that support complementary missions that will be valuable partners. Economic development and other community organizations identified as key stakeholders include all of the county economic development corporations (specifically Fresno, Madera, Kern, and San Joaquin counties), the California Central Valley Economic Development Corporation, Central Valley Water Awareness Committee, Edison Ag TAC Center, Friant Garden and Water Education Center, Trickle “L” Drip/Micro Forum, Westside Resources Conservation District, and the San Joaquin River Parkway Trust.

The Great Valley Center will also be a significant stakeholder in the International Center for Water Technology since its report, “The Economic Future of the San Joaquin Valley,” first advanced the concept of a precision irrigation industry cluster, which led to the establishment of the San Joaquin Valley Water Technology Industry Cluster.

4. **Elected Officials and Public Agencies:** Support from state and U.S. representatives will play a critical role in the launch of the International Center for Water Technology. United States Senators Diane Feinstein and Barbara Boxer, Congressmen Cal Dooley and George Radanovich, California Senators Jim Costa and Charles Poochigian, and

Assemblypersons Reyes, Flores, and Briggs represent the Fresno area in their respective offices.

State and U.S. public agencies that are considered to be key stakeholders in the development and operation of the ICWT are the California Department of Water, United States Bureau of Reclamation, CALFED, California Energy Commission, United States and California Environmental Protection Agency, Department of Pesticide Regulations, and the State Water Quality Control Board.

C. Description of Proposed Physical Facility and Location Alternatives

The vision for the International Center for Water Technology includes a physical, state-of-the-art facility that will accommodate a permanent technology exposition (approximately 6,000 – 8,000 square feet), office space for the ICWT divisions and other interested campus and community partners, office space for the Irrigation Association Western Division headquarters, conference room, training and video conferencing facility (approximately 2000 – 3000 square feet), and ample parking. A detailed description of the physical facility is beyond the scope of this initial business plan. As the project moves forward, detailed plans will be developed.

Ideally, the ICWT would be located on the campus of Fresno State in order to bring maximum value to the University community and to leverage the resources of the Save Mart Center. Campus alternatives need to be identified. Off-campus location alternatives include the Clovis Research and Technology Park, the Fancher Creek development, and the Edison Ag TAC facility in Tulare County.

D. Staffing Plan

Full operation of the ICWT will require the staff support described in the table below. However, the ICWT is not expected to operate at full capacity for three to five years beyond construction, and staffing requirements will be scaled accordingly.

Position Title	Summary of Position	Number/ Designation	Reports To
CEO	Overall responsibility for development and operation of the ICWT	1/Management	Provost and Board of Directors
Director of Testing and Certification Programs	Continue existing CIT equipment testing and evaluation services; expand services into new market niches	1/Management	CEO
Testing and Certification Technicians	Operate equipment testing and evaluation services; implement standards testing projects	2/ Staff	Director of Testing and Certification

Director of Marketing and Member Relations	Overall responsibility for advertising campaign, web site, media relations, on-site and off-site trade shows, member relations, and export assistance programs	1/Management	CEO
Communications Coordinator	Development and management of web site; coordination of media relations, trade show participation, and member communications	1/Staff	Director of Marketing and Member Relations
Director of Public Policy and Education	Overall responsibility for public policy activities, including policy studies, development of credit and no-credit education programs, and publications.	1/Management	CEO
Education Coordinator	Coordination of professional development and other training opportunities (including export programs) for the cluster and community education	1/Staff	Director of Public Policy and Education
Director of Research and Development	Provides overall direction for research; liaison between University and industry research partners	.5/Faculty	CEO
Director of Finance and Administration	Overall responsibility for all administrative and organizational functions, including finances	1/Management	CEO
Assistant to Director of Finance and Administration	Administrative support and management of facility, including Water Technology Exposition Center	1/Staff	Director of Finance and Administration
Fundraising Coordinator	Development and coordination of grant and contribution proposals	1/Staff	Director of Finance and Administration
IT Manager	Network support for ICWT	.5/Staff	Director of Finance and Administration
Receptionist/Clerical Support	General receptionist duties and other clerical support	1/Staff	Director of Finance and Administration
Total Management and Staff at Full Operation:		12.5	
Total Faculty at Full Operation:		.5	

E. Management Structure Alternatives

1. **University Model:** Within the University-based management structure, Fresno State would “own” and manage the International Center for Water Technology. The University would take primary responsibility for fundraising, hiring and managing personnel, building and managing the facilities, and creating and implementing programs and services. The governance structure would involve a board of directors from the private sector and an executive committee responsible for Center oversight. However, ultimate responsibility and, therefore, authority would rest with the University. The advantages to the University model are:

- **Funding** - Funding from government grants, contracts, and special allocations is more accessible because of the overall “education” mission of the University and its neutrality.
- **Expertise** – Through the Center for Irrigation Technology and other, related programs, the University has the intellectual capital necessary to develop the programs and services of the ICWT.
- **Program Leveraging** – There are several other programs at Fresno State that would add tremendous value to the ICWT effort, such as the California Water Institute, engineering and industrial technology expertise, computer sciences, international and electronic business, venture capital, and innovation and entrepreneurship. If the ICWT is housed at Fresno State, those programs are more easily accessed.
- **Infrastructure** – The University already operates similar public-private partnerships and has the necessary management, financial, technology, plant operations, and administrative systems in place.
- **Neutrality** – Because some of the Center’s activities will include cooperative marketing efforts, it is important to have a neutral, third party that is leading those marketing efforts and ensuring that they are fair. The University has an established track record within the industry for providing unbiased, neutral leadership.

The disadvantages to the University model are:

- **Industry Input** – The ICWT will only be successful if it includes the active involvement of members of the San Joaquin Valley Water Technology Industry Cluster, especially in the areas of fundraising, educational programs, and cooperative marketing. The University model has the potential to become University-centered, which might inadvertently exclude as much industry input as is needed.
- **Organizational Culture** – It is important that the ICWT develop an entrepreneurial culture so that it can fulfill its sizeable mission and take advantage of the opportunities in the marketplace. An entrepreneurial culture is nimble, aggressive, fast, and rewarding of risk-taking. Because of its size and lengthy history, the University has an established culture that would not necessarily prevent the ICWT from operating in an entrepreneurial fashion, but it may occasionally present obstacles for staff.

2. **Industry Model:** Within the industry model, the San Joaquin Valley Water Technology Industry Cluster would “own” and take ultimate responsibility for the development and operation of the ICWT by forming a non-profit corporation and governing board of directors. Since it is unlikely that industry volunteers will have the time necessary to fully develop and operate the

ICWT, we assume that the non-profit corporation would then enter into an agreement with Fresno State and essentially “outsource” the development and operation of the ICWT to the University. The agreement would specifically articulate the roles and responsibilities of the industry and the University. The advantages of the Industry Model are:

- **Industry Involvement** - By definition, this model would require maximum industry involvement, which is critical to the success of the Center.
- **Industry Governance** - With the University model described above, industry input may be valued, sought and included, but the University would ultimately be responsible for the governance issues. With the Industry Model, it may be possible to utilize University resources through a contractual agreement while ultimate responsibility and authority rests with the non-profit corporation.

The disadvantages of the Industry Model are:

- **Lack of Infrastructure and Capacity** - An industry-led model puts a tremendous burden on volunteers to fully develop and operate the ICWT. Even if the University is contracted with to be the “implementation partner,” much effort will still be required of volunteers to organize, formalize, manage the contractual relationships, and govern the center.
- **Confusion of Roles** - Because little organizational infrastructure exists within the San Joaquin Valley Water Technology Industry Cluster, the University would be heavily relied upon to develop and operate virtually all functions of the Center. Management and faculty working for the Center would be in the awkward position of answering to multiple supervisors (University and industry-led board of directors).
- **Funding Restrictions** - Even within an industry-led model the University would need to be involved to secure funds through government grants, contracts, and special allocations. The management of those funds would likely remain with the University since (1) the non-profit corporation would not want to assume the risk of managing government funding, and (2) it would be very difficult (and in some cases impossible) to transfer government funds to the non-profit corporation that were allocated to Fresno State. The University would then be ultimately responsible for the management and implementation of any public funds.
- **Neutrality** - If the ICWT is “owned” by the industry and operated by the University, there is less neutrality than the University model, which may present problems related to the cooperative marketing efforts.

