



Shared Values, Shared Vision

California's
Economic Ties
with Canada



Bay Area Economic Forum

A Partnership of the Bay Area Council and
The Association of Bay Area Governments

March 2007

Bay Area Economic Forum

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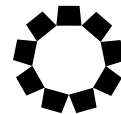
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A Bay Area Economic Forum Report
March 2007

BAY AREA COUNCIL


**BAY AREA
ECONOMIC
FORUM**



**Association
of Bay Area
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“The affinity between Canada and California is enormous, as are the possibilities for dramatically strengthening our future relationships. We enjoy multiple existing alliances in our economies, in the interwoven character of our communities, and in our vibrant alliances in research, education and innovation. The challenge before us is to take our current relationships to a higher and more strategically focused level: we have the possibility of leading the world in creating new and effective models whereby multiple sectors of society can work across national boundaries to create solutions to the manifold challenges facing all of us.”

Dr. Robert C. Dynes
President, University of California

“There are many strong ties already between Canada and California in areas as broad as education, energy, entertainment and agriculture. As a Canadian leading one of California’s great public universities, I can see many new exciting opportunities to enhance partnership between the great country of Canada and the vital state of California.”

Dr. Robert J. Birgeneau
Chancellor, University of California, Berkeley

“Canada is much more than the most important trading partner of the United States. The amount of personal interaction between the peoples of our countries is immense, and the benefits of that close collaboration are there for anyone to see. My first trip out of our country as Secretary of State was to Canada. We are good friends, good neighbors, and good allies.”

The Honorable George P. Schultz
Thomas W. and Susan B. Ford Distinguished Fellow, Hoover Institution, Stanford University
Former Secretary of State
Former Secretary of the Treasury

Executive Summary

California and Canada maintain broad, deep and longstanding commercial ties that grow out of some remarkable similarities. California's population (36 million) is comparable in size to Canada's (32 million). California, viewed as a separate nation, boasted the world's eighth largest economy in 2005, with a \$1.6 trillion gross state product; Canada's economy, at \$1.1 trillion, ranked ninth.

Both economies are highly diversified, emphasizing trade in agriculture, tourism, financial services and high technology. Both claim world-class universities and research institutes; skilled, productive workforces; similar business culture and practices; a comparable legal framework, including treatment of intellectual property; and a common language throughout much of both countries. Provinces such as Ontario, Quebec, Alberta and British Columbia, and cities such as Vancouver, Ottawa, Toronto and Montreal mirror California's strengths in information technology, biotechnology, energy and entertainment.

California and Canada are both open, progressive societies that share many common values, including a global outlook, an identification with innovation and creativity, and a strong commitment to environmental protection. These shared characteristics have generated considerable cross-border economic activity and have enabled both sides to leverage important comparative advantages. Cultural similarities have placed the two economies on parallel tracks in their competitiveness strategies that, in turn, create opportunity for new kinds of commercial, research and government-to-government partnerships.

A Strong Trading Relationship

Canada-California trade has grown steadily since the 1970s, accelerating with enactment of the Canada-U.S. Free Trade Agreement in 1989, and the North American Free Trade Agreement (NAFTA) in 1994. Canada is the second largest customer for California's exports—behind Mexico, passing Japan this year for the number two position, and significantly ahead of China. California ranks fourth among states as a buyer of Canadian exports, behind Michigan, Ohio and Texas—edged out of third place by Texas in 2004.

After a brief decline in 2001 following the bursting of the tech bubble and the September 11 attacks in the U.S., two-way Canada-California trade has grown from \$26.9 billion in 2002 (\$16.8 billion in California imports from Canada and \$10.1 billion in California exports to Canada) to \$36.9 billion in 2006 (\$22.7 billion and \$14.2 billion respectively), according to U.S. and Canadian government statistics.

An April 2004 study by consultancy Trade Partnership Worldwide, LLC, measuring state-by-state employment impacts of U.S.-Canada trade, found that trade with Canada contributed \$21.8 billion to the California economy in 2003 and supported some 626,000 jobs statewide. Updated figures suggest that the number of California jobs supported by two-way Canada trade increased in 2005 to more than 832,000.

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The mix of trade has changed over time in important ways:

- California computer and electronics sales to Canada, up steadily since 2002, are still below 2001 levels.
- California's farm exports to Canada more than doubled over 2001–2005 to \$2.1 billion, and Canada is the number one foreign buyer of California agricultural products.
- Automobiles and parts (\$9.7 billion) account for Canada's entire trade surplus with California.
- Canadian oil exports to California have helped replace disrupted Iraqi supplies since 2003.
- Canada provides 23% of California's natural gas supplies and a third of its hydropower.
- Canadian lumber exports fell early in the decade, due to a trade dispute, and have partially recovered but have also been displaced by other building materials.

Broadening Horizons

In 2005, about 1 million Canadians visited California, spending an estimated \$710 million, while 877,000 Californians traveled to Canada and spent about \$504 million. The number of Canadian tourists to California each year has remained fairly constant, even after September 11. Travel from California fell after September 11 and has only partially rebounded.

While the number of visitors has not grown, estimated expenditures in Canada have risen steadily. Favorite Canadian destinations for Californians include Vancouver, Victoria and the Canadian Rockies; favorite California destinations for Canadians are San Francisco, Los Angeles (including Disneyland), Palm Springs and San Diego.

Investment Made Easy

Two-way investment has broadened in the past 20 years from real estate, financial services, transportation, aerospace and software into increasingly cutting-edge areas of research: computing and telecommunications, digital media, biotechnology, pharmaceuticals, nanotechnology and advanced materials, medical and scientific instruments and enterprise solutions technology.

A 2004 competitiveness study by KMPG concluded that Canada has the lowest business startup and operating costs of any G-7 country, about 5.5% below those in the U.S. Generous research funding through the university and health care systems—along with R&D tax credits, employment offsets and other business incentives at the federal and provincial levels—have helped create and nurture technology and knowledge-based clusters across Canada. For many California companies, especially those hiring large numbers of programmers, designers, clinical researchers or engineers, it has meant a cost savings of 25–40% to locate operations in Canada. California trade and investment have been most

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extensive with British Columbia, Alberta and Ontario provinces but are also strong in Quebec and the Maritimes.

At the same time, California is an affluent, well-educated, forward-looking market for Canadian companies, and a source for high-end, highly specialized scientific and technical personnel. Often complementary work in advanced fields such as digital media, IT, biomedicine, agricultural sciences, aerospace and energy have led to interesting cross-border synergies:

- San Francisco-based network security firm nCircle opened a Toronto R&D center and has since won Canadian government work in procurement and emergency management services.
- Redwood City interactive game developer Electronic Arts (EA) operates the world's largest development studio in Vancouver, B.C., with 1,300 employees, and a boutique studio in Montreal—creating a critical mass of digital media talent that has fostered new curricula at universities and film schools across Canada.
- Environmental planning, restoration and landscape design firm Rana Creek, of Carmel Valley, is designing a “living roof” garden and integrated landscaping for the Vancouver Convention Center.
- WorldHeart Corp., created in 1996 to develop heart implant device technology that originated at the University of Ottawa Heart Institute, is now headquartered in Oakland and has completed clinical training with teams from Toronto and Ottawa for a new-generation pump that prevents heart failure in patients awaiting transplants.
- Ballard Power Systems of Burnaby, B.C., provides hydrogen fuel cells to a pilot program of the California Fuel Cell Partnership, a group of automakers, energy companies, utilities, transportation providers and government environmental quality agencies partnering to test 300 fuel cell vehicles during 2000–2007.

And in a series of high-profile acquisitions:

- Disney Interactive Studios bought startup Propaganda Games to design a new game franchise based on the “Turok” comic book.
- Vivendi Universal took over Vancouver game developer Radical Entertainment and its 200-person studio.
- SupportSoft of Redwood City purchased Halifax-based Core Networks, a developer of broadband network management software, to strengthen its offering of digital “triple-play” capability—phone, Internet and television—to telecom service providers.
- Autodesk expanded into the entertainment market with the purchase of Toronto-based 3D visualization software maker Alias.
- Yahoo bought Vancouver game developer Ludicorp for its Flickr photo sharing and management tools.
- Apple acquired Vancouver software developer SchemaSoft for its tools that enable file sharing across multiple formats.

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From 2002–2006, Silicon Valley venture capital (VC) firms invested more than \$760 million in Canadian enterprises. Canadian VC firms returned the favor in Silicon Valley, in the amount of nearly \$230 million during that same period. Canadian investors also participate in California venture funds: the Ontario Municipal Employees Retirement System (OMERS) and Teachers Merchant bank, for example, participate in two life sciences funds managed by San Francisco-based Alta Partners.

