APPENDIX 4

BUSINESS SURVEY ANALYSIS

BUSINESS SURVEY ANALYSIS

The business survey allowed us to examine questions about innovation, networks, and policy in more detail. The survey results describe the types of businesses involved in the innovation of green products and the role of green innovation both in the creation of a firm's new products and in the operations of the firm. It identifies some of the economic "drivers" of green innovation and obstacles to green innovation. It characterizes the institutional networks that contribute to education in green practices and that support the development of green innovation. Finally, it examines the effects of environmentally-related public policy on business operations and of the broader business climate on the ability to innovate.

The survey sampled three types of firms—those defined as *green* by the product or service offered, a strategic random sample of firms that do not offer green products or services (hereafter referred to as *traditional* firms) and, finally, a sample of firms from certain industries that report their toxic chemical releases and waste management activities to the U.S. Environmental Protection Agency's Toxic Release Inventory (hereafter referred to as TRI firms).Thus, we were able to examine the circumstances in which innovation occurs and how it spreads among different types of economic producers. The sample covered firms throughout the state, providing a rich picture of the variations among and within the case-study regions.

We have divided the survey findings into several broad areas. *Green Practices and Activities* reports the level of use of green business practices among the respondents, distinguishing responses by respondent category (green, traditional or TRI) and region. *Innovation* questions specifically address the ways that respondents develop or make use of green innovations. *Regional Assets* describes endogenous strengths and regional competitive assets that influence business location and relocation decisions. *Policy Perceptions and Impact* addresses the role of Federal, state and local policies in firm operations, looking in particular at both AB32 and the impact of the Stimulus Package. *Regional Networks* examines the relationships between businesses and public and private organizations within the green economy. Finally, a cross analysis is done to examine the specific characteristics of green innovative companies in the survey. Sample selection and survey methodology, as well as detailed information on the characteristics of respondents (size of firm, industry, location, etc.) are described in Appendix 3. Survey Methodology.

Survey results for green businesses are further broken out by region, industry, and/or company size to analyze different characteristics among companies located in different regions, industry sectors or with different number of employees. The majority of green companies in the survey are located in six California regions (East Bay, Los Angeles, San Diego, Silicon Valley, Inland Empire and Upper San Joaquin Valley). For the purpose of this analysis, companies are grouped in eight industry aggregates according to their business activity: Architecture/Engineering/Design, Construction, Energy Research and

Utilities, Manufacturing, Transportation/Logistics, Recycling/Remediation, and Environmental Services and Other. The Environmental Services and Recycling/Remediation categories are not present in the traditional and TRI surveys given the inherent green character of those industries. Finally, by size, there are four categories according the number of full-time employees of the surveyed firms: 4 or fewer employees, 5-24 employees, 25-99 employees, and 100 employees or more.

Despite the random selection of firms to take part in the survey, each survey sample presents specific characteristics that are important to take into consideration. For instance, the green survey has a considerably higher percentage of firms located in the East Bay (40%) while almost half of the TRI companies and more than a quarter of traditional firms are located in Los Angeles County. Within the green survey, there is a higher presence of Architecture/Engineering/Design, Construction and Environmental Services firms while in the traditional survey businesses in Manufacturing, Construction and Other Industry sectors dominate. The TRI survey is mostly Manufacturing companies (87%).

By size, there are also significant differences between each of the surveys with more small firms in the green and traditional surveys and larger companies in the TRI survey. For instance, 31% of green firms had 4 or less full-time employees compared to 21% of the traditional firms and 0% of the TRI firms. On the other hand, 58% of the TRI firms had 100 or more full-time employees compared to 9% of traditional firms and 4% of green companies in the survey.

Growth Plans

The survey asked whether firms had plans to grow, stay the same size or shrink in the next year and the next five years. Results indicate that green businesses are more likely to plan to grow within the next year than traditional and TRI businesses, and traditional businesses are more likely to grow than TRI businesses. Meanwhile, TRI businesses are far more likely to have plans to downsize over the year. Table 1 compares growth plan results for the three surveys.

Table 1. Growth Plans for the Next Year by Survey

	Green Businesses	**Traditional Businesses**	**TRI Businesses**
n=	*334*	*176*	*61*
Grow	51%	39%	30%
Stay the same size	42%	53%	53%
Shrink	7%	9%	18%

Notable outliers among green businesses at the regional level include the Inland Empire and San Diego regions. Of firms in these two regions, 71% and 64% respectively responded that they are planning to grow their firm size over the next year. Los Angeles green businesses are the most pessimistic compared to the rest the regions, as 15% of

the region's green firms responded that they were expecting to shrink over the next year, compared with 7% across the regions.