3. Recommendation: Based on the above analysis, the University model is recommended. To mitigate the potential disadvantages of the University model, the following actions should be taken. First, an advisory board should be established to guide the development and operation of the ICWT. The majority of the advisory board members should be private industry members. Second, a small Executive Committee of the advisory board should be developed with two appointments made by the University president and two elected by the industry. The Executive Committee will assume responsibility for oversight and implementation of the advisory board’s direction with the concurrence of the University president. Third, it should be emphasized to industry members on the advisory board and within the San Joaquin Valley Water Technology

Industry Cluster that their input is critical to the success of the organization and that it is their responsibility to proactively offer input on the guidance of the Center. Finally, to provide as much flexibility as possible and because of its interdisciplinary nature, it is recommended that the ICWT be a freestanding entity on campus reporting directly to the Provost.

V. Benefits of the International Center for Water Technology

A. Benefits to the Region - Economic Development for the San Joaquin Valley

The San Joaquin Valley's chronic double-digit unemployment and low per capita income are well documented. Counties within the San Joaquin Valley are literally among the poorest in the United States. The Valley's historically poor economic conditions coupled with the New Economy's emphasis on innovation-driven economic competitiveness (as opposed to population and cost driven economic strategies) has created a new sense of urgency to transform the Central Valley.

1. Water and Flow Technology – A Strong Regional Asset for New Economy Activity:

The San Joaquin Valley's water and flow technology represents an excellent building block for new economy activity in the region. A higher concentration of water and flow technology firms exists in the San Joaquin Valley than anywhere else in the United States. The water and flow technology manufactured in the San Joaquin Valley rivals or exceeds the technology produced in other parts of the world. The intellectual capital needed to support the water and flow technology industry (both University and private service providers) is more developed and concentrated in the San Joaquin Valley than any other area within California and the rest of the U.S. The industry provides excellent career ladders from entry-level positions with promotion opportunities to positions requiring four-year college and graduate degrees. Because of the increasing need to manage water more wisely in agricultural, commercial, and municipal settings, the water technology industry is poised for substantial growth, especially in global markets. For these reasons and many others, fostering the growth and expansion of the San Joaquin Valley Water Technology Industry Cluster is a sound economic development strategy.

2. Development of Regional Identity: The proposed International Center for Water Technology and all of its programs and services represent the largest and most comprehensive effort in the world to promote and develop water and flow technology applications. The Center would be the focal point of numerous national and international tours and with a concerted effort, local, national, and international media. Such attention from visitors and the media would establish the San Joaquin Valley as the world's center for water and water technology development and applications. Just as San Diego is known for biotechnology and the Silicon Valley is known for information technology, the San Joaquin Valley can and should become known for its leadership in water and flow technology.

3. Enhanced Business Attraction Efforts: Business attraction is a fundamental component of regional economic development. Members of the San Joaquin Valley Water Technology Industry Cluster can be a great source of leads for other manufacturers and suppliers that would relocate to the area if it were the undisputed, central location for water technology. In fact, a major water technology manufacturer has already indicated his interest in exploring relocation opportunities in the Valley since he learned of the development of the industry cluster.

4. Research and Development Opportunities for the Valley: Support for the water technology cluster and the ICWT would provide genuine research and development opportunities for the Valley that do not currently exist. In other Valley industries, the high-value

R&D functions are outsourced to other metropolitan areas. As a result, the intellectual capital, public and private R&D funding, and spin-off opportunities leave the area, as well. Since the level of research and development activity is a frequent measure of regional prosperity, water technology R&D would be a substantial regional asset.

B. Benefits to the University

The International Center for Water Technology would provide several benefits to the University community. First, the Center would capitalize on and provide growth opportunities for some of the University's strongest programs, such as agricultural sciences, engineering, irrigation technology, and business and entrepreneurship applications. Second, it would enhance University-industry collaborations, which lead to better educational programs, job opportunities for graduating students, and endowment opportunities. Third, the ICWT would provide enhanced learning and training opportunities for students of all varieties. Finally, the University's image would be enhanced with local, state, national, and international audiences as a world leader in water and flow technology.

C. Benefits to the Industry

The most immediate benefit to the industry is increased exposure through marketing programs (advertising, trade and reverse trade missions, trade shows, and enhanced media and public relations) resulting in increased sales. The intermediate and long-term benefits are research and development activities resulting in new product opportunities; improved conditions of the workforce through the apprenticeship, internship, and worker certification programs; and improved representation in public policy arenas.

D. Advancement of Environmental Benefits - Water Conservation:

Advancement of water-conserving technologies such as those developed by the water technology industry have great appeal to citizens, community groups, public agencies, and elected officials who are concerned with preserving and conserving water for environmental purposes. This cross-section appeal of the water technology industry will assist in the funding and development of the ICWT.

VI. Implementation Plan

The following implementation plan is a rough outline of the steps we believe need to be taken to launch the development of the ICWT. The plan lacks input from persons experienced in developing and managing a capital campaign and building project. We submit it for initial consideration and will seek input from representatives with such expertise.

A. Phase I – Months 1 through 6:

- Finalize the business plan.
 - Circulate plan to Technology Collaboration Committee of the water cluster and incorporate feedback.
 - Circulate plan to campus development team and incorporate feedback.
- Seek formal approval to move forward.
 - Present to Drs. Welty and Ortiz.
 - Present plan to water cluster at September meeting.
- Create and convene advisory board, including industry and University representatives.
 - Advisory board drafts bylaws, including membership policies.
 - Advisory board drafts industry-University partnership agreement.
 - Advisory board develops fundraising strategy.
- Begin facility discussions.
- Develop operational budget.

B. Phase II – Months 7 through 12:

- Formally hire CEO of the ICWT.
- Rough outline of facility plans and corresponding capital budget developed.
- Basic collateral material developed.
- Begin implementation of fundraising strategy.
- Location options identified and analyzed.
- Develop rollout plan for delivery of ICWT services.
- Formal presentation of concept to key stakeholder groups (see list identified in Section IV.B.)

C. Phase III – Months 12 through 18:

- Fundraising campaign in full motion.
- Location finalized.
- Facility plans finalized.
- Begin expansion of industry services and begin membership campaign to promote those services.
- Hire additional staff (positions TBD).

D. Phase IV – Months 18 through 24:

- Fundraising continues.
- Membership services continue to expand.
- Additional staff hired as needed.

E. Phase V – Months 24 through 30:

- Fundraising complete.
- Construction process begins.

VII. Funding Prospects

A. Capital Campaign

Because of the multiple and diverse public benefits the ICWT will contribute to the San Joaquin Valley (i.e. potential for job creation, workforce training, increases in exporting, environmental preservation, and energy conservation), we believe the project has great potential to receive public funding from key agencies and special state and federal allocations. In fact, we anticipate that approximately 80% of the total capital campaign can be raised through public funds. The remaining portion of the funding will be sought from the industry. Because of the close involvement of 20+ of the Valley's largest manufacturers in the development of the ICWT, we believe the likelihood of raising those funds is very strong. In addition, there are some very large firms in the water technology industry outside the San Joaquin Valley that have close connections with local industry members. Those firms will be approached, as well.

B. Operational Capital

The Center for Irrigation Technology has proven that there are substantial grant opportunities for the operation of programs related to water technology. The ICWT will rely on grant monies for portions of the testing and certification, education and outreach, export assistance, and research and development services. The remaining portion of the operational budget will be developed through fee-based services, conferences and trade shows, and annual membership fees.

A detailed fundraising strategy and operational budget are targeted for completion in Phase I of the project (see Implementation Plan, Section VI).

VIII. Conclusion

The International Center for Water Technology is one of the most promising projects in the San Joaquin Valley for meaningful, innovation-driven economic development. Even though it is only a concept at this point, there are many valuable assets that can be leveraged to develop the Center, such as an existing center with a 20 year history of adding value to the precision irrigation industry (Center for Irrigation Technology), an already established, state-recognized center for water policy (California Water Institute), the backing of the private sector (San Joaquin Valley Water Technology Cluster), risk capital specifically dedicated to Agri-technology (San Joaquin Venture Partners), a political climate that is supportive of water- and energy-conserving technologies, a global market that is exploding with expansion opportunities for the industry, and local economic development and other officials who understand the importance of the Water Technology Cluster to improved economic conditions in the San Joaquin Valley.