Educational Ties

Student and research exchanges reflect the trends described above. While the numbers of students and visiting scholars crossing the border appear small at first glance—just over 2,000 Canadian students enrolled at California colleges and universities, about 1,000 California students in Canada study-abroad programs, and fewer than 4,500 Canadian scholars and researchers in the entire U.S., according to the Institute of International Education—actual numbers may be much higher because of relaxed entry requirements and monitoring of Canadian arrivals, especially those crossing the border by land rather than by air.

U.C. Berkeley, Stanford University, UCLA, University of Southern California, U.C. Santa Barbara and U.C. Davis all have relatively large numbers of Canadian students and scholars. Berkeley and UCLA have formal Canadian studies programs with endowed chairs and scholarships. The California State University system has cooperative relationships with three English-speaking and three French-speaking universities in Canada.

Three of 15 Canada-U.S. Fulbright scholars in 2006 are at California institutions, including the University of Southern California, U.C. Santa Barbara and Berkeley. Respective areas of study include technology and the entertainment industry; geography and the environment; and cross-border regulation of greenhouse gases and toxic substances. Since 1992, Berkeley has hosted sixteen fellows in this special program, Stanford has hosted nine and UCLA and Santa Barbara have hosted four each.

What the Future Holds

Perhaps the biggest story in the Canada-California relationship, however, is forward-looking. At present, California and Canada have been proceeding along parallel tracks toward long-term strategic initiatives in alternative fuels, stem cell research, cap and trade programs to reduce carbon emissions, secure borders, infrastructure improvements and more. At the university and governmental levels, a series of new and exciting partnerships are beginning to take shape, which attempt to leverage the complementary strategic interests, research capabilities and talents of these two cutting edge markets.

The Canada-California Strategic Innovation Partnership (CCSIP), initiated by Canada's national science advisor Dr. Arthur Carty and University of California president Dr. Robert Dynes, a native of Canada, is a program designed to formalize research, entrepreneurial and investment links in the areas of stem cell research and regenerative medicine; broadband

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Internet connectivity; advanced transportation and energy; nanotechnology; and infectious diseases and pandemics. Working groups are also looking at ways to leverage highly specialized researchers, venture capital and joint intellectual property arrangements to achieve “research, development and delivery” of innovation.

CCSIP has gained support at the highest levels of the Canadian government, following summits held at UCLA in January 2006 and at the University of British Columbia in June 2006, as well as discussions between Canadian Ambassador to the U.S. Michael Wilson and Governor Schwarzenegger in October 2006.

CANARIE Inc., a Canadian public-private advanced broadband network development organization, has already linked its CANet 4 high-speed system with the Corporation for Education Network Initiatives in California (CENIC) infrastructure to provide joint data-sharing for researchers at up to 10 gigabytes per second, with successful tests involving the Communications Research Center in Ottawa, the Montreal Neurological Institute, and U.C. San Diego.

Other collaborative efforts include expansion of California’s Hydrogen Highway pilot program of hydrogen-powered vehicles and filling stations, part of the California Fuel Cell Partnership program, to become a “B.C. to B.C. Hydrogen Highway” reaching from British Columbia to Baja California; a first-ever Alberta-California Energy Conference held at U.C. Berkeley in March 2007; the Alberta-California Venture Channel, a partnership to match Silicon Valley venture capital and company-building expertise with Alberta tech entrepreneurs; a North American Cleantech Venture Network matching investors and firms developing environmentally friendly technologies; and recent discussions between the premiers of British Columbia and Manitoba with Governor Schwarzenegger on ways to increase state-to-province trade and investment ties.

These and other measures suggest a new, closer relationship between Canada and California, two vibrant economies with many common characteristics and even more common interests.

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Canada and California: A 180-Year History

The Canadian presence in California dates back to the British fur trade of the early 1800s. With enactment of an 1804 treaty between the U.S. and Britain that allowed Canadian settlers to trade in U.S. territory, traders with the Montreal-based North West Company (NWC)—known as “wintering partners” or “Nor’westers”—spread out across Canada and down into the U.S., beginning in the Missouri Valley and extending by 1811 down into the Columbia/Snake River region in Oregon.

During this period, the rival Hudson’s Bay Company (HBC) also extended its trading network westward. Over time HBC came to administer Britain’s territorial claims from Alaska down to Oregon and east to the Rockies, from its Fort Vancouver regional headquarters, under chief factor John McLoughlin. HBC and NWC merged in 1821, to better compete with American and Russian traders and to settle the territory in advance of U.S. westward expansion.

In 1828 McLoughlin sent chief trader Peter Skene Ogden, a former NWC trader from Saskatchewan, on a nearly two-year expedition that followed the Humboldt River to the Sierra Nevada and south to the Gulf of California. HBC later established an office on Montgomery Street in San Francisco in 1841, under a new chief trader, William Rae.

The Gold Rush and California statehood in 1849, however, eclipsed the fur trade and drew numerous manufacturers and sellers of clothing, tobacco, food and dry goods to the West Coast. HBC eventually closed down its California and Northwest operations, leaving many Canadian trappers and traders to settle in Oregon and California, as farmers or merchants.

The U.S. and Britain signed an 1854 Reciprocity Agreement on trade that facilitated trade with Canada, but that agreement was rescinded on the U.S. side in 1866, the year before Canada confederation. (British Columbia would not become a province until 1873.) After two failed free trade attempts in 1874 and 1911, U.S.-Canada trade was eventually liberalized under the 1935 Reciprocal Trade Pact. Defense production sharing arrangements during World War II integrated manufacturing for military purposes, and a 1965 Auto Pact freed trade in autos and parts for cross-border production and assembly.

But it was not until the 1980s that California’s trade and investment relationship with Canada would expand dramatically in new directions, as several factors converged: new markets in the computing, telecommunications and aerospace sectors; California’s demand for Canadian engineers; emerging cross-border energy and financial markets; and relaxed trade restrictions under the Canada-U.S. Free Trade Agreement (1989) and NAFTA (1994).



U.S.-Canada Free Trade

The 1989 Canada-U.S. Free Trade Agreement (FTA), negotiated at a time when the multilateral Uruguay Round of the General Agreements on Tariffs and Trade (GATT) was foundering, has in many ways served as a model for the other U.S. bilateral free trade agreements that have followed.

The FTA was based on the principle of “national treatment”—that each country treated trade in goods and services with the other transparently, as if the flow of commerce were domestic. Exceptions were allowed, such as California’s restrictions on pesticides in imported agricultural products. About 80% of tariffs between Canada and the U.S. had already been eliminated by 1989. The FTA addressed remaining tariff and a range of non-tariff trade and investment barriers.

Specifically it:

- Eliminated all tariffs on goods that meet rules of origin requirements by 1999.
- Eliminated most import and export restrictions on energy, including short-supply/conservation quotas.
- Gradually extended “national treatment” to services sectors.
- Ended Canadian review for most portfolio investment and direct investment under \$150 million.
- Facilitated cross-border travel for business visitors, traders, investors and intra-company transferees.
- Removed most non-tariff barriers for wine.
- Opened government procurement markets to bids \$25,000 or over.
- Established a bilateral commission for dispute settlement, while protecting sovereignty for cultural and financial sectors, and for antidumping and countervailing duty cases.

U.S.-Canada Free Trade

In 1994, the FTA was superseded by an expanded North American Free Trade Agreement (NAFTA) which included Mexico. NAFTA has retained most of the original FTA provisions that had previously defined the U.S.-Canada relationship.

Environmental and labor cooperation agreements signed later have resulted in broad protocols regarding worker safety, treatment of migrant workers, regulation of pesticides, cross-border air quality and an emerging regional market for electric power. Trade differences between the U.S. and Canada under both the FTA and NAFTA have, for the most part, been minor and limited almost exclusively to agriculture (wheat, greenhouse tomatoes, horticulture) or continuations of historic disputes (softwood lumber).

In the first 10 years of NAFTA, Canada's exports to the U.S. grew from \$113.6 billion to \$213.9 billion, and U.S. exports to Canada grew from \$96.5 billion to \$152.9 billion.



Sources: California State World Trade Commission, 1989; Office of the U.S. Trade Representative; California Department of Food and Agriculture

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California-Canada Trade

Two-way California-Canada trade totaled approximately \$36.9 billion in 2006, according to U.S. Census Bureau and Statistics Canada figures—made up of \$22.7 billion in California imports from Canada and \$14.2 billion in California exports to Canada.

The two-way total is a marked increase from \$26.9 billion (\$16.8 billion in California imports from Canada and \$10.1 billion in California exports to Canada) in 2002, and \$16.6 billion in 1997. And current California-Canada bilateral trade has increased more than four-fold from the \$7.7 billion in 1988, when the Canada-U.S. Free Trade Agreement was signed.