Traditional businesses in the Inland Empire also responded differently to the question than those in other regions. While 9% of traditional firms cited plans to downsize within the next year, 31% of businesses in the Inland Empire responded that they were expecting to shrink. Unfortunately this difference is based on a small sample of firms, and thus cannot be statistically verified. Too few TRI firms answered the question to tease out regional differences.

In order to make comparisons among green businesses, a cross-analysis is used to distinguish between innovative and non-innovative green companies. Green firms that answered "Yes" to the survey question "Has your firm introduced a new product or service in the past three years to reduce environmental impact?" were considered innovative green firms. This analysis revealed that green innovative firms are more likely to grow (55% vs. 47%) than green non-innovative firms.

Table 2. Growth Plans for the Next Year, Green Companies (this and the next table are both number two, we need to renumbered all tables!)

	Innovative Green Firms	**Non-innovative Green Firms**
n=	*157*	*111*
Grow	55%	47%
Stay the same size	39%	46%
Shrink	6%	7%

When looking at their five-year growth plans, the difference between business types begin to fade. As Tables 2 and 3 outline, a large majority of all business types have plans to grow over the next five years, though traditional businesses lag the other types. TRI businesses are also more likely than their green and traditional counterparts to shrink over the next five years.

Table 3. Growth Plans for the Next Five Years by Survey

	Green Businesses	**Traditional Businesses**	**TRI Businesses**
n=	*306*	*161*	*60*
Grow	83%	73.9%	81.7%
Stay the same size	15%	24.8%	11.7%
Shrink	2%	1.2%	6.7%

At the regional level, green firms in San Diego and Silicon Valley are more likely to plan to grow over the next five years. In San Diego, 97% of firms responded that they planned to grow, a statistically significant level, while in Silicon Valley, 92% of green businesses plan to grow.

Interestingly, while with their one-year plans, a smaller percentage of traditional businesses in the Inland Empire, compared with all regions, are planning to grow (23% versus 39%), in their five year plans, 100% of traditional Inland Empire firms are planning to grow, compared with 74% for all regions. This reflects confidence that in the long run, the effects of the economic recession will fade and the region's rapid growth will resume.

GREEN PRACTICES AND ACTIVITIES

The next chapter details businesses' and regions' current and future green practice plans. Businesses address the perceived barriers to incorporating green practices into their operations.

Green Business Practices and Activities

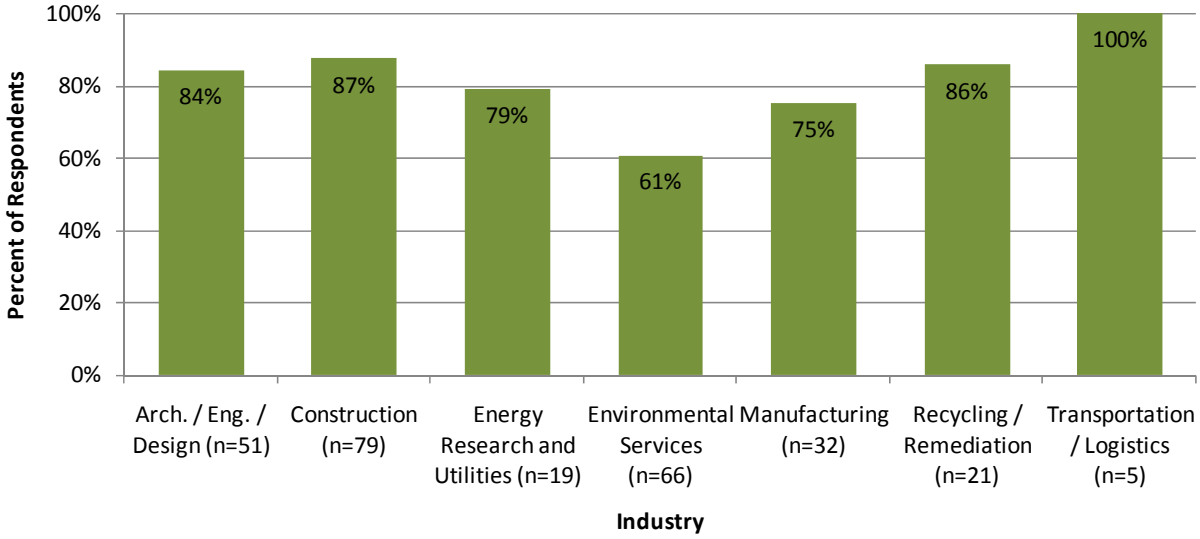
All business types were asked about how important green business practices were to their firm. Table 4 shows that green businesses clearly value all types of green practices much more than traditional and TRI businesses. Seventy-seven percent of green businesses rated such practices as *Very important* compared with only 46% of traditional businesses and TRI businesses. These differences have high levels of statistical significance. Surprisingly, more traditional businesses rated green practices as *Not important*, compared to TRI businesses (11% verses 5%).