As mentioned in the Executive Summary, the San Joaquin Valley has the opportunity to become the undisputed, global leader in water and flow technology. Multiple benefits will flow to the San Joaquin Valley in the process such as job creation through industry expansion and enhanced business attraction efforts, attraction and retention of intellectual capital through research and development activities, influence on public policy in water-related areas, and the development of a regional identity for dominance in a knowledge-based industry.

Identifying the opportunity is a first and important step, but the far greater challenge of implementation is before us. ***To begin to meet the challenge, we request formal approval from the University and the San Joaquin Water Technology Cluster to aggressively move forward, and we request the assignment of University personnel with expertise in capital campaigns and facility planning to this effort.*** With those elements in place, we will move forward on the Implementation Plan and look forward to realizing the potential of the International Center for Water Technology.

Appendix A
ICWT Organizational Chart



International Center
ICWT
Water Technology



Provost

Board of Directors

Board Exec. Comm.
2 CSUF appointments
2 industry appointments

CEO

Director of Testing
and Certification Programs

Director of Marketing
and Member Relations

Director of Public Policy
and Education

Director of R&D

Director of Finance
and Administration

Testing/Cert. Tech

Testing/Cert. Tech

Communications
Coordinator

Education
Coordinator

Asst. to Director
of Finance

Fundraising
Coordinator

IT Manager

Receptionist/
Clerical

Appendix B
“Economic Future of the San Joaquin Valley”
Executive Summary

THE ECONOMIC FUTURE OF THE SAN JOAQUIN VALLEY

EXECUTIVE SUMMARY

JANUARY 2000

Growing a Prosperous Economy That Benefits People and Place



NEW VALLEY
CONNEXIONS

PREPARED BY
COLLABORATIVE ECONOMICS FOR
NEW VALLEY CONNEXIONS
*A Partnership of the Great Valley Center
and the Office of Strategic Technology,
California Trade and Commerce Agency*



About This Report

This report is part of The New Valley Connexions program of the Great Valley Center in partnership with the California Trade and Commerce Agency, Office of Strategic Technology. The Great Valley Center is a regional resource to help people successfully manage growth and change in the Central Valley. The purpose of the research grant was to “identify opportunities to grow technology-based clusters in the San Joaquin Valley in order to make the Valley more competitive, enhance its base of agriculture and natural resources, attract compatible investment, and improve the quality of life.” The report was prepared by Collaborative Economics, strategic advisors to civic entrepreneurs, based in Palo Alto, California.

The document is intended to stimulate discussion and catalyze action. The Great Valley Center and Collaborative Economics welcome your comments and further suggestions.

The San Joaquin Valley Region

Counties: Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare

Total area: 27,280 square miles; 17% of the land area of California

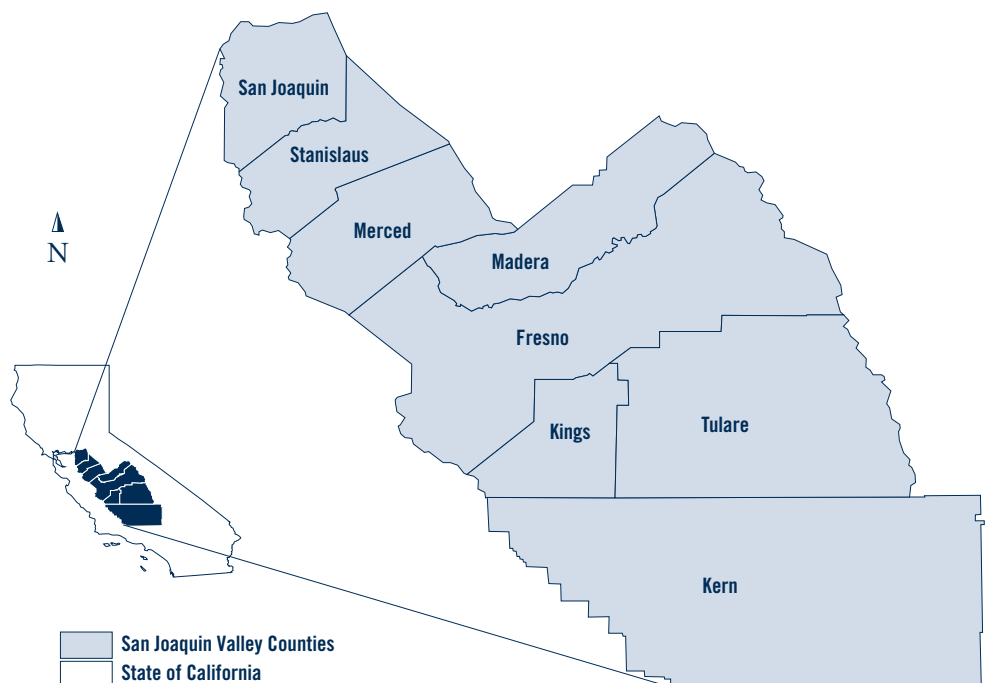
Total population: 3.3 million; 10% of California’s population

Ethnic composition: 53% white, 34% Hispanic, 8% Asian/Pacific Islander, 4% African American, and 1% Native American

Age distribution: 0–9 years old, 18%; 10–19 years old, 16%; 20–44 years old, 36%; 45–64 years old, 19%; 65+ 10%

Adult educational attainment: 66% are high school graduates; 14% have bachelor’s degree

NEW VALLEY CONNEXIONS PROJECT AREA: THE SAN JOAQUIN VALLEY





Executive Summary

The Great San Joaquin Valley. The richest agricultural region in the world. The low-cost place to live in California. Crossroads of California history. The next California frontier. Home to some of California's oldest families. Home to the newest and youngest Californians. A place that has changed slowly in the past decades. A place that could change beyond recognition.

The San Joaquin Valley is critically important to California and to the nation, as well as to the people who live there. The San Joaquin Valley is growing at a faster rate than the State. The region accounts for 50% of the state's agricultural output. It is vast, spanning more than 250 miles in length and accounting for 17% of the state's land mass.

In many ways the region is a microcosm of the challenges, opportunities, and dichotomies facing the state, played out across a vast expanse of land marked by both large urban centers and diffuse rural settlements. How to make the new demographics work, how to ensure sensible development patterns, where to house the next 10 million people, how to develop next-generation leaders—all have been the subject of intense speculation, research, and debate.

Yet it is the economic opportunities in the Valley that will in the long run shape these societal challenges and the context for addressing them. This report and the research underlying it examine two questions:

- What can be the economic future of the San Joaquin Valley?
- How can the region achieve that future?

Whereas others have pointed out the problems in the San Joaquin economy, this report looks explicitly at opportunities—opportunities that are achievable in the next 10 to 20 years, that build on the best assets and traditions the region has to offer, that fit with global business trends, and that will benefit companies and communities, people and place.

This report paints an achievable vision of a San Joaquin Valley economy rooted in innovation, where people and companies compete globally by continuously improving products, services, and processes. It identifies six cluster opportunity areas that can emerge as strong drivers of the regional economy and can gain national and international prominence. It argues that this economic evolution can result in economic prosperity, growth of a broad and upwardly mobile middle class, and an increasingly vital and interesting quality of life. It points out the emerging signs that the San Joaquin Valley already is poised to become a key regional player in California's new economy. And it outlines strategic recommendations for achieving these goals.

California's "New Economy"

The San Joaquin Valley is one of several major economic regions constituting the state of California. From 1994 to 1996, the California Economic Strategy Panel researched the fundamental economic change taking place statewide and identified a "new economy" transforming California's regions. The panel's report, *Collaborating to Compete in the New Economy*, defined and described this new California economy.



What Is the New Economy?