Top 10 California Exports to Canada (in dollars)

	2005	2002
Computers	1.38 billion	1.24 billion
Motor vehicle parts (excl. engines)	315 million	197 million
Aircraft parts (excl. engines)	237 million	217 million
Trucks	204 million	n/a
Fuel oil	194 million	n/a
Medical supplies	187 million	156 million
Medicine	177 million	99 million
Electronic tubes/semiconductors	173 million	268 million
Consumer electronics	159 million	n/a
Medical equipment	150 million	112 million

2002 Top 10 California Exports not on the 2005 list: telecommunications equipment (\$120 million); televisions and radios (\$108 million); and fresh grapes (\$104 million).

Sources: U.S. Census Bureau; Statistics Canada

Top 10 California Imports from Canada (in dollars)

	2005	2002
Automobiles	9.30 billion	7.71 billion
Trucks	1.51 billion	n/a
Organic chemicals	526 million	273 million
Office machines/equipment	433 million	705 million
Petroleum/coal products	324 million	n/a
Meat	308 million	215 million
Newsprint	273 million	238 million
Synthetic rubber/plastics	267 million	n/a
Motor vehicle parts	259 million	193 million
Containers	257 million	177 million

2002 Top 10 California Imports not on 2005 list: clothing (\$170 million); electrical lighting equipment (\$145 million); and basic plastic shapes and forms (\$132 million).

Sources: U.S. Census Bureau; Statistics Canada

Canada-California trade doubled during 1990–1997, growing by an average 10.2% annually. Growth slowed over 1997–2001, averaging 2.4% annually. In terms of California exports, Canada has been California’s third largest trading partner after Mexico and Japan, but in 2006 surpassed Japan to become the state’s number two export market.

California Trade with Canada, 1997–2001 (in dollars)

	California Exports	California Imports
1997	8.53 billion	8.11 billion
1998	9.30 billion	10.51 billion
1999	9.42 billion	14.15 billion
2000	10.53 billion	17.27 billion
2001	11.82 billion	17.98 billion
2002	10.08 billion	16.77 billion
2003	11.23 billion	17.93 billion
2004	12.11 billion	20.77 billion
2005	13.21 billion	22.05 billion
2006	14.19 billion	22.67 billion

Sources: U.S. Census Bureau; Statistics Canada

Top 5 California Trading Partners, by Exports (in billions of dollars)

	2002	2003	2004	2005	2006
Mexico	16.07	14.87	17.24	17.70	19.36
Japan	11.10	11.75	13.32	13.50	13.98
Canada	10.08	11.23	12.11	13.21	14.19
China	4.48	5.46	6.84	7.85	9.97
South Korea	4.71	4.83	5.91	6.34	7.05

Source: California Chamber of Commerce

Among the key trends appearing in the data:

- Cross-border automobile and parts production account for nearly half of Canadian exports to California; this joint manufacturing, which generates jobs and business activity on both sides of the border, masks a California-Canada trade relationship that is essentially in balance.
- Silicon Valley computer and telecommunications sales to Canada totaled \$1.9 billion in 2005—20% of total exports, but down from \$2.1 billion in 2004. Telecommunications and office equipment sales began to slip in 2003 due to slowing post-tech-bubble demand and low-cost competition from Asia and Mexico.
- While agricultural shipments from California to Canada continue to rise, their share of total exports to Canada has remained flat at about 20%.
- The Iraq war and disruption of Iraqi oil supplies to California has led to increased sourcing of fuel oil, petroleum and coal products, and synthetic rubber and plastics from Canada since 2003.

Agriculture/Forest Products

California agricultural exports to Canada totaled \$1.756 billion in 2005, up from \$1.137 billion in 2001. Canada is the leading foreign buyer of California agricultural products. California, meanwhile, bought \$308 million in meat from Canada in 2005, up from \$290 million in 2004 and \$216 million in 2003.

The California-Canada agricultural trade relationship has not always been easy, but disputes have typically been resolved by changing market conditions. Meat imports from Canada fell during 2003 after mad cow disease (bovine spongiform encephalopathy or BSE) turned up in Alberta and in a Washington cow imported from Canada. Trade has recovered somewhat, particularly since a U.S. ban on live cattle imports from Canada was lifted in January 2005. In the meantime, the federal BSE ban also affected California dairy farmers who often bought replacement heifers from Canada.

Canada's Food Inspection Agency ordered destruction or quarantine of thousands of nursery plants and cut flowers from California in 2004 after oak death pathogen was found in

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camellias from a Southern California nursery that turned up in six retail nurseries in British Columbia.

A U.S. antidumping complaint against Canadian greenhouse tomatoes led to a 32% countervailing duty in October 2001. Canada responded with a similar action on U.S. fresh tomatoes, impacting California producers. The dispute was eventually resolved and, over time, California has imported more Canadian greenhouse tomatoes while selling back to Canada more processed tomato products.

Canadian softwood lumber exports to California slowed from \$138 million in 2001 to \$112.8 million in 2002 and \$90.7 million in 2003, following the expiration of a 1996 U.S.-Canada Softwood Lumber Agreement and the resumption of tensions in a trade dispute dating back to 1982. At issue for years has been whether government “stumpage” fees charged to log public lands in Canada—primarily in B.C. and Alberta—are so low that they constitute a subsidy damaging to U.S. lumber producers when Canadian lumber is imported. After the 1996 agreement lapsed in March 2001, the U.S. imposed 27% duties on Canadian softwood lumber imports.

A five-year NAFTA process prompted successive U.S. reductions of the softwood lumber imports duty, while the World Trade Organization upheld the basic U.S. subsidy complaint. Faced with further impasse, both parties reached a new seven-year agreement in October 2006 that returns \$4 billion in countervailing duties collected by the U.S.; replaces U.S. countervailing duties with a Canadian export tax to offset lower stumpage fees but retain the revenues in Canada; and caps Canadian imports if lumber prices fall below set thresholds. Duty concessions and a California construction boom spurred imports in 2004–2005. Canada shipped \$138.2 million in lumber to California in 2006, a similar level to 2001.

Top 10 California Agricultural Exports to Canada (2005)

Lettuce	\$202 million
Strawberries	\$172 million
Table Grapes	\$159 million
Processed tomatoes	\$138 million
Wine	\$119 million
Almonds	\$112 million
Oranges/orange juice	\$94 million
Carrots	\$77 million
Peaches/Nectarines	\$66 million
Broccoli	\$54 million

Sources: California Department of Food & Agriculture; U.C. Davis Agricultural Issues Center

Total California Agricultural Exports to Canada (2000–2005)

2005	\$1.756 billion
2004	\$1.467 billion
2003	\$1.367 billion
2002	\$1.195 billion
2001	\$1.137 billion
2000	\$1.191 billion

Source: California Department of Food & Agriculture; U.C. Davis Agricultural Issues Center

Energy

Canada is the world’s fifth largest energy producer; seventh largest oil producer, with 175 billion barrels of reserves from Alberta oil sands; third largest producer of natural gas; second largest generator of hydroelectric power; and largest uranium producer.

In 2005, Canada provided nearly 23% of California’s natural gas supply, some 1.3 billion cubic feet per day. This was down from a high of more than 1.8 billion cubic feet per day—more than 27% of total supplies—in 2000. It reflects a decline in overall usage from the height of the tech boom, as well as increased conservation.

Canada was not a significant supplier of oil to California until 2003, when it shipped 4.4 billion barrels—1.9% of total foreign supplies in that year, and less than 1% of total supplies. Canada, along with Saudi Arabia, Australia and Brazil, helped pick up the slack after a falloff in supply from Iraq, California’s largest foreign supplier in 2001–2002.

In 2005, Canada sold some 4.9 billion barrels of oil to California. Volumes are expected to grow as Alberta oil sands production increases and new pipelines open to Canada’s West Coast, where oil can be loaded onto tankers. For example, a third of the 400,000 barrels per day capacity of Enbridge Pipeline’s proposed Gateway pipeline from Alberta to Kitimat, B.C. is expected to be shipped to California.

BC Hydro provided close to 13,000 gigawatt-hours of hydroelectric power to California utilities in 2005, mostly as seasonal backup during summer months—down from 19,000 gigawatt-hours in 2002 but up from subsequent years. Today, Canada supplies about a third of California’s hydro power and about 5–6% of its total electricity, according to California Energy Commission figures.

Entertainment

“Near-shoring” of film and television production due to lower costs; high-quality production, location, casting and other services; and relative ease of filming on location has at times generated controversy in Hollywood and San Francisco. Still, the industry ties between California and Canada are long-standing and extensive.

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Vancouver first became a popular shooting and production location in the 1970s and 1980s with the Stephen J. Cannell Productions television series *The Rockford Files* and *The A-Team*, as well as a handful of made-for-television movies and feature films. Federal government subsidies to domestic industry, combined with aggressive local and provincial film boards offering cooperation and incentive packages, have led to partnerships throughout Canada.