Table 4. Importance of Green Business Practices by Survey

	Green Businesses	**Traditional Businesses**	**TRI Businesses**
n=	*298*	*175*	*59*
Very important	77%	46%	46%
Somewhat important	12%	43%	49%
Not important	3%	11%	5%

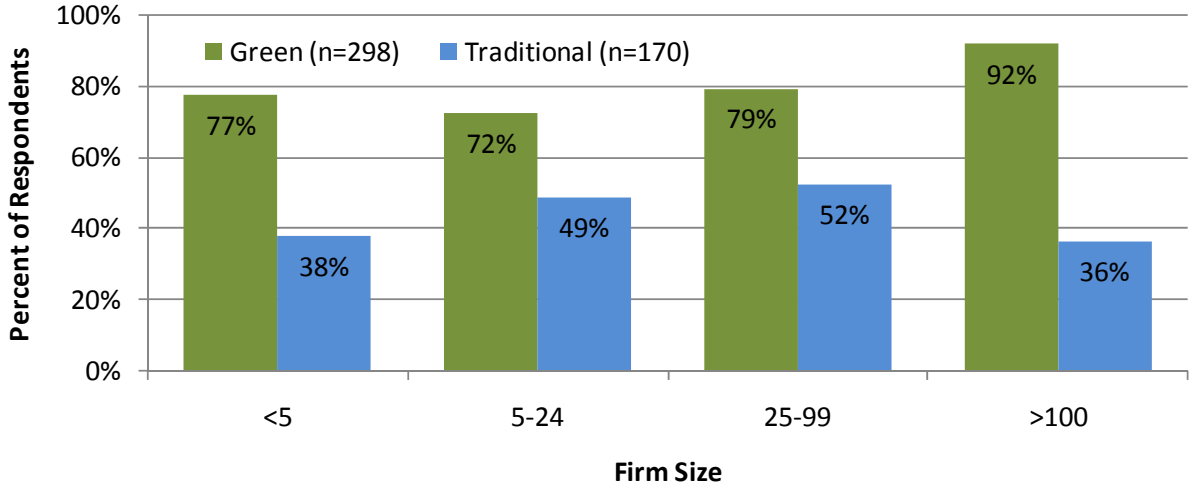
Within industries, there seems to be very little consistency between business types. Among green architecture and design firms, for example, 84% responded that they felt green practices were *Very important*, while only 20% of traditional architecture and design firms responded this favorably. Such differences are common in all industry types. Among green businesses, there is also a range in attitudes between industries (Figure 1). Green *Environmental Services* businesses feel least strongly about incorporating green practices (61%).

Figure 1. Green Businesses Rating Green Practices as Very Important, by Industry



The importance of green practices also varied by firm size (Figure 2). As firm size increases, firms seem to be more likely to rate green practices as *very important*. This trend is consistent across both green and traditional businesses. While it might seem that this change would likely be due to a business's financial ability to invest in such practices as the firm size grows, as we will see below in the discussion of barriers, this is not the case. The notable outlier for this trend is traditional businesses with more than 100 employees. For these firms, green practices seem less important than for small traditional firms. There were not enough TRI survey respondents to analyze the responses by firm size.