To many people's surprise, the new economy is not a set of new industries. Rather, the new economy is about all industries competing in fundamentally different ways. It is not just about "high tech," but about applying new ways of doing business to a wide range of products, services, and sectors. Activities in the new economy share some characteristics. The new economy is fast, global, knowledge based, networked, and technology-intensive.

- **Fast.** Time is market in the new economy. Companies compete to develop and produce innovative products and services faster than their competition.
- **Global.** New economy companies operate and sell globally and compete against foreign competition.
- **Knowledge based.** The knowledge and know-how of employees are essential to the success of new economy companies.
- **Networked.** New economy companies specialize in what they do best and develop relationships with partners, suppliers, and subcontractors to do the rest. They tap into information and innovation networks to stay abreast of change.
- **Technology-intensive.** Companies in the new economy create, adapt, and use technology—simple as well as sophisticated—to improve products and processes constantly.

What these characteristics boil down to is innovation. To compete today, companies have to innovate continuously. They must develop better products and services faster than the competition. The new California economy is an innovation-based economy. This characterization is true from apparel to agriculture, from timber to telecommunications, from light industrial manufacturing to software.



Joining the New Economy

The San Joaquin Valley can and must join the new economy. Doing so will entail a shift in how the San Joaquin Valley and its companies compete. Instead of competing primarily on low cost, more and more companies must compete on high productivity and serve increasingly sophisticated and demanding markets.

This transition is already under way, but must be nurtured and accelerated. Some signs of the new economy:

- World Color in Merced, whose flexible high-tech production process allows it to meet national demand for customized printing products
- Farmington Fresh in Stockton, whose innovative packaging provides value-added food products to the national and Asian marketplace
- Skylynx Communication in Fresno, whose innovative wireless technology is providing Internet services to growing technology-based businesses in the San Joaquin Valley and beyond.

Despite some emerging signs of the new economy, the current path of the San Joaquin Valley economy is based on population and cost-driven growth. People from Mexico, California, and other states and countries have been moving to the Valley, attracted to its relatively low living costs, and the population is expanding rapidly because of high birth rates. From 1990 to 1999, population in the San Joaquin Valley increased 22%. And an additional 885,000 people are likely between 1999 and 2010. Population growth has spurred job growth in people-serving industries, such as housing construction and retail. This activity creates the appearance of economic vitality.

The shortcoming of a population-driven strategy is that it does not lead to a rising standard of living and long-term vitality. Despite this rush of construction and retail activity, job growth has lagged labor force growth since 1990. And employment growth has actually led to a declining standard of living. Per capita income declined from \$19,800 to \$18,950 in real terms between 1990 and 1997. Sunbelt states such as Arizona and Florida experienced this phenomenon in the 1980s, when population and job growth actually resulted in a lower standard of living and the population-induced boom was not sustainable.

Just as people are attracted to the Valley's low costs, so are companies. The region has attracted companies to its growing supply of low-skilled, low-cost labor and relatively inexpensive land. Although this activity can provide a platform for future growth, competing primarily on low cost and routine production is ultimately a losing proposition. In a global economy, another lower-cost location will always develop. The southern U.S. states learned this hard lesson when they attracted textile mills from New England in the 1980s, only to see them relocate to lower-cost Caribbean locations in the 1990s. In addition to this vulnerability factor, a strategy of keeping costs low will keep household incomes low. The current path of population and cost-driven growth is flawed in the long run; it cannot lead to sustained increases in standard of living and broad-based economic vitality.

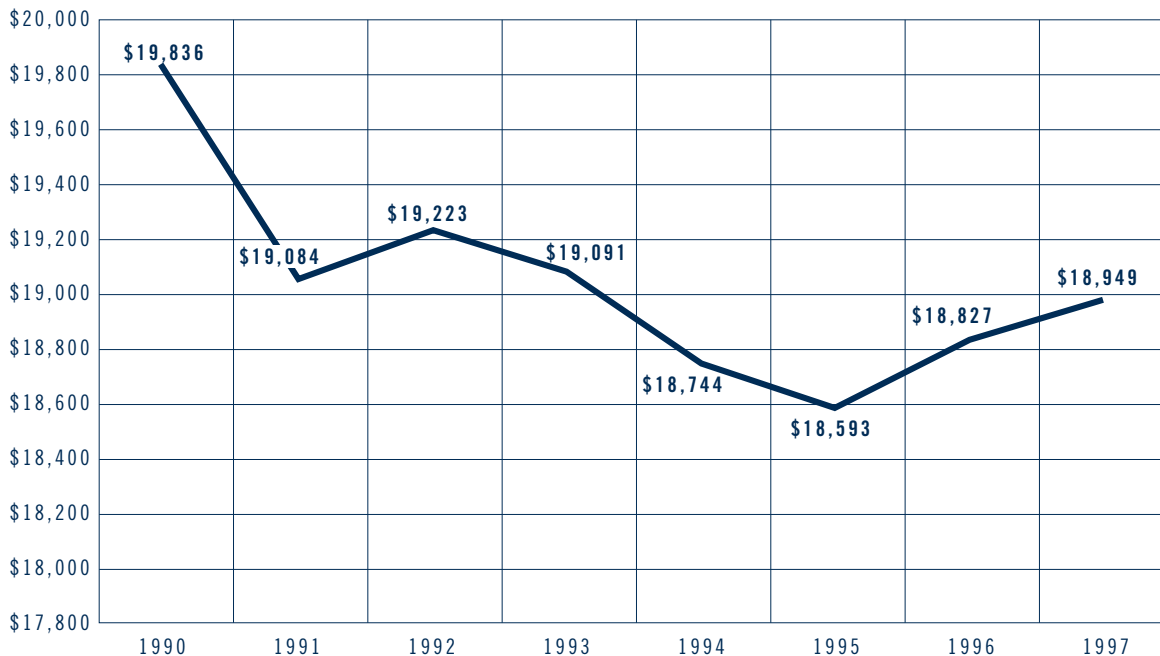
True economic vitality over the long run requires developing significant outward-oriented sectors that compete on innovation and that serve sophisticated state, national, and international markets. These driving industries will pay strong wages and provide a sustained stimulus to the growth of local-serving sectors such as retail, services, and construction.



Models of Economic Growth

	DRIVERS OF GROWTH	REGIONAL OUTCOMES
<u>Population-Driven</u>	<ul style="list-style-type: none"> ■ Population growth ■ Attraction of low living costs ■ Local markets to serve 	<ul style="list-style-type: none"> ■ Veneer of vitality ■ Short-term/boom-and-bust cycles ■ Declining standard of living
<u>Cost-Driven</u>	<ul style="list-style-type: none"> ■ Companies attracted to low-cost labor ■ For routine production, services 	<ul style="list-style-type: none"> ■ "Move-on" syndrome ■ Wage increases, which put region at risk
<u>Commodity-Driven</u>	<ul style="list-style-type: none"> ■ Natural resource availability ■ Global commodity markets to serve 	<ul style="list-style-type: none"> ■ Possibility of cycles ■ Declining direct employment
<u>Innovation-Driven</u>	<ul style="list-style-type: none"> ■ Value creation ■ Product differentiation ■ Increased productivity ■ Sophisticated global markets to serve 	<ul style="list-style-type: none"> ■ Rising standard of living, income mobility ■ Resilience ■ Diversification

San Joaquin Valley Per Capita Personal Income (1998 dollars)



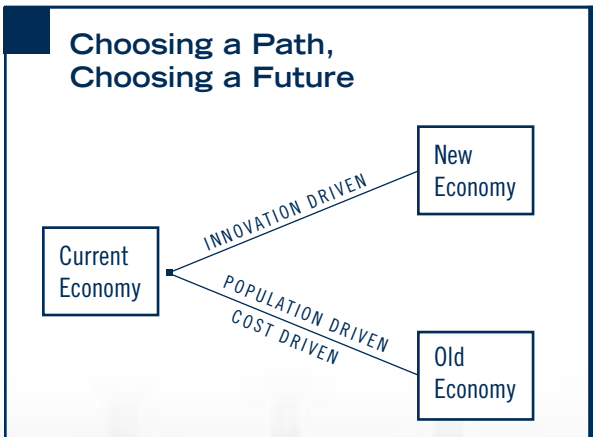
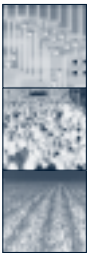


The current outward-oriented driver of the San Joaquin Valley is agriculture production. Farming accounts for 12% of the region's gross product and 8% of its employment base. A major finding of this report is that production agriculture does have many features of the new economy. It has shifted from basic to specialty crops, enjoys rising productivity, and is a major integrator of technology—biotechnology, information technology, spatial technology. And certainly farming has stimulated a host of local support industries: distribution, engineering, business services.