For example:

- The film *Capote* with Philip Seymour Hoffman was a Canada-California joint venture that teamed United Artists and Sony Classics with Canadian film production company Infinity Media and investment from Manitoba Film and Sound.
- Toronto-based Alliance Atlantis Communications, a broadcasting and film distribution company, is a 50% co-owner and co-producer of the *CSI* television franchise with CBS.
- SDI Media Group of Culver City, one of the world's leading film/TV post-production firms, set up a state-of-the-art studio in Toronto.
- SoftImage, founded in Quebec in 1986, was the first company to produce 3D animated films with its SIGGRAPH '93 software, used in *Jurassic Park*. SoftImage 3D animation and special effects technologies were also featured in *Titanic* and *Terminator 2*.
- Finally, Société Generale de Financement du Quebec (SGF) announced in October 2006 that it would invest \$18 million in a \$270 million, fifteen-film production deal involving Dark Castle Entertainment, director Joel Silver and Warner Bros. Pictures. Total investment from Quebec sources is expected to be \$170 million, for six films to be shot in Quebec, that will ultimately create 1,500 jobs, \$53 million in wages and \$12.4 million in provincial revenues.

Tourism

Tourism between Canada and California has remained robust during the current decade. After September 11, less frequent travel abroad in general was offset for California residents by Canada's proximity and accessibility by land transport.

Apart from a dip in Canadian travel to California during 2002—partly a result of post-9/11 safety concerns, stepped up air passenger security, and dampening of business travel due to a declining tech sector—visitor traffic has been roughly consistent year-on-year. San Francisco, Los Angeles, San Diego and Sacramento all have direct air links to Canadian cities. Favorite Canadian destinations for Californians include Vancouver, Victoria, the Canadian Rockies and Toronto.

Ontario and Quebec are also important business destinations, along with Vancouver. Ontario alone produces 73% of Canadian exports to California and accounts for 55% of Canadian

California-Canada Trade

imports from the state. In 2005 it accounted for a third of total Canada visitors (286,000) and just under a quarter of total California tourist spending (\$117 million).

Favorite California destinations for Canadians are San Francisco, Los Angeles (including Disneyland), Palm Springs and San Diego.

Travel and Tourism Spending

	Canadians visiting California	Expenditures in U.S. dollars	Californians visiting Canada	Expenditures in U.S. dollars
2001	910,000	522 million	1.3 million	582 million
2002	874,000	540 million	946,000	481 million
2003	890,000	587 million	1.1 million	447 million
2004	983,000	650 million	937,000	552 million
2005	1.0 million	710 million	877,000	504 million

Source: U.S. International Trade Administration, Office of Travel & Tourism Industries

Employment

An April 2004 study by consultancy Trade Partnership Worldwide, LLC, measuring state-by-state employment impacts of U.S.-Canada trade, found that trade with Canada contributed \$21.8 billion to the California economy in 2003 and supported some 626,000 jobs statewide. An update of those figures suggests that the number of California jobs supported by two-way Canada trade increased in 2005 to more than 832,000.

An estimated 600,000 Canadian expatriates reside in California, about 250,000 of them working in the Bay Area, particularly in Silicon Valley tech sectors.



Stalking the Blue Moose

Nuvation Engineering CEO Michael Worry is typical of the community of successful Canadian expatriates living in Silicon Valley. San Jose-based Nuvation is a small engineering design services firm, with about 60 employees, that designs and tests embedded chip sets, circuits and software on an outsource basis for companies like Intel, Altera, Xilinx, Texas Instruments, Freescale and Analog Devices.

Worry, a University of Waterloo engineering graduate, moved to Silicon Valley and launched Nuvation with a group of partners in 1997. The founders “boot-strapped” the company, growing without needing to raise funds from outside sources. Nuvation’s designs, IP and services are used in products ranging from handheld global positioning devices, to Internet-based streaming surveillance video, to robotic surgical equipment, to electronic warfare guidance systems. For fun, Worry participates in teams that build wireless-controlled combat robots—“BattleBots”—that spin, slice and throw each other around a ring in staged competitions.

In 2004, Worry returned home—in a sense. Nuvation opened a satellite design center in Waterloo, Ontario to tap into the University of Waterloo’s graduate talent pool of more than 18,000 trained engineers and technicians. The center has grown from a staff of four to more than fifteen, and has already moved once to larger quarters.

Worry serves on the board of directors of the Digital Moose Lounge (DML), a part social, part professional group of Canadian expats, friends and sponsors that now numbers about 1,500. He is also the keeper of the Data Moose, a life-size blue fiberglass moose mascot.

DML has emulated the model of Chinese, Indian and other expat networking organizations in the Valley, hosting a combination of social and business events, including an annual picnic that typically draws a Bay Area crowd of about 400 and an annual Expat Survival Day of seminars on cross-border tax, immigration and other issues.

Stalking the Blue Moose

The Lounge was the brainchild of Handol Kim and Jeane Weaver in the Canadian Consulate's San Jose office. In 1999, Kim sent out ten emails to gauge interest in a networking organization; forty-two people showed up. Among its current partners, sponsors and suppliers, DML lists Cisco, the Tech Museum, Clearly Canadian, law firm Fenwick & West, and both Labatt's and Molson beers.

DML receives strong support from the Consulate, as well as from the University of Waterloo, Communitel (a Waterloo regional technology association) and Alberta Innovation and Science. As with other expat networking groups, it works to leverage cross-border clusters of technology professionals and investors, build alumni networks, recapture technical know-how and reverse a potential brain drain from Canadian universities to south of the border.



Shared Values, Shared Vision





Academic Exchanges

The Institute of International Education (IIE) reports that of the 28,202 Canadian students in the U.S. during academic year 2005–2006, 2,039 were enrolled in California colleges and universities. These students represented 2.7% of the 75,386 international students from all countries enrolled in California institutions.

The numbers of international students from Canada at various California colleges and universities are relatively small: as of fall 2006, for example, U.C. Berkeley reports 172 students and 46 visiting scholars, Stanford has 213 students and 158 visiting scholars and researchers, and the California State University system has 138 Canadian students.

Using IIE's formula for calculating foreign students' financial contributions to the economy—costs for tuition fees, living expenses and dependents, less scholarships and other supports—the contributions from Canadian students and their families added up to nearly \$56.4 million in 2005–2006.

California students enrolled in Canada study abroad programs, according to IIE, number just over 1,000.

Visiting scholars are difficult to track on a comprehensive basis. According to the U.S. Department of Homeland Security (DHS) Office of Immigration Statistics, most enter the U.S. on J-1 or H-1B visas as researchers and/or teachers, but relaxed documentation requirements for Canadian nationals entering the U.S. leads to incomplete reporting. Not all visas that have been granted are ultimately used, for example. IIE reports a total 4,496 visiting scholars in the U.S. from Canada in academic year 2005–2006. These are mainly arrivals by plane, filling out a form I-94 before clearing customs at their U.S. point of entry.

IIE does not break down these numbers by state, in part because the destination field on the Form I-94 is not included in Department of Homeland Security reporting. Canadian visa holders entering the U.S. via border crossing points are not required to fill out a Form I-94, and are counted informally by DHS.

Three academic exchange efforts are worth highlighting: the Canadian Studies Programs at UCLA and U.C. Berkeley, and the Canada-U.S Fulbright Scholars Program launched in 1990.

Shared Values, Shared Vision

The UC Berkeley Canadian Studies Program was founded in 1982, within the Department of International and Area Studies, to institutionalize the interdisciplinary study of Canada through courses and research.

In 2001, the Canadian government donated a \$250,000 matching grant over a three-year period to help raise the \$1 million needed for the program, including what is now the Thomas Garden Barnes Chair in Canadian Studies. The program was fully funded as of 2005. Two endowments—the John A. Sproule Postdoctoral Research Fellowship and the Edward Hildebrand Fellowship Fund—have supported graduate and postdoctoral research on issues relating to Canada.

Events planned for 2007 include an Alberta-California Energy Conference and lectures by visiting Canadian scholars throughout the year on subjects including aboriginal studies, architecture, the U.S.-Canada softwood lumber trade dispute and sustainable community development.

Past visiting scholars have conducted research and presented papers and dissertations on Quebec, border crossing issues, early Canadian trade and stock markets, and native communities in the U.S. and Canada. Conferences have addressed trade, immigration, sustainable forestry, agricultural policy and post-9/11 cross-border security.

A similar **UCLA Canadian Studies Program** was established in 2001 with a second endowment from the estate of Dr. Edward Hildebrand, supporting graduate work in Canadian studies. The program focuses primarily on lectures and research, including efforts to build a library of Canada-oriented journals, books, documents, and primary source materials and to increase Canadian curricular content in UCLA classes.