Figure 2. Businesses Rating Green Practices as Very Important, by Firm Size, by Survey



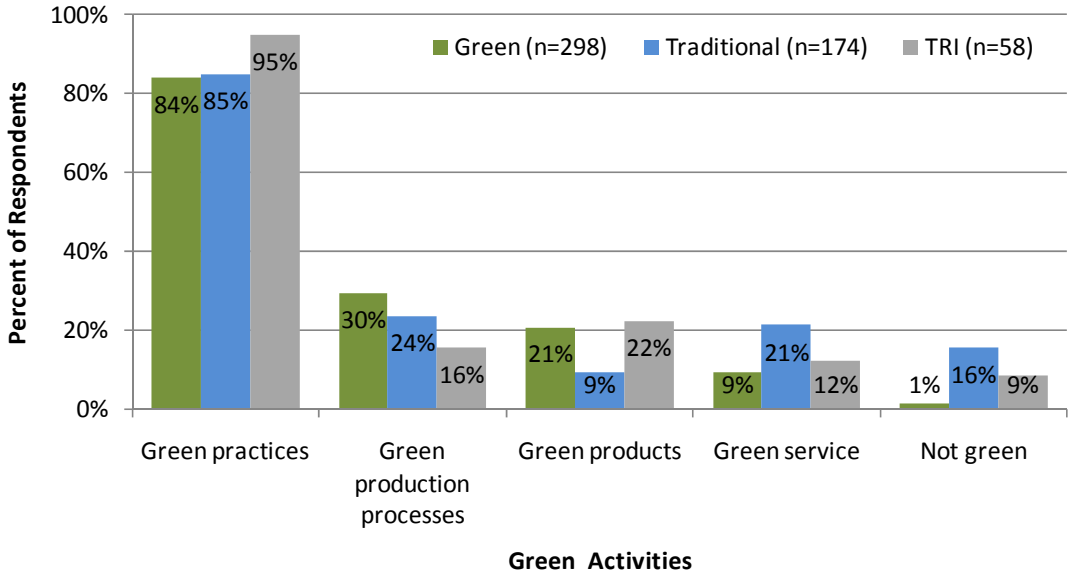
Among green businesses, there were few regional differences in attitudes towards green business practices.

Businesses were given the option to identify which green activities they engage in. Participants were able to select as many options as applied. The five choices were:

- We make green products (e.g., solar panels)
- We provide green services (e.g., environmental consulting, waste management services)
- We use green production processes (e.g., zero-waste)
- We incorporate green practices into our operations (e.g. recycling, reduce energy use, etc.)
- We are not a green business

Figure 3 shows the percentages of businesses of each business type that engage in each green practice activity. TRI businesses were most likely to respond that they are already incorporating *Green Practices into our Operations* (95%). This is likely because many TRI businesses have already had to "green" themselves due to local, state and federal regulations. There is little variation across green and traditional businesses in the propensity to incorporate green practices into internal operations. The area in which green businesses particularly exceed their traditional and TRI counterparts is in the provision of green services. This high percentage agrees with the relatively high percentage of *Environmental Services or Consulting* firms in the green business survey (26%).

Figure 3. Green Activities by Survey



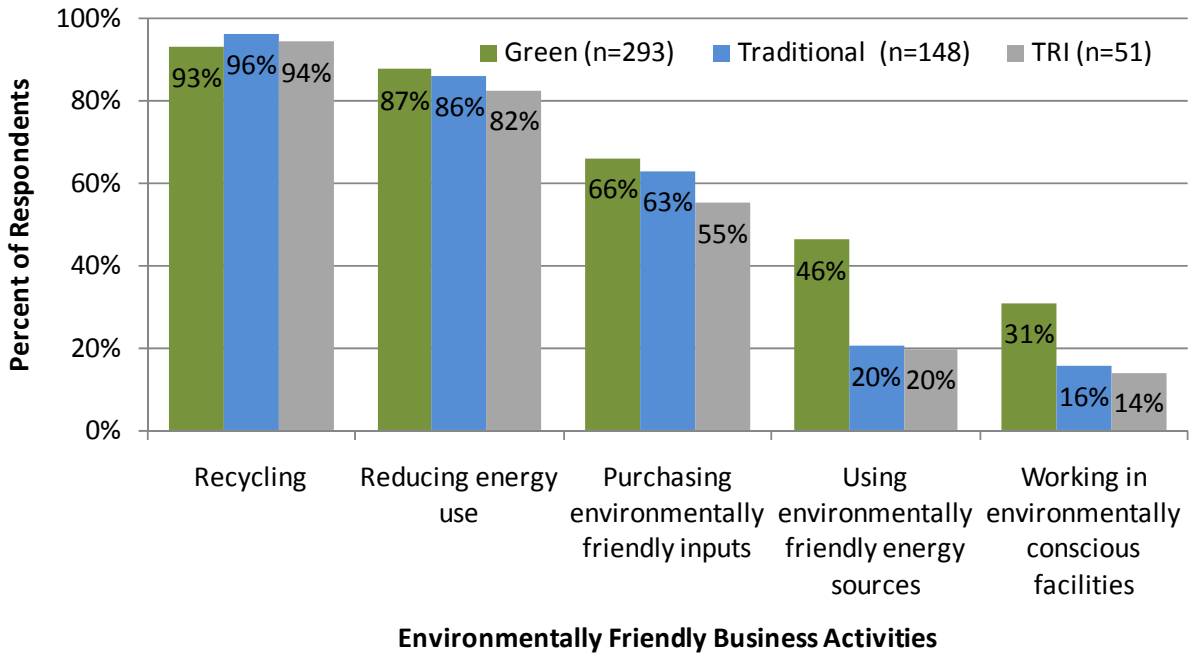
Surprisingly, among all of the firms surveyed, only 16% of traditional businesses and even fewer, 9%, TRI businesses responded saying that they are not a green business.[i]