Yet, as the primary driver of the regional economy, agriculture production has two fundamental weaknesses. First, direct employment is declining, as farms substitute technology for labor. Second, reliance on agriculture alone subjects the region to the vagaries of global commodity markets and agriculture labor markets, absent counterbalancing economic activities.

The long-term challenge facing the San Joaquin Valley is to develop a broader portfolio of outward-oriented industries that provide opportunities for more people to earn a higher standard of living. Achieving sustained increases in prosperity requires rising productivity. Productivity growth is the basis for rising real wages for workers and consequently, for a rising standard of living over time. The way to increase productivity is to find new, more highly valued ways to leverage natural, human, and capital resources.

The Valley needs to evolve toward high-value manufacturing and service activities that compete on new economy factors: innovation, speed, global perspective, knowledge, networks, flexibility, technology. Employment in these outward-oriented, innovation-based industries must grow faster than population growth and the industries must become a more dominant driver of employment and revenue in the San Joaquin Valley.



Envisioning the Economic Future

The research underlying this report addressed the question, “What is a desirable and achievable economic future for the San Joaquin Valley?”

The research approach included quantitative economic analysis, interviews with more than 100 Valley companies and leaders, and research on industry, market, and technology trends.

The research approach rests on several key principles:

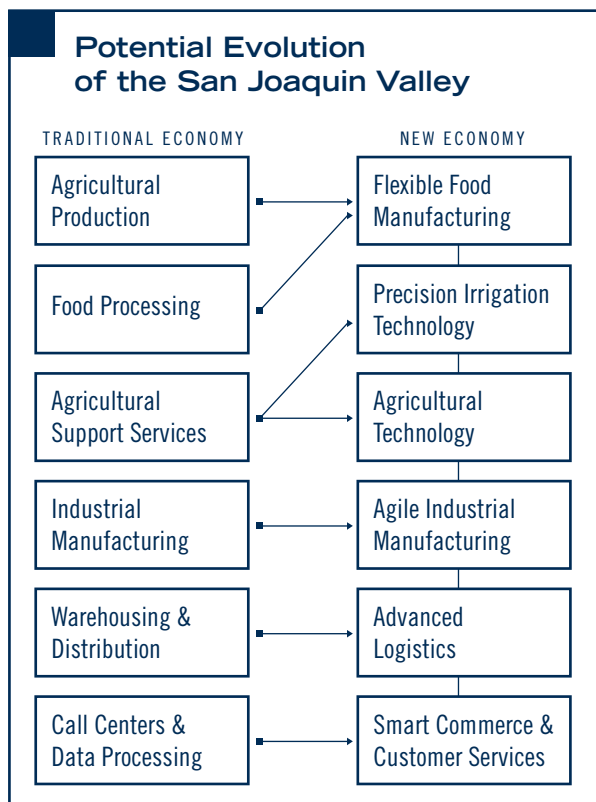
- *Regional economies grow from what currently exists.* New economic drivers evolve out of the existing company competencies and the workforce skills and experience base in a region. Driving industries must serve markets beyond the San Joaquin Valley.
- *Industry, technology, and market trends shape opportunities.* External and internal market trends and interregional dynamics create strategic opportunities for companies and industries in a particular region to grow.
- *Leadership can make a difference.* Leaders can take initiative to accelerate the evolution of an economy toward a higher-value future.
- *Catalysts can change the path.* Catalytic initiatives can spark movement of companies, institutions, communities, and people to realize the vision.



Six Opportunity Areas

This report paints an achievable vision of a San Joaquin Valley economy rooted in innovation. The vision is grounded in six specific opportunity areas that can emerge as strong drivers of the regional economy.

Each of these specialties can evolve from the San Joaquin Valley's current base of activities in agriculture production, agriculture support services, food processing, call centers, warehousing/distribution, and industrial manufacturing. Driving external forces—trends in industry structure, technology, customer requirements, competition—create these opportunities. The opportunity areas have synergy with each other. Progress in developing a single area will enhance progress in others. All these activities are nascent and require significant scale-up to create critical mass.



The six opportunity areas are described below.

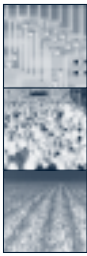
- **Flexible Food Manufacturing.** A key finding of this report is that agriculture is joining the new economy. Responding to increased competition and global market opportunities, segments of the agriculture industry already are competing on new economy factors—taking risks, developing new products, creating and integrating technologies, serving sophisticated and global markets. The opportunity is to transform more agriculture products into manufactured food products—a fast-growth, high-value global market.
- **Precision Irrigation Technology.** Global demand for fresh water for urban and environmental uses will drive further innovation in the irrigation industry. Future market growth will come more from turf and landscape irrigation than from agricultural irrigation. The opportunity is to increase the competitiveness of the existing irrigation industry by focusing more on international trade and entrepreneurship development through collaborative relationships with universities, competitor companies, and water users and suppliers.



- *Agriculture Technology.* Current university-based research in precision agriculture and agricultural biotechnology can be leveraged to build a concentration of expertise that is exported worldwide. Already, California's universities are working on technologies that will transform the production of agriculture to use fewer resources, less land, and less chemicals and at the same time to be much more productive and competitive.
- *Agile Industrial Manufacturing.* The San Joaquin Valley's manufacturing base, devoted initially to supporting agriculture, has diversified over time to serve a range of specialized markets. The opportunity is to develop and connect this manufacturing base into an agile manufacturing cluster, serving diverse markets outside the region. Agile manufacturing is based on the ability to produce customized products quickly in an environment of change and uncertainty.
- *Advanced Logistics.* Logistics is an increasingly important source of strategic advantage for many industries, and the industry is growing at 20% annually in the United States. The Valley's current call centers, warehousing, and distribution competencies could evolve into Internet order fulfillment centers and specialty logistics services, driven by innovation in information technology. The San Joaquin Valley could become the West Coast's strategic nerve center for logistics innovations.

- *Smart Commerce and Customer Services.* The San Joaquin Valley can become the "I-800" capitol of the on-line world, providing sophisticated support services to the growing electronic-commerce industry. The growth of the Internet is transforming the way commerce takes place. The region can go well beyond traditional call centers to high-value, comprehensive "smart" customer services, integrating e-mail, fax, Web interactions, and voice services.

Evolving toward these innovation-based activities can bring sustained increases in standard of living to the San Joaquin Valley people, and national and international prominence to the region. In fact, a key finding of this report is that the San Joaquin Valley economy has the opportunity to produce a large number of middle-class, family-wage jobs. These jobs are precisely the kinds that are disappearing from the coastal metropolitan regions, with their increasingly "hourglass" distribution of occupations and wages.