Workshops during 2006 covered political ethics, protection and promotion of cultural diversity in media, North American security and the political economy of immigration. Earlier programs explored health care and NAFTA.

The **Canada-U.S. Fulbright Scholars Program** is a nationwide research program established in 1990 under the Institute of International Education. Significantly, three of the fifteen participating Fulbright scholars in 2006 are at California institutions, including the university of Southern California (technology and the entertainment industry), U.C. Santa Barbara (geography and the environment), and Berkeley (cross-border regulation of greenhouse gases and toxic substances).

Past scholars have attended California schools as diverse as the California Institute of Technology (the flow of knowledge capital), California State University Long Beach (immigration), CSU Sacramento (accounting), CSU Humboldt (forestry) and San Diego Community College (U.S.-Canada border history). Stanford University has hosted nine Canada-U.S. Fulbright scholars from 1992–2005. Berkeley has hosted sixteen. UCLA and U.C. Santa Barbara have each hosted four, and San Jose State University has had two.

Academic Exchanges

U.C. Berkeley has a reciprocal exchange relationship with the University of British Columbia in Vancouver, B.C. The California State University system has relationships with three English-speaking universities in Canada—McGill, Concordia and Bishop’s—and with three French-speaking universities—Laval, University of Montreal-Sherbrooke, and the University of Quebec.

Canadian and California universities are also among the participants in the **Canada-California Strategic Innovation Partnership (CCSIP)**. The CCSIP initiative is described in greater detail in the concluding section of this report.

Shared Values, Shared Vision





Investment

Since the late 1970s, Canada has typically ranked third or fourth in terms of foreign direct investment in California. A 2002 report by the Public Policy Institute of California estimated that Canadian firms employed 63,700 workers in California in 1999, increasing to 76,400 in 2001. Some 29% of Canadian investment in California was in the information sector in 1999, and 27% was in real estate, including an estimated \$4.3 billion in commercial property.

As in other aspects of the economic relationship, the net numbers declined in the wake of the 2000–2001 tech industry contraction and have since stabilized with a more diverse mix of businesses and sectors. A 2006 Canadian Embassy report shows some 300 Canadian companies in 1,300 California locations, employing nearly 41,000 workers.

Selected Canadian Firms with California Subsidiaries

Company	Industry Sector	Number of Jobs	California Locations
Nortel Networks	Telecommunications	6,815	32
Onex Corp. (American Medical Response)	Ambulance/transit	2,641	40
Circle K Stores	Grocery retail	2,336	305
Onex Corp.	Health clinics	2,091	43
George Watson (Entenmann's Inc.)	Grocery/bakery	2,089	35
Cinram International	CD manufacturing	1,656	12
Thomson Company	Publishing/information	1,529	29
Agrium Inc. (Western Farm Svc.)	Farm/nursery supplies	1,267	53
Quebecor Inc.	Printing	1,062	10
Signature Fruit Co. LLC	Fruit/vegetable canning	978	7
Cascades Inc. (Dopaco)	Paper products	918	4
Royal Bank of Canada (RBC Dain Rauscher)	Securities/mortgage	843	56
Fairmont Hotels & Resorts	Hospitality	801	5
Manulife Financial	Insurance	541	45

Shared Values, Shared Vision

Stantec Consulting	Engineering services	504	13
Wawanesa Mutual	Insurance	500	1
Magna Entertainment (Los Angeles Turf Club)	Racing	450	1
SMTC Corp.	Printed circuits	450	2
FirstService Corp. (Colliers Intl., CM&R)	Real estate	435	14
Lions Gate Entertainment	Film/video production	417	10
Alcan Inc.	Metals/industrial packaging	409	14
Fairfax Financial Holdings	Insurance	408	25
Toronto Dominion Bank (TD Ameritrade)	Securities	402	13
Tree Island Wire	Steel wire	387	9
Versacold	Refrigerated warehousing	375	13
Hub International	Insurance	315	12
Celestica Inc.	Semiconductors	250	2
Vincor Intl. (R.H. Phillips)	Winery	245	1
Geac Enterprise Solutions	Computer programming	200	1
SunOpta Inc.	Frozen foods	200	5
Bombardier	Aircraft/railroad equipment	148	10

Source: Embassy of Canada

Canadian portfolio investment in U.S. firms has grown from \$93.9 billion in 1994 to \$177.9 billion in 2000 to \$196.3 billion in 2004. U.S. portfolio investment in Canada during those same years was \$102.6 billion, \$193.6 billion, and \$248.5 billion. The strongest reported growth sectors were in energy, mining, financial services and retailing from the Canadian side, and in machinery, transportation equipment, financial services and retailing from the U.S. side. For California, the two-way investment mix also includes computing, software, communications and networking, Internet applications (including gaming), chemicals and materials.

A Major Market Close to Home

Large California firms have a long-established market presence in Canada that often includes direct investment. Bechtel Corporation, for example, has been involved in Canada since 1942. Major construction and engineering projects over the years have included the Trans-Mountain Pipeline, the Churchill Falls and James Bay hydroelectric projects, the Alcan Alma smelter, gasoline hydro treatment projects for Royal Dutch Shell, and the Athabasca Oil Sands Downstream Project. Bechtel is a majority owner of Bantrel, a Canadian engineering and construction company established in 1983, and is a joint venture partner with BPR, a Quebec engineering firm founded in 1961.

San Ramon-based Chevron Corp. began selling and refining petroleum products in British Columbia in 1935. It has a network of filling stations in B.C. and operates the province's only West Coast refinery, in Burnaby. Its net daily production in Canada in 2005 was 83,000 barrels of oil, including production from oil sands, and 6 million cubic feet of natural gas. Chevron holds a 27% stake in eastern Canada's offshore Hibernia field and a 20% non-operating interest in the Athabasca Oil Sands Project (a joint venture with Shell Canada Ltd. and Western Oil Sands L.P.). The company also has exploration projects in Northern Canada's MacKenzie Delta region, and in Newfoundland's offshore Orpan Basin.

San Francisco-based Levi Strauss & Co. entered the Canadian market in 1965 with the purchase of a stake in Edmonton-based retailer Great Western Garment. Levi Strauss completed the acquisition in the 1970s and introduced the Levi's brand in 1978. Today the company does extensive sales, marketing, product development and merchandising throughout Canada and maintains a product development center for the U.S. market. Sales are made through eleven branded stand-alone stores as well as through department stores like Hudson's Bay Company, outlet stores such as Wal-Mart, and specialty stores. With a market presence in 110 countries worldwide, Levi Strauss currently ranks Canada as one of its top ten markets.

Selected California Firms with Canadian Subsidiaries

Company	Industry Sector	Number of Jobs	Canadian Locations
Safeway	Grocery retail	30,000	Calgary
McKesson Corp.	Pharmaceutical / Medical imaging	3,000	St. Laurent, QC; Richmond, BC
Oracle	Software / systems	2,460	Mississauga, ON; Montreal; Toronto; Vancouver
Raytheon	Aerospace	1,600	ON; AB; BC
Electronic Arts	Online gaming	1,300	Burnaby, BC
Solectron	Electronics	1,035	Winnipeg; Ormeaux, QC; Newmarket, ON; Kanata, ON; Laval, QC
Payment Processing	Payment software	1,000	Whistler, BC
Hewlett Packard	Computers / peripherals	900+	Winnipeg; Victoria, BC; Mississauga, ON; Hull, QC; Halifax, NS
Chevron Corp.	Energy	885	Vancouver; Calgary; Mississauga, ON
Autodesk	Software	840+	Burnaby, BC; Montreal; Markham, ON; Ottawa, QC; Calgary; Toronto
Sanmina-SCI	Electronics	800+	Toronto; Kanata, ON
Genentech	Biotech	725	Ayr, ON; Mississauga, ON
Cisco Systems	Communications	700	Toronto; Montreal; Vancouver
Teradata	Software	400	Mississauga, ON
Adobe Systems	Software	300	Ottawa, QC
Varian Medical Corp.	Medical equipment	300	Mississauga, ON; Winnipeg
McAfee Inc.	Security software	300+	Markham; Pointe Claire, QC; Waterloo, ON
ABM Industries	Janitorial	250	Vancouver
Redback Networks	Telecommunications	250	Burnaby, BC; Ontario
Netsuite	Computer svcs.	200	Mississauga, ON
URS Corp.	Engineering	200	Markham, ON
Intel	Semiconductors	180	Toronto; Vancouver
Bio-Rad Laboratories	Medical equipment	40	Mississauga, ON

Venture Trends

During 2002–2006, some fifty Silicon Valley venture capital firms invested more than \$680 million in Canadian enterprises in a variety of industries including semiconductors, software, computing and networking equipment, IT services, telecommunications, biopharmaceuticals, medical equipment, photonics, alternative energy, data storage, energy management and chemicals.