Compared to the other green business regions, both San Diego and Silicon Valley business respondents produce more green products (41% and 30%, respectively). This reflects how green companies in these two regions are more interested in green product manufacturing as opposed to the East Bay, LA and Inland Empire where the focus of green companies is mainly in providing green services. San Diego also has a higher percentage of businesses that use green production processes, 35%, compared with 27% for all regions. Regarding the incorporation of green practices, Silicon Valley green businesses are the most likely to use green practices in their operations (90%) while San Diego businesses are the least likely (76%).

Firms with more than 100 employees are more likely to use *green production* processes and incorporate *green practices into their operations* than firms with fewer than 100 employees. However, these large firms are less likely to offer green products. This may reflect that fact that firms producing green products tend to be earlier in the product cycle, and thus smaller. When it comes to *green services*, large firms were roughly on par with other sized businesses.

Next, businesses were asked about specific business-related practices and activities. This question offered firms another opportunity to address the types of general environmentally friendly activities that they do, regardless of which industry they are in. Figure 4 summarizes the responses of each business type. The two categories in which green businesses outranked traditional and TRI businesses are *Using environmentally friendly energy sources* and *Working in LEED certified, or otherwise environmentally conscious facilities*. Forty-six percent of all green businesses responding said that they use green energy sources, compared with less than 20% for both traditional and TRI businesses. Similarly, 30% of green businesses operate in environmentally friendly facilities, while less than half of traditional and TRI businesses do. In other categories, the operational differences are less pronounced.

Figure 4. Environmentally Friendly Business Activities



Only 1% of green businesses said that they *do not incorporate green practices*, while just over 2% of traditional businesses said this. No TRI businesses said that they do not incorporate green practices. The difference in green practices seems to have very little to do with regional context. However, Table 5 demonstrates that there are a number of differences in the incorporation of green practices by industry across green firms. Architecture and Construction firms were the most likely to indicate that they worked in environmentally conscious facilities and purchased environmentally friendly raw materials or supplies.

Table 5. Green Activity Among Green Businesses by Industry

		Recycling	Reducing energy use	Using environmentally friendly energy sources	Working in environmentally conscious facilities	Purchasing environmentally friendly raw material or supplies
Architecture	*n=53*	91%	92%	51%	40%	77%
Construction	*n=79*	94%	82%	65%	42%	78%
Energy Research	*n=18*	89%	94%	56%	22%	50%
Environmental Services	*n=59*	95%	97%	32%	27%	49%
Manufacturing	*n=34*	88%	82%	32%	12%	56%
Recycling	*n=21*	91%	91%	48%	26%	70%
Transportation	*n=6*	100%	62%	19%	19%	57%

In terms of firm size, the biggest differences were in the use of environmentally conscious facilities. Firms with more than 100 employees were far and away the most likely to work in such facilities (67%). Table 6 outlines these results.