Characteristics of San Joaquin Valley's Opportunity Area Clusters

INDUSTRY CLUSTERS	EMPLOYMENT 1998	CONCENTRATION 1998	AAGR EMPLOYMENT 1993-1998	AVERAGE WAGE 1998	ESTABLISHMENTS 1998	AAGR ESTABLISHMENTS 1993-1998
Flexible Food Manufacturing	41,426	5.2	1.0%	\$ 31,693	2,096	-1.7%
Agriculture Technology	39,898	21	5.8%	\$ 32,134	2,618	8.9%
Precision Irrigation	5,050	1.5	1.3%	\$ 26,756	265	-1.4%
Agile Industrial Manufacturing	20,101	.8	3.8%	\$ 31,578	864	0.2%
Advanced Logistics	32,350	1.1	3.5%	\$ 32,006	2,417	2.4%
Smart Commerce & Customer Services	5,361	.4	7.4%	\$ 57,518	350	7.9%
All Clusters	139,136	1.8	3.5%	\$ 32,871	8,345	2.9%
All Industries	842,968	1.0	2.0%	\$ 27,946	66,097	3.1%
Cluster Percent of Total	16.5%				12.6%	

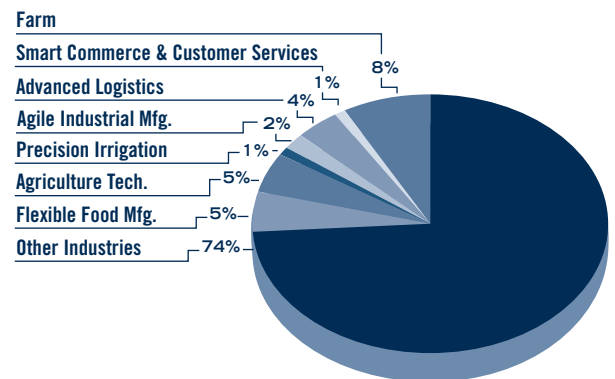
AAGR = Average Annual Growth Rate

Concentration = Share of cluster employment in region relative to that cluster's employment nationally

Source: Regional Financial Associates

Economic growth and sustained improvement in the standard of living for San Joaquin Valley residents will require that cluster industry employment make up a larger share of total San Joaquin Valley employment.

Distribution of Employment, San Joaquin Valley, 1998





Strategic Recommendations

The secret to building an innovative economy is in building an innovative community.

Significant regional initiative is necessary to transition the San Joaquin Valley to participate more fully in new economy activities.

Community, business, education, and other leaders must take deliberate action to leverage strengths, build assets, and change mind-sets.

The report makes seven Strategic Recommendations. These Strategic Recommendations represent the themes common to the more than 40 action initiatives that are proposed (which are described in the full report) to support the six specific opportunity areas. These Strategic Recommendations include:

- *Regional Leadership.* Develop “networks of responsables” in the region that will drive the testing, refining, promotion, and implementation of the vision. These “responsables” include people acting as stewards of the overall regional vision as well as of each particular opportunity area.
- *Cluster Networks.* Create intermediary institutions, personal relationships, and electronic networks that expedite collaborative partnerships among cluster companies, education institutions, and other organizations. By collaborating, the small- and medium-sized companies so predominant in the Valley can create the scale effects necessary to serve global markets and improve their efficiency and innovation.
- *Innovative Workforce.* From K-12 through community colleges and universities, develop a computer and information-technology literate workforce (technology implementers) and people capable of learning throughout their lifetimes. Increase collaboration between the education and training communities and cluster companies.
- *Technology Development Community.* Develop a community of applied research professionals in companies and universities that are tightly oriented to the cluster industries (technology innovators). Shape the basic research activities at University of California-Merced and the applied R&D activities at Fresno State to meet the needs of industry clusters.
- *Entrepreneurship.* Cultivate innovation economy entrepreneurs, and next-generation business leadership. Create the places, financial support and other resources, and the culture that encourage people, especially young talent, to recognize business opportunity and exploit it.



- *Regional Identity.* Shift mind-sets in and outside the region toward a positive vision of the future and the behavior change necessary to achieve it. Cultivate a regional identity that fits with both the region's traditional history and strong future promise and that overcomes misperceptions about limited opportunities. Perception matters for prosperity.

Examples of Required Mind-Set Shifts

- From *isolation* of companies in the region to *integration* of companies across the region
- From *low educational attainment* to *high educational aspirations*
- From serving *local markets* to serving *global markets*
- From land as *unlimited resource* to land as *limited resource*
- From quality of life as residual to quality of life as economic development requirement
- From *community leadership* to *regional leadership*
- From *attraction* of companies to home-grown *entrepreneurship*

- *Livability/Environment.* Attracting and retaining young talent and midlevel professionals is essential to achieving the vision. As an economic development tool, consciously create a high-quality living environment attractive to knowledge workers, including vital downtowns, protected open space and landscapes, preserving in some places the distinctive landmarks and physical character of the rural West.

The full report of THE ECONOMIC FUTURE OF THE SAN JOAQUIN VALLEY is available on-line at www.greatvalley.org/nvc/tech_clusters.html or from the Great Valley Center.



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Appendix C
San Joaquin Valley Water Technology
Briefing Paper

**THE WATER FLOW TECHNOLOGY CLUSTER
IN THE SAN JOAQUIN VALLEY**

DRAFT

Prepared for:

The Great Valley Center
The James Irvine Foundation

Collaborative
E C O N O M I C S

STRATEGIC ADVISORS TO CIVIC ENTREPRENEURS

April 9, 2001

About the Cluster Engagement Project

In January, 2000, the Great Valley Center released “The Economic Future of the San Joaquin Valley” which outlined a regional strategy for sustainable economic growth in the eight-county region. Six economic opportunity areas were identified, including Precision Irrigation Technologies. The report recommended that industry leaders work together to improve their cluster in the region. Subsequently, the Great Valley Center was awarded a grant from The James Irvine Foundation to begin implementing of the report’s recommendations establish a regional economic leadership group and to engaging companies in the Water Flow Technology cluster to develop an action plan.

Three industry leaders, Claude Laval, John Brewer and Ray Dunn, decided to spearhead the formation of the cluster group and chair the process of cluster engagement. The Fresno Business Council partnered with the Central Valley Futures Institute to create a support structure for the industry. Subsequently, the University Business Center at CSU Fresno, in association with the Center for Irrigation Technology and the Central California Futures Institute of California State University Fresno received a grant from the Fresno Area Workforce Investment Corp to provide additional support towards cluster development.

About This Paper

The purpose of this paper (draft) is to brief leaders of the San Joaquin Valley Water Flow Technology Cluster, the Great Valley Center and other San Joaquin Valley leaders about the water flow technology cluster in the San Joaquin Valley—its growth and evolution, key factors driving change, requirements for future success, and potential areas for collaborative action. The paper is based on interviews with 12 executives in the water flow technologies industry as well as additional quantitative and qualitative research by Collaborative Economics. It will provide a base of common information for the Water Flow Technology Cluster’s first meeting to be held April 13, 2001.

We encourage comments on this draft before the first meeting. Please direct comments to Kathie Studwell at studwell@coecon.com. or 650-614-0244.

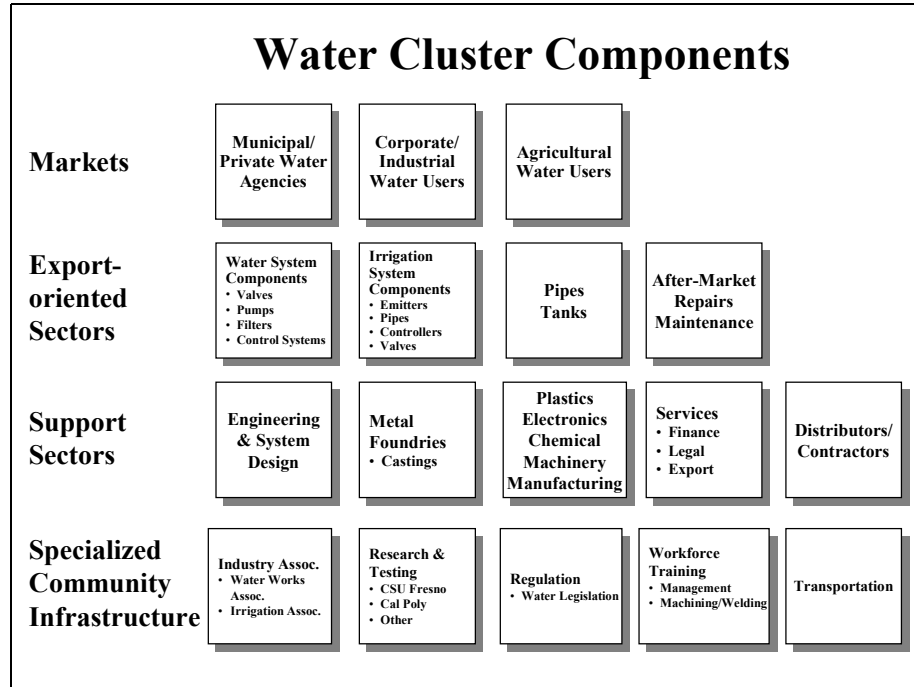
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Components of the Water Flow Technology Cluster

The Water Flow Technology Cluster includes companies that manufacture and market products used to control the distribution, pressure and measurement of water and other liquids for commercial, industrial, municipal and agricultural markets.