Over the same period, approximately 20 Canadian venture firms invested in Silicon Valley, in deals totaling nearly \$230 million. Industries included communications and networking, drug delivery systems, medical instruments and devices, semiconductors, alternative energy, water treatment, and software.

Among the significant deals in recent years (extracted from data developed by Canadian consular offices):

- Elevation Partners of Menlo Park invested \$150 million to form a creative and management partnership for cross-border digital gaming and software development between Pandemic Studios in Los Angeles and BioWare Corp. in Edmonton.
- Sanderling Biomedical Venture Capital and VantagePoint Venture Partners together contributed \$140 million to biopharmaceutical/drug discovery firm Gemin X Biotechnologies over 2002–2004.
- Canaan Capital, Firsthand Partners and Focus Ventures invested a combined \$21 million in Toronto semiconductor/IC maker Silicon Optics.
- Battery Ventures, Morgenthaler Ventures and Norwest Venture Partners together put \$20 million into Inkra Networks, a Burnaby, B.C. communications and networking firm.
- New Enterprise Associates invested \$18 million in Toronto semiconductor/circuit maker ViXS Systems.
- Cisco Systems, U.S. Venture Partners and Mobius Venture Capital invested a combined \$17 million in Klocwork, an Ottawa developer of software and programming tools.
- 3i Corp., Vista Equity Partners, Vengrowth and RWI Group contributed a total \$13 million to Ottawa-based SigE Semiconductor.
- Cypress Capital Corp. put \$11 million into Ontario medical devices manufacturer Prism Medical Ltd.
- Alta Partners invested \$10 million, and Prospect Venture Partners invested \$3.08 million, in Ottawa biopharmaceuticals firm Zelos Therapeutics.

Investing in Technology

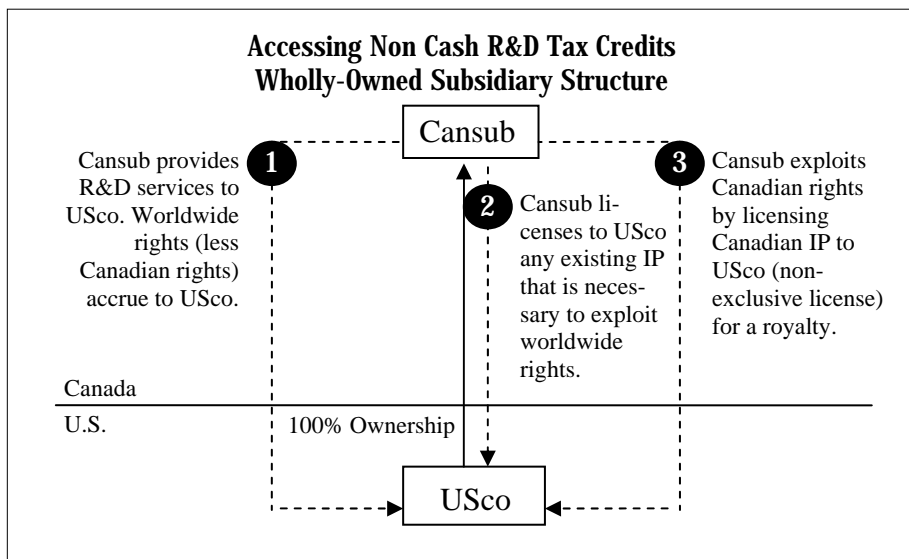
A two-way flow of cross-border venture capital and equity investment, mergers and acquisitions has grown steadily across the tech sector. Canada has been a major global player in computing, semiconductors, software, IT services and telecommunications. Canadian universities and technical schools have turned out highly skilled engineers, scientists and technical professionals in those fields, as well as in aerospace, advanced materials and, more recently, biomedicine and pharmaceuticals.

A January 2004 KMPG competitiveness study of business startup and operating costs in nine countries found Canada second only to Singapore and ahead of all its G-7 counterparts, with business costs averaging 5.5% below those of the United States. Overall business costs in Canada—a function of wages, energy costs, real estate prices, taxes and incentives—can be 25–40% lower than in the U.S., according to companies interviewed.

An effective program of Scientific Research & Experimental Development (SR&ED) credits and cash offsets tied to job creation, plus IP protection, has lured knowledge-based companies to Canada. Firms report added benefits: employee turnover rates are often lower, time zones are comparable, language is not an issue, legal and corporate governance standards are similar, and trade and borders are relatively open.

A captive R&D operation can be established in a few days' time for about \$2,000. Under a wholly-owned subsidiary model, the Canadian subsidiary (“Cansub”) provides R&D services to the U.S. parent company (USco), and the worldwide rights to the intellectual property developed in Canada would accrue to the U.S. parent company. Wholly-owned subsidiaries operating in Canada are only eligible to receive SR&ED credits which can be applied against corporate income taxes payable in Canada.

Non Cash R&D Credits

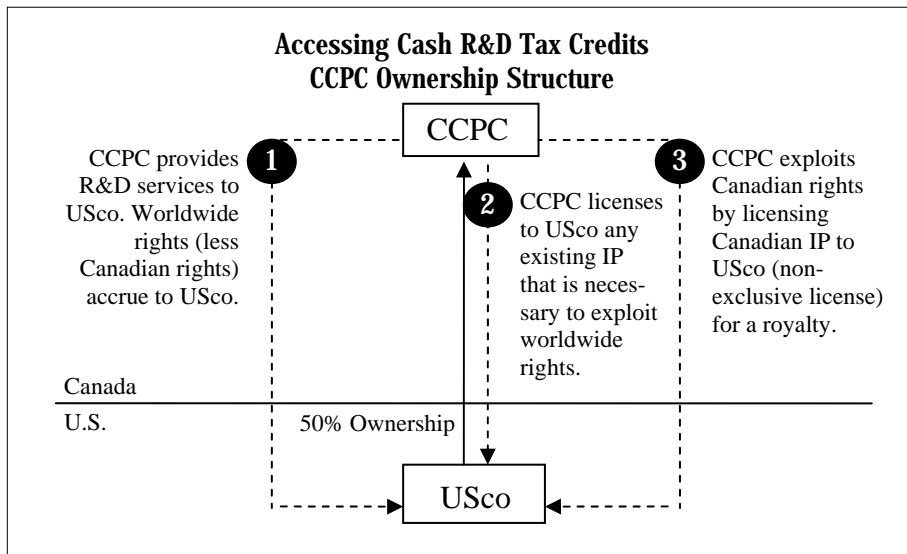


Investment

To obtain cash tax credits, a California company can set up a Canadian-Controlled Private Operation (CCPC) in Canada, in which it owns 50% or less of the company's shares, with the balance held by Canadian residents, which might include strategic partners such as Canadian investors (e.g., venture funds), a Canadian university, Canadian employees, or transplanted U.S. senior employees from the U.S. corporation, who take up residence in Canada.

After the CCPC has been established, the California company (a 50% owner of the CCPC) can enter into a contract with the CCPC to perform R&D work on its behalf, retaining 100% ownership of the intellectual property generated by the CCPC. In this manner, the California company receives cash tax credits to offset R&D labor costs, and also maintains control over the intellectual property.

Cash R&D Tax Credits



For a CCPC, these tax credits will be paid out in cash refunds to the extent that the CCPC does not have any income taxes payable in Canada. These can be an important source of cash flow for early stage companies, potentially providing months of additional runway before seed or venture capital funds are exhausted. Refundable credits are available up to a maximum 35% of qualified SR&ED expenditures up to 2 million Canadian dollars (about 1.71 million U.S. dollars), for a potential refund of 700 thousand Canadian dollars (about 598 thousand U.S. dollars).

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The table below illustrates the impact which cash R&D tax credits can have on labor costs for a software engineer in Canada's key technology markets including Calgary, Montreal, Vancouver, Toronto, and Ottawa, as compared with San Jose, California. Salary figures are from the KPMG 2004 Competitive Alternatives Study. The analysis also takes into consideration the mechanism of the R&D tax credit program, and assumes the company is eligible for the full refundable amount. All figures are in U.S. dollars, with Canadian labor costs converted at an exchange rate of 1.25.

	Calgary	Montreal	Vancouver	Toronto	Ottawa	San Jose
Salary	68,518	68,262	71,275	71,108	68,132	92,198
Statutory Benefits*	2,550	5,646	2,402	3,897	3,838	8,324
Non Statutory Benefits**	<u>12,618</u>	<u>12,125</u>	<u>13,430</u>	<u>12,608</u>	<u>12,102</u>	<u>17,357</u>
Fully Loaded Labor Costs	83,686	86,033	87,107	87,613	84,072	117,879
Less Cash R&D Tax Credits	<45,089>	<63,704>	<55,764>	<55,232>	<52,932>	
Total Labor Costs	38,597	22,329	31,343	32,381	31,140	117,879

* Statutory benefits include government pension plans, public medical plans, unemployment insurance and other discretionary benefits.