Table 6. Green Activity Among Green Businesses by Firm Size

	<5	5-24	25-99	≥100
n=	*117*	*95*	*48*	*12*
Recycling	97%	94%	98%	92%
Reducing energy use	93%	86%	92%	92%
Using environmentally friendly energy sources	51%	42%	44%	58%
Working in environmentally conscious facilities	35%	28%	25%	67%
Purchasing environmentally friendly raw material or supplies	75%	65%	52%	83%

Very few firms took the opportunity to expand on their green practices in an open-ended question format. Those who did, however, cited *Green commute/transportation*, *Providing green policies/advocacy/information* and *Reducing water use* as some of the main alternative activities that they engage in. One green, Los Angeles business wrote, "we encourage bicycle commuting to our associates," while a traditional business in Silicon Valley noted, "we use closed loop water cooling so we don't waste water."

Barriers to Green Practice Implementation

When asked about the barriers to incorporating green practices, there was consensus between the three business types (Table 7). The largest issue for all businesses is the cost of incorporating green practices, followed by lack of demand and then lack of information. Cost seems to be a much higher barrier for TRI businesses than for their green and traditional business counterparts.

Table 7. Barriers to Incorporating Green Practices by Survey

	Green Businesses	Traditional Businesses	TRI Businesses
n=	*176*	*134*	*48*
It is too expensive	59%	48%	63%
There is not enough information	27%	34%	27%
There is not enough demand from our customers	53%	40%	35%

Among green businesses, regional difference exist in regards to information about green practices. Only 9% of green businesses in the East Bay region found lack information to be a barrier, while this percentage is 23% in Los Angeles, and 41% in Silicon Valley. These differences are statistically significant at 95% confidence levels. Surprisingly, there were fewer differences among regions in the traditional and TRI business surveys.

In referring to both cost and lack of demand as being prohibitive barriers to some green practices, one TRI business wrote, "it can be expensive - we have to make persuasive arguments to our customers that it is the right thing to do, but the economy can make that a difficult sell." Another traditional business commented, "[it is] not expensive in terms of raw materials, rather in the cost of compliance with the bureaucracies." Bureaucratic costs and "red tape" were often cited as reasons for unmanageable costs and lack of information for green practice implementation. A different traditional business in the Los Angeles region commented, "some … government agencies and some utility companies make it nearly impossible to make it to anyone's advantage, or just so difficult you give up in trying to make your way through the incomprehensible process." Even a green business in the East Bay region added, "the lack of green supplies on the shelf to purchase [makes it difficult]. The[re is a] lack of … information about alternatives when purchasing." These attitudes about green practice barriers are pervasive and span across business type and region.

When asked about specific barriers to green practice implementation (Table 8), firms with more than 24 employees were more likely to cite cost as a barrier. It may be that the cost of implementing such practices becomes prohibitively high, the larger a business is. Firms with less than 5 employees were least affected by the cost of implementation.

Table 8. Barriers to Incorporating Green Practices for Green Businesses by Firm Size

	<5	5-24	25-99	≥100
n=	*77*	*54*	*26*	*9*
It is too expensive	53%	56%	81%	78%
There is not enough information	27%	26%	31%	33%
There is not enough demand from our customers	58%	59%	31%	56%

Businesses were then asked to say whether they have plans to expand their green practices. Here, there is a clear distinction between business types. Among green businesses, 77% said that they are planning on expanding their practices, despite the previously mentioned barriers, while only 65% of traditional businesses are planning to. None of the five TRI businesses, which answered this question, are planning to expand their practices. Thus, while current practice and awareness levels appear somewhat consistent across business types, there seems to be a greater push to move forward by green businesses. Table 9 compares the attitude across surveys.

Table 9. Expansion of Green Practices in the Future

	Green Businesses	Traditional Businesses	TRI Businesses
n=	*277*	*140*	*5*
Yes	77%	65%	0%
No	23%	35%	100%

Among green businesses, there is a clear difference, by firm size, between how willing firms are to expand their green practices in the future. Only 71% of firms with 24 to five employees responded that they are planning on expanding their green practices. This is compared to over 90% of firms with 25 or more employees. Table 10 summarizes the green business response rates by firm size.

Table 10. Expansion of Green Practices in the Future for Green Businesses by Firm Size

	<5	5-24	25-99	≥100
n=	*116*	*96*	*43*	*12*
Yes	74%	71%	93%	92%
No	26%	29%	7%	8%

While green businesses are known for their environmentally friendly products and services, it appears that traditional and TRI businesses are at times just as engaged as the green businesses in several aspects of green practices. Firm size seems to be a key variable in explaining green practices, with large firms being more willing to implement and expand green practices than smaller firms even. The fact that there is a higher percentage of small firms in the green survey than in the traditional and TRI survey might explain why green firms in the survey seem to be less likely to incorporate green practices than traditional and TRI firms.