Water Flow Technology companies market their products domestically and internationally. Major markets include municipal water services, irrigators in agriculture, turf and landscaping, retailers (home do-it-yourselfers), residential developers and other industries.



Evolution of the Cluster in the San Joaquin Valley

A stable supply of water comes to the Valley

The story of the Valley's water industry is linked to its agricultural roots and the need to irrigate most food and fiber crops. The Valley's agricultural and irrigation heritages are intertwined and—up until the recent boom in landscape and turf irrigation and the expansion of product lines into other markets—mutually dependent. The Valley's irrigation industry began after water delivery and power systems to power water pumps were constructed in the 1920s and 1930s. Two major projects, the state's California Water Project and the federal government's San Joaquin Valley Project built in the 1950s and 1960s, increased the availability of water and the acreage of irrigated agriculture, making the San Joaquin Valley the most productive agricultural region in the world.

Pumps were needed to take water out of wells and water canals and distribute it with enough pressure to reach the opposite side of a field. Valves were needed to control the pressure and filters proved useful for screening sand and dirt out of the well or canal water.

Though in the 1950s and 1960s many people thought that the supply of water was endless, droughts and increasing demand for water due to population growth boosted the use of modern irrigation and other water technologies. Farmers switched to modern irrigation practices to reduce the cost of water inputs. Local manufacturers responded with water-saving technologies and now the Fresno area and California are world leaders in micro-irrigation manufacturing. Water conservation and energy conservation nation-wide and world-wide has spurred innovations in pumps, valves, filters, timers and all other aspects of the water industry.

Firms initially engaged in farm machinery production, expanded their product lines and markets

Several firms, initially producing primarily for the agricultural irrigation market, began to expand their product line so as to also serve turf and landscape irrigators as well as municipal water services and other industries. Pumps that could move irrigation water could be redesigned to move water for municipal water systems or industrial fluid systems. The same happened in other areas of the industry, for instance filters, valves and control systems.

As a result of expanded product lines and more international marketing, locating in San Joaquin Valley to be close to agriculture irrigation is no longer necessary.

With a greater share of their product lines devoted to markets other than agriculture, locating in the nation's most productive agricultural region has become less important. With larger growth expected in all markets other than agriculture, access to these markets, both domestic and international, is more critical.

Many Fresno area-based firms in the Water Flow Technology Cluster have been sold to larger firms that can offer better distribution and broader product lines to their customers. In some cases the result of mergers and acquisitions has been the relocation of manufacturing plants outside of the San Joaquin Valley.

Size, Growth and Concentration

The most current data available (1998) shows that the Water Flow Technology Cluster consisted of about 2,800 employees working in approximately 90 establishments. Despite some mergers and acquisitions, employment grew by about 1% between 1993 and 1998, representing an average annual growth rate (AAGR) of just about .25%.

Growth in establishments has been minimal, probably due to recent mergers and acquisitions going on industry-wide. The average firm size is small, about 33 persons per establishment. The industry is 1.2 times as concentrated in the San Joaquin Valley as in the nation. This means that the industry is a regional specialization.

Average wages per employee for the Water Flow Technology Cluster are about \$36,000 per year. They are lower than industry wages statewide (\$40,000) but closer to industry wages nationally (\$37,000) reflecting the Valley's cost of living is similar to the nation's and lower than the rest of California.

Cluster Employment and Establishments

SIC Code	Description	Employment			98Estabs SJV
		1993 SJV	1998 SJV	1998 CA	
3089	Mfg. - Miscellaneous plastics products, nec	217	234	8,058	2
3491	Mfg. - Misc. fabricated metal products	301	131	2,167	0
3494	Mfg. - Misc. fabricated metal products	53	356	551	0
3523	Mfg. - Farm and garden machinery	951	917	1,378	26
3561	Mfg. - General industrial machinery	708	491	2,968	6
3569	Mfg. - General industrial machinery	95	155	3,167	3
5083	Wh. Trade - Machinery, equipment, and supplies	438	514	1,325	49
Total	Water Flow Technology Cluster	2,764	2,797	19,615	86
Total	All Industries	763,051	842,968	11,581,331	66,097

Factors Driving Change

Industry Factors

Expanding product lines. Firms are diversifying by offering similar products, but to newer markets. For instance, companies that started by producing for the irrigation market, now serve municipal water systems and commercial and industrial markets. And firms that may have produced exclusively for the agricultural market are now producing for turf and landscape markets as well.

Consolidation. To compete effectively, especially against large public companies, firms are finding that they need to expand their product lines and markets, especially international markets. This often results in local firms being sold to or merged with larger firms located outside the San Joaquin Valley.

Global markets. Some firms in the San Joaquin Valley compete effectively in many international markets, though trade restrictions, the exchange rate, and other factors, have hindered the ability of others to sell internationally.

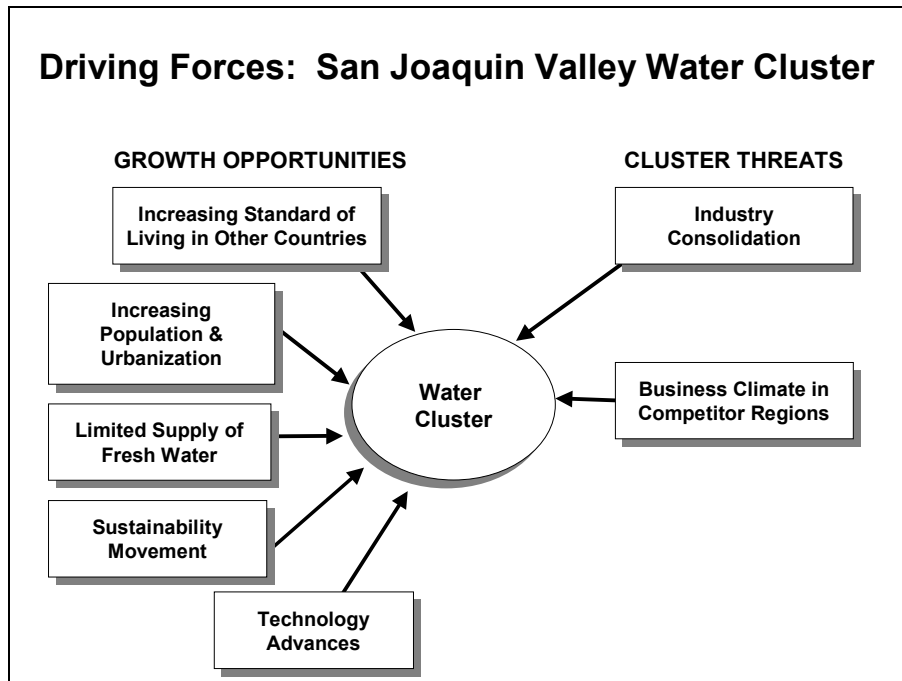
External Drivers

Cost of electricity/power. As the cost of power increases, buyers will increasingly become more interested in power-saving innovations on pumps, electronic controls and timers, etc.

Cost of water. Continuing population growth worldwide is increasing competition between urban, agricultural and environmental uses of water. More buyers will be attracted to water-saving, and thus cost-saving, innovations.

Automation. The demand for labor-saving innovations, such as automatic controls and remote control timers will increase as the cost of labor increases.

Advances in materials. Innovations in raw materials (e.g., polymers, advanced materials, alloys, exotic metals) could provide cost-saving or quality-enhancing benefits to water industry products, such as those that resist rusting or other types of degradation and wear.



Key Requirements for Success

Specialized work force.

Water Flow Technology firms need an available supply of specialized talent, especially upper management, technicians and engineers. This is the highest priority issue facing all company executives interviewed. Meeting the increasing demand for electronically controlled or power-saving water industry products requires growing a pool of electronic technicians and engineers. The San Joaquin Valley does not have an adequate supply of people with these skills. Some companies outsource engineering design to other parts of California or the nation. Furthermore, upper management versed in flexible manufacturing, contract manufacturing, international sales and change process management are very difficult for recruit to the Fresno area unless they are originally from the area.