** Non Statutory benefits include other employer-sponsored benefits such as paid time not worked (holidays and vacation), private health insurance, and other discretionary benefits.

Work that qualifies for SR&ED tax credits includes support work in engineering, design, operations research, mathematical analysis, computer programming, data collection, testing, internal technical documentation and first-line management of employees and contractors.

Additional incentives include:

- **Industrial Research Assistance Program (IRAP).** Captive R&D operations in Canada with 500 or fewer employees may be eligible for matching grants, as well as technical and research assistance. Eligible R&D costs include in-house labor or sub-contractor labor costs. Under an IRAP Youth Employment Program, firms may also receive financial assistance when employing Canadian university graduates.
- **Export Development Canada (EDC) Buyer Financing Program.** EDC provides vendor financing to customers located outside of Canada who purchase technology or goods produced or developed in Canada. This program is especially valuable to small technology companies that do not have the necessary working capital to support sales under large contracts.
- **Targeted Wage Subsidy Program.** This federal program covers a portion of training costs and up to 60% of wages for new employees, over a period of up to thirty weeks. Assistance varies on a case by case basis and from one region to another. Generally, the contribution ranges from \$2,000 to \$5,000 per new employee.

Investment

Complementary technologies become even more attractive when the original pool of engineering, coding or development talent can be retained and the Canadian facility—a relatively short distance away—can be expanded to pursue new applications. Consider these deals, done in the past two years:

- A merger of Milpitas-based Uniphase with Ottawa-based JDS Fitel in 1999 led to the creation of JDS Uniphase (now called JDSU), a world leading optical technology and broadband test and measurement company based in the Bay Area.
- Autodesk acquired Toronto-based 3D animation and graphics software developer Alias in October 2005, for \$182 million. The deal injected R&D capital into Alias' operations, while expanding Autodesk's capabilities in both the design and media segments.
- Yahoo acquired Vancouver-based game developer Ludicorp, in March 2005, for \$39 million, in order to secure Ludicorp's Flickr web photo sharing and management tools.
- Apple acquired SchemaSoft, a Vancouver software developer, in February 2007, for its tools that enable file-sharing across multiple formats.
- Disney Interactive Studios bought Vancouver startup Propaganda Games to build its gaming presence, beginning with a new game franchise based on the Turok comic book, while Vivendi Universal took over Vancouver game developer Radical Entertainment and its studio facility with some 200 employees, also to expand its interactive gaming footprint.
- SupportSoft of Redwood City purchased Halifax-based Core Networks, a developer of broadband network management software, to strengthen its offering of digital "triple-play" capability—phone, Internet and television—to telecom service providers.



Canada “Near-Shoring”: A Cost-Benefit Analysis

Two California companies reach different conclusions

Giant Killer Robots (GKR) is a San Francisco digital special-effects studio, started in 1997, that began a transition from commercials and music videos to feature films with its work on the Robin Williams film *What Dreams May Come*. It has since contributed scenes to films such as *Blade: Trinity*, *Fantastic Four*, two films in the *Matrix* trilogy, and *Happy Feet*. GKR considered several different growth paths in 2005: expanding its range of capabilities as a premium full-service firm; expanding staff and facilities to take on more projects at once; or competing for less complex, lower-priced work with faster turnaround.

Living and working in Vancouver for six months on the *Fantastic Four* project, Studio visual effects (VFX) supervisor and co-founder Peter Oberdorfer saw potential in a Vancouver studio. Property, equipment, utilities and other startup costs were relatively low, and federal and provincial R&D tax credits, plus a digital artist employment credit, brought overall costs to 24% below those in California. Vancouver has a large pool of digital media talent, produced by companies like Electronic Arts and schools like UBC and the Vancouver Film School. GKR could form its own local area network between Vancouver and San Francisco on the CANARIE national high-speed broadband system.

But cost savings weren't enough, Oberdorfer says. A staff of 100—a 2:1 ratio relative to California—was needed for the economic benefits to pencil out over time. While Vancouver designers and programmers were strong in gaming and other media, specialized talent in feature films was hard to find. Senior staff were unwilling to relocate as part of a training effort. GKR has shelved the Vancouver studio for two or three years.

CenterBeam Inc., a San Jose IT outsourcing firm formed in 1999, provides desktop and server management, hosted messaging, network and system administration and end user support—including security, Sarbanes-Oxley and health insurance compliance, data storage and other features—on a subscription basis over the Internet to small and medium-sized businesses. CEO Kevin Francis, a native of Nova Scotia, had

Canada “Near-Shoring”

set up centralized back office functions in Halifax for Xerox Canada years earlier and opted to do the same for CenterBeam, opening a technical support solutions center in April 2004.

The center is staffed by 135 systems and technical support engineers, programmers and account managers who maintain the servers and network, develop applications and service clients for CenterBeam worldwide. Francis says wage and exchange rates, plus R&D and jobs credits, enabled him to hire three engineers for the price of one in Silicon Valley, but that wasn't the determining factor in his decision.

Nearby, New Brunswick boasts a pool of 50,000 tech workers, most in IT, and a university system that produces large numbers of qualified university graduates, particularly engineers, programmers and technicians. Employee turnover in Silicon Valley is close to 50%, compared with 7–8% in Halifax. Francis had considered going further offshore, but many of his customers were new to the idea of outsourcing their critical IT functions and required a comfort level that a support center in India or Costa Rica could not provide. Finally, New Brunswick had built a world-class broadband fiber-optic network essential to CenterBeam's operations.





Alberta's Different Approach

More than a decade of hard economic times and budget cuts in the 1980s and 1990s left Alberta struggling to diversify its economy beyond agriculture and energy into value-added knowledge industries.

The province had strengthened its university infrastructure, with the University of Alberta, University of Calgary and other institutions turning out skilled graduates in nanotechnology, IT and wireless applications. But turning engineers into managers, and ideas into startups and products, remained a challenge. According to Lee Kruszewski of the Alberta government's Department of Advanced Education and Technology, Alberta's economy had just begun to turn around in the late 1990s, and the government preferred a more cautious, targeted approach to incubating and growing tech firms than simply offering blanket incentives. Their plan was to provide funding support to public-private partnerships and business-focused non-profit entities that would screen business and project applicants for viability, and would provide expertise to help startup enterprises accelerate commercialization of new technology.

In 1999, the government began hosting expatriate events in California, focusing on networking Alberta alumni and alerting them to emerging provincial business opportunities. In 2002, it formed the Alberta-California Venture Alliance (ACVA), which matches some fifty California venture investors with entrepreneurs and investors in Canada who are looking to raise capital, enter the U.S. market, and/or strengthen their managements and advisory boards. To keep investment in Alberta, ACVA requires an initial round of Alberta VC investment before a company can participate in the Alliance's program.

Alberta has also committed \$30 million to expand AVAC Ltd., a public-private entity originally created in 1997 to evaluate and fund value-added research in agricultural science. A new investment initiative, IVAC, will extend AVAC's portfolio to provide early-stage and seed funding for life sciences and industrial technology startups. IVAC is

a matching fund that involves funding participation from industry and partner tech-sector organizations.

Discussions are also underway to link students, faculty and researchers at Canada's National Institute for Nanotechnology, housed on the University of Alberta campus, with California universities and research institutions via the CANARIE broadband network as part of the Canada-California Strategic Innovation Partnership (see the Partnership Opportunities concluding section of this report).



California's Attraction: More than Sun and Sand

A broad range of California companies are active in Canada, serving the domestic market, engaging in cross-border manufacturing or using Canada as a platform for global production. For Canadian firms, California's population and economy mean that a California presence, at the minimum, doubles the size of their market at relatively low cost without going any further offshore. For tech firms in particular, California offers a sophisticated customer base for tech products and services; a center for cutting-edge innovation, fed by world-class universities and research institutes; an incubator for scientific and creative talent; and an important link to technology markets in Asia through its entrepreneurial communities in Silicon Valley, San Francisco, greater Los Angeles and San Diego. Canadian firms have thus become significant investors in California, focusing on both market and technology development.

For example:

- Ontario-based Research in Motion acquired (in March 2006) Ascendant Systems of San Jose, a maker of voice mobility software that extends PBX phone functions to wireless phones and PDAs.
- DALSA Corp. of Waterloo, Ontario, whose optic lens technology helped produce the photos transmitted to Earth from the Mars Rover, has opened a 12,000 square foot, full-service rental center for subsidiary DALSA Origin, offering high-end digital equipment for film and television production—including the world's first and only 4K digital motion picture camera.
- MOSAID Technologies, an Ottawa provider of semiconductor memory test and analysis systems, bought Sunnyvale-based Virtual Silicon Technology, a developer of wireless chip design processes and functions, for \$5.35 million in October 2005.
- MacDonald, Dettwiler & Associates Ltd. of Richmond, B.C., a data systems and services company providing satellite imaging, mapping and data management for the aerospace, defense, real estate, banking and insurance sectors, acquired DataQuick, a

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San Diego developer of property history and valuation data, in 2000 and Marshal & Swift/Boeckh, a Los Angeles supplier of commercial and residential property appraisal data, in 2004. The two deals give MDA electronic access to data on 83 million properties in more than 800 counties in 46 states.