INNOVATION QUESTIONS

In order to understand more about businesses ability to change and innovate for more environmentally progressive practices and products, a series of questions on innovation were asked in each of the surveys. The following section identifies what types of innovation businesses engage in, and which sources they use to find more information about both operational innovation and regulations and product innovation.

Operational Impact of Environmental Regulations

One potential indicator of innovation is a business that changes the way it operates or alters its production process. Incorporating such changes may involve applying new technologies, recently commercialized. Green, traditional and TRI businesses were all asked whether they have changed the way they operate in order to reduce environmental impact or meet environmental regulations. Green and traditional businesses have similar affirmative response rates, 68% and 65% respectively. Far more TRI businesses, however, 89% wrote that they have changed to respond to environmental issues. The difference in these rates is statistically significant. It may very well be that this difference can be attributed to the fact that most environmental regulations affect the biggest offender, and thus TRI businesses are more likely to have had to change their practices. Table 11 compares percentages of businesses, which have been affected by business type.

Table 11. Change in Operational Processes to Reduce Environmental Impact

	Green Businesses	**Traditional Businesses**	**TRI Businesses**
n=	*282*	*137*	*49*
Yes	68%	65%	89%
No	32%	35%	12%

As with green practices and activities, changing operational practices varied by industry. Green architecture, construction and recycling companies had higher rates of positive responses (73%, 85%, and 81%, respectively), compared with the other industry groups, all of which had positive response rates near 55%. Green transportation firms are the least likely to have changed their operation practices, with only 33% responding that they had.

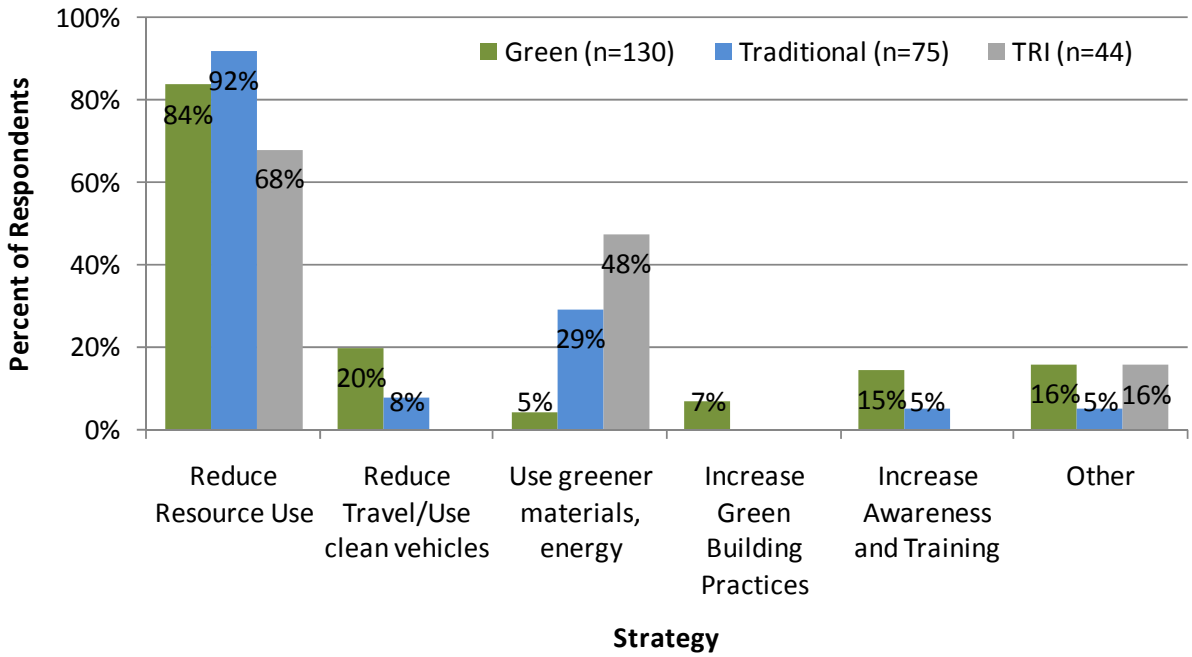
Firm size did not seem to make a difference to either green or traditional businesses.