Workforce training. Nearly all executives interviewed provide on-the-job training, but at a very large cost. Workers skilled in trades involving metal-working, molding and machining are in high demand (this is universal) but difficult to keep or attract to the Fresno area, so manufacturers must do the training themselves. A local school does some training, though it is not thought to be adequate.

Supportive business environment and clear expectations

Business needs a community that provides a clear vision for itself and clear and consistent guidelines on business-related regulations, such as industrial and office zoning, permitting, infrastructure, licensing and taxation. Executives of Fresno-based businesses are not

confident in the leadership of the city of Fresno to establish a supportive business environment. This lack of confidence has affected business investment decisions.

Quality of life

This requirement is related to recruitment of specialized workers to the Fresno area. Quality schools for workers' children, vital downtown centers, clean air and water, and recreation and entertainment opportunities are all important attractors of specialized workers. Though Clovis schools are very good, many schools in the area have comparatively low graduation rates, low rates of entry into college or other higher education and lower scores on SATs.

Transportation

The road network within the San Joaquin Valley is excellent in terms of distribution of manufactured goods outside the region. In terms of air travel, though, executives stated that they must pay twice the air fares into and out of Fresno that they would pay at Sacramento or Bakersfield airports. Flights connecting Fresno with major markets are minimal at best so travel times are exceedingly long. This inhibits visits by customers and travel for sales and marketing purposes. It is a major constraint to future business investment in the region.

Potential Opportunities for Collaborative Action

Interviewees suggested several potential opportunities for collaborative action.

Increase the supply of specialized workers, including top management, engineers, technicians and metal workers.

- Expand technical school and trade school offerings.

Improve the business environment; reduce risk and uncertainty for would-be investors, including airlines.

- Work with city and county to establish clear economic development goals and objectives.
- Establish partnership with city and county to establish mutually acceptable regulations and guidelines.

Work with economic development organizations to attract complementary firms to the region and increase the concentration of employment in water industry.

Establish marketing alliances for large overseas contracts.

Establish a water industry learning network.

For example, SA Water, South Australia's Water Company, is providing support to the Water Industry Alliance, an industry cluster established in 1998 to bring together South Australian companies with an interest in the water industry, with the objective of winning national and international business through effective commercial collaboration. Work has commenced on investigating ways in which South Australian companies can successfully provide new or upgraded water and wastewater infrastructure in interstate markets.

For a modest subscription investment, companies have access to:

- High quality, quantifiable, early market intelligence utilizing the resources of SA Water Corporation, United Water and Riverland Water and their international parents, opportunities identified by member companies, as well as established international networks and linkages
- Industry forums on topical commercial issues
- Assistance with joint marketing
- Assistance with collaborative bid preparation
- On-line database information on the industry, including the capabilities of member companies

In national and international markets, the Water Industry Alliance is able to act as an independent gateway by providing South Australian-based water industry information to clients seeking solutions to their water and wastewater handling and treatment problems.

Appendix: Persons Interviewed

Bob Early, Grundfos Pumps

Claude Laval, Claude Laval

Dan Schueler, Wade Manufacturing

David Zoldoske, Center for Irrigation Technology

George Alexanian, Alextronics

Joe Bezerra, California Agricultural Technology Institute

John Brewer, CMB

Laura Dorsey, Irrigation Association

Paul Cordua, Hit Products

Ray Dunn, Floway

Steve Huth, Water Specialties

Zvi Zella, Netafim

Appendix D
Center for Irrigation Technology
Client List

Appendix D

Partial List of CIT Clients

Agricultural Products Inc., Ontario, CA	Harkers Hollow Golf Club, Phillipsburg, NJ
AGRIFIM, Fresno, CA	HIT Products Corp., Lindsay, CA
Alex Tronics, Fresno, CA	Hunter Industries, San Marcos, CA
American AVK Company, Fresno, CA	Hunter Innovations, Sacramento, CA
American Cyanamid Company, Stamford, CT	Inverness Golf Club, Toledo, OH
Ames Company, Woodland, CA	Iowa Export-Import Trading Co., DesMoines, IA
AMIAD, Oxnord, CA	Irridelco International Corp., Englewood Cliffs, NJ
Antelco Corporation, Longwood, FL	Irrigation Association
Aquapore Moisture Systems, Phoenix, AZ	Irrrometer Co., Inc., Riverside, CA
Automata, Inc., Grass Valley, CA	J.M. Lord, Inc., Fresno, CA
Big Canyon Country Club, Newport Beach, CA	Jain Irrigation, Columbus, OH
Boss Irrigation, Lubbock, TX	K-Rain, Riviera Beach, FL
Bowsmith Inc., Exeter, CA	Lasco Industries, Brownsville, TN
Boyle Engineering Corp., Fresno, CA	Matco, Santa Clara, CA
Broadtronics, Alburn, CA	Materials Processing Corp., Minneapolis, MN
Buckner Inc., Fresno, CA	Metropolitan Water Districts
CAL Fed, Fresno, CA	Mill River CC, Stafford, CT
California Department of Pesticide Regulations	MWD of Southern California, Los Angeles, CA
California Department of Water Resources	Nantucket Cranberries, Middleboro, MA
California Edison AgTac, Tulare, CA	NC Cox, Fullortons, CA
California Energy Commission	Nelson Irrigation Corporation, Walla Walla, WA
CBG Enterprises (Gravi-Chek), San Diego, CA	Netafim Irrigation Inc., Fresno, CA
Champion Irrigation, Los Angeles, CA	Olson Irrigation, Santeo, CA
Chapin Watermatics, Inc., Watertown, NY	Orbit Irrigation, North Salt Lake, UT
City of Newark, Newark, NJ	P.G.A. West, LaQuinta, CA
Claude Laval Corp., Fresno, CA	Pacific Gas & Electric Co., Fresno, CA
Conbraco, Mathins, NC	Paramount Farms, Kettleman City, CA
Dig Corporation, San Marcos, CA	Pepco WCP, Inc., Fresno, CA
DM Camp & Sons Bakersfields, CA	Pierce Corporation, Eugenu, OR
Drip-In Irrigation, Fresno, CA	Plastro Irrigation Inc., Suisan, CA
Dura Plastic Products, Inc., Beaumont, CA	PotLatch Corp., Boardman, OR
Durham Pump, Durham, CA	R & G Sloane Mfg. Co., Sun Valley, CA
E.I. Dupont, Wilmington, DE	Rain Bird Sales, Inc., Glendora, CA
Eurodrip, Greece	Richdel/Garden America, Carson City, NV
Febco Division of CMB Ind., Fresno, CA	Roberts Irrigation Products, Inc., San Marcos, CA
Flomatic Valves, Glens Falls, NY	Safe-T-Lawn, Inc., Miami, FL
Fresno Irrigation District	Santa Ana Country Club, Santa Ana, CA
Geoflow SDI, San Francisco, CA	SCGA Members Club, Murrieta, CA
Greenscape Irrigation, Inc., Greenlawn, NY	Senninger Irrigation, Inc., Orlando, FL
Hardie Irrigation, Laguna Niguel, CA	Southern California Edison, San Dimas, Ca
Harkers Hollow Golf Club, Phillipsburg, NJ	

State Water Quality Control Board
Superior Farming Co., Bakersfield, CA
Superior Valves, Valencia, CA
Systematic Irrigation Cont. Inc., Newport Beach, CA
The Toro Company, Riverside, CA
Thompson Mfg. Co., Chino, CA
T-Systems International Inc., San Diego, CA
Turlock Irrigation District, Turlock, CA
Underhill Intl., Laguna Niguel, CA
United States Department of Agriculture (USDA)
US Bureau of Reclamation
Wade Mfg. International, Fresno, CA
Wadsworth Golf Construction Co., Plainfield, IL
Weather-Tec Corp., Fresno, CA
Western Ag Products, Los Angeles CA
Westland Water District
XCAD Calco & Irrigation, Paul, ID
Zurn Industries/Wilkins, Paso Robles, CA