- Arctic Glacier Inc. of Winnipeg, already the second largest packaged ice company selling in the U.S., acquired California Ice, a group of six regional companies with statewide presence and distribution, over May–August 2006, for \$190 million.
- Sierra Wireless Inc., a Richmond, B.C. maker of wireless PC cards, modems and embedded modules, bought AirPrime, a Carlsbad firm specializing in high-speed wireless products that use the code division multiple access (CDMA) wireless standard. AirPrime’s Carlsbad operation, acquired in 2003, is now Sierra Wireless’ largest foreign division, employing some 100 people.
- WorldHeart Corp., created in 1996 to develop heart implant device technology that originated at the University of Ottawa Heart Institute, is now headquartered in Oakland and has completed clinical training with teams from Toronto and Ottawa for a new-generation pump that prevents heart failure in patients awaiting transplants.
- In a \$1.6 million deal, Markham, Ontario-based Nuvo Research Inc., a developer of pharmaceutical products applied to the skin, such as ointments or patches, acquired fqubed Inc., a San Diego firm that, in partnership with U.C. Santa Barbara, holds proprietary technology for high-volume testing of such “transdermal” therapeutics.
- Ballard Power Systems of Burnaby, B.C., provides hydrogen fuel cells to the “B.C. to B.C. Hydrogen Highway” pilot program of the California Fuel Cell Partnership—a group of automakers, energy companies, utilities, transportation providers and government environmental quality agencies partnering to test 300 fuel cell vehicles during 2000–2007.
- 180 Connect, a listed Canadian company, now based in the U.S., that provides contract installation, maintenance and repair for broadband satellite, cable, phone and commercial security networks, has been selected to build a \$41 million open access, broadband fiber-optic network for the City of Palo Alto. Financing is to come from Royal Bank of Canada Capital Markets.
- MDS Inc., a major Toronto-based contract pharmaceutical research firm, acquired Molecular Devices, a Sunnyvale provider of high-performance content screening, cellular analysis and biochemical testing tools, for \$615 million in January 2007. A new, cross-border business unit, MDS Sciex, employs 1,100, including 250 scientists and engineers and expands both firms’ offerings to pharmaceutical, biotech, academic and government research laboratories worldwide.



Partnership Opportunities

The collaboration that already exists between California and Canada, as outlined throughout this report, has been largely market-based, although Canada has not been reluctant to lend government support—as a convenor, a catalyst or an investor—to jump-start innovation.

California and Canada are both progressive, forward-thinking and global in their outlook. They have begun to confront a variety of challenges with similar approaches and concerns: global warming and the gradual transition out of a carbon-based economy; the potential for disease pandemics; using “smart” technologies to improve the productivity of highways, water systems, air traffic corridors and freight supply chains; unlocking the secrets of the human genome to treat disease and regenerate tissue and organs; and more. Many of the innovations anticipated in these areas are in their very earliest stages of research and development.

The process of accelerating such innovations through basic research, application of that research and commercialization of the applications—research, development and delivery (RD&D)—will be expensive and time-consuming. But it can be less so—to the extent that companies, universities, research laboratories and governments can collaborate and share information in the basic building block stages. That, in turn, raises questions about building a research infrastructure, identifying sources of funding, and reaching agreement on use and compensation for shared intellectual property.

California and Canada have taken initial steps to explore potential opportunities for cooperation through several channels, the largest and most formalized being the Canada-California Strategic Innovation Partnership (CCSIP).

CCSIP’s purpose is to leverage parallel research, development and commercialization of products and services on both sides of the border by linking the shared knowledge and talents of researchers, entrepreneurs, investors and government. The Partnership has identified several large-scale, interdisciplinary areas of research that have advanced in complementary ways in California and Canada: stem cells, cancer, emerging infectious diseases, advanced transportation and energy, information and communications technology, and nanotechnology.

Working groups in each of the research areas report to a steering committee made up of representatives from the U.C. system, UCLA’s vice chancellor for research, and Hewlett-Packard on the California side, and the B.C. Innovation Council, the University of British Columbia (UBC), McGill University, and the National Research Council of Canada on the

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Canadian side—with the Consuls General of Canada for San Francisco/Silicon Valley and Los Angeles participating as informal members.

A pair of summits held in January 2006 at UCLA and in June 2006 at UBC laid the groundwork for the working groups and for subsequent meetings in Canada with Deputy Minister for International Trade Marie-Lucie Moran and with representatives of Industry Canada. In an October 2006 meeting with Canada's ambassador, Governor Arnold Schwarzenegger endorsed the CCSIP initiative.

Participation in CCSIP is open to all the research universities in California, but the effort has been spearheaded on the California side by the ten U.C. campuses under the leadership of University of California president Dr. Robert C. Dynes, a Canadian expatriate. Leadership on the Canadian side includes Canada's national science advisor Dr. Arthur Carty and the presidents of McGill University, the University of British Columbia, and the University of Alberta. CCSIP also encompasses the full membership of the "G13" group representing the most research-intensive Canadian universities.

Along with the working groups in each of the research areas, CCSIP partners are studying future models for multinational education involving shared research, faculty student exchanges, and professional development to guide technology transfer and commercialization of research. A further effort is underway to address potential legal, financial and structural impediments to shared cross-border research and investment.

One likely approach to undertaking joint RD&D will be to connect the U.C. system's Institutes of Science and Innovation and Canada's Networks of Centres of Excellence and to begin building research laboratory partnerships; direct investments and exchanges in labs and other research facilities; and/or joint institutes, faculty appointments and supervision of PhD candidates.

To facilitate joint research, a broadband network link has been established between the CANARIE CANet 4 system in Canada and the Corporation for Education Network Initiatives in California (CENIC). A successful test in late 2006 linking Ottawa's Communication Research Centre and the U.C. San Diego division of the California Institute for Telecommunications and Information Technology delivered up to ten gigabytes per second for real-time sharing of complex data and graphics.

Canada's university system and major investments by Canadian federal and provincial governments also provide fertile ground for university-industry collaboration with California companies. In one example, Hewlett-Packard Company (HP) is working with counterparts in Alberta to leverage the province's investment in nanotechnology R&D—an outgrowth of the provincial government's decision to invest its energy wealth in a hi tech future. With matching funding from Alberta, Canada's National Research Council has established its nanotech arm, the National Institute for Nanotechnology (NINT), on the Edmonton campus of the University of Alberta, a major engineering center. Joint research is underway between HP and Canadian scientists on nanowires that can be used in biological and

Partnership Opportunities

chemical sensors, leveraging HP's expertise in nanowires and Canadian expertise in chemistry. In another joint project with provincial funding, HP is helping the University of Calgary's high performance computing group to build a new data center, with scientists working in both Calgary and Palo Alto.

Still other initiatives are underway that seek to leverage shared interests and complementary research and technological capabilities. Multiple avenues are under discussion for joint stem cell research, funding and IP sharing. In the biotechnology sector, California is home to 2,500 companies and 87 private and public research institutions that attracted \$2.3 billion in National Institutes of Health grants in 2000. In Canada, Montreal, Vancouver and Toronto alone are home to more than 500 biotech companies generating \$15 billion annually and employing 60,000 workers in 2003, providing a rich base for cooperation. Manitoba signed a 2004 memorandum of understanding with Minnesota to develop a North/South Bioscience Corridor to promote collaborative R&D. Both Manitoba and British Columbia have sought similar province-level arrangements with California.

As mentioned earlier, Canada and California are participating in the "B.C. to B.C. Hydrogen Highway" pilot program to promote fuel cell technology that will test 300 fuel cell vehicles and a network of hydrogen filling stations from British Columbia to Baja California. Participants include automakers, energy companies, utilities, transportation providers and government environmental agencies in the California Fuel Cell Partnership.

These new kinds of partnerships—bridging governments, universities, businesses and investors, all at once—represent a public-private path to innovation that may fill the same role in the 21st century that advanced research enterprises like the U.S. Defense Department DARPA program, and facilities like Bell Labs or the Xerox Palo Alto Research Center (PARC) played decades earlier.

In the process, they hold the promise for placing—and keeping—California and Canada at the cutting edge of important science, technology, industry, higher education and economic growth, for decades to come.

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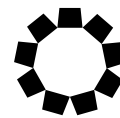
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