Businesses were provided an opportunity to explain the ways in which regulations have affected their operations. By far, the most common response had to do with *reducing resource consumption*. This includes reducing energy and water use, managing stormwater runoff, and reducing waste. Traditional businesses were most affected, 92%, followed by green (84%) and TRI (68%) businesses. Businesses mentioned

strategies ranging from installing solar panels to installing energy curtains, to recycling water as ways to reduce their water and energy use.

As Figure 5 shows, the second most common strategy among traditional and TRI businesses is the *use of greener materials and energy*. Almost half (48%) of TRI respondents cited this as an operational change or innovation. Fewer traditional, 29% and green, 5%, businesses said that they have innovated their practices in this way. Twenty percent of green businesses also identified *reducing their travel and using cleaner transportation methods* as an important strategy. A utilities company in the San Diego region wrote, "we are purchasing smaller, more fuel efficient fleet vehicles to reduce (our) gasoline expense and consumption, and are reducing travel miles through use of GPS directed dispatching."

Figure 5. Operational Change by Survey



There are a few regional differences among green firm respondents. Silicon Valley firms are less likely to have reduced their resource use, 69% compared to the green average, 87%. However, they have been more willing to increase their green building practices- 15% of green Silicon Valley respondents wrote that they have done this compared to only 7% of the green average—not surprisingly due to their strong local green building industry. Green firms in the East Bay are more likely than the green average (27% compared to 20%) to have reduced their travel needs or to have switched to using cleaner transportation, perhaps reflecting greater transit accessibility in that region.

Lastly, more green respondents from Los Angeles cited greener materials and energy sources in their production processes (31% compared to 5%).

There does not seem to be a clear pattern regarding operational change by firm size. It may be suggested that smaller firms are more like to have implemented inexpensive strategies for addressing environmental issues (such as recycling, reducing travel, reducing waste/reuse, etc.). Table 12 summarizes changes by firm size.

Table 12.. Operational Change by Green Business Firm Size

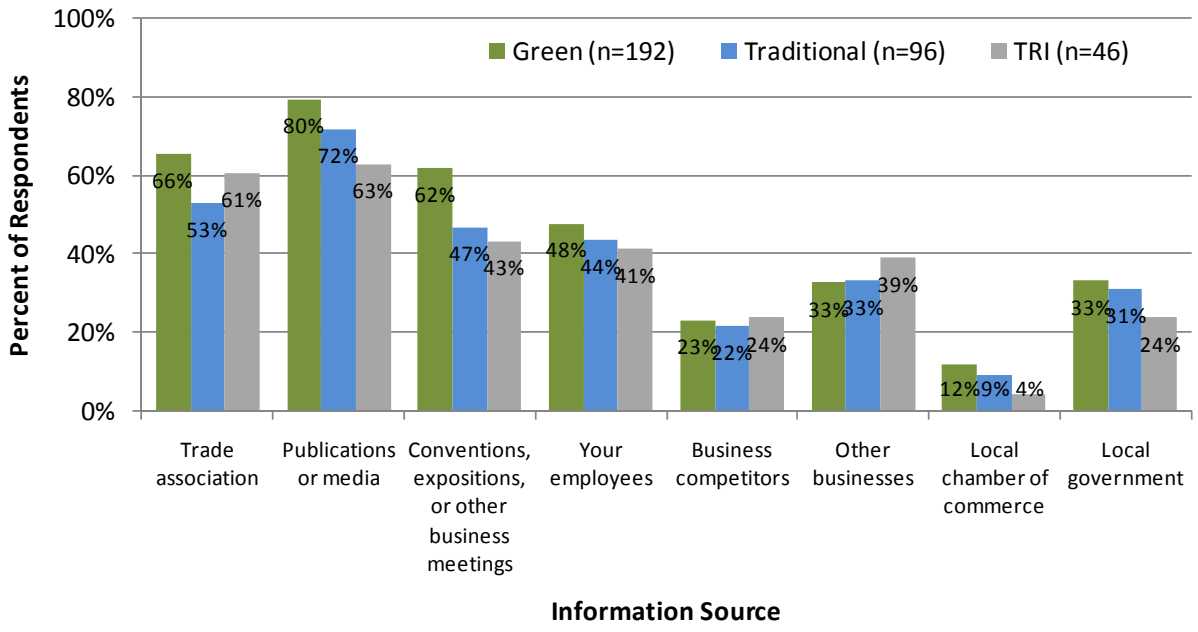
	<5	**5-24**	**25-99**	**≥100***
n=	*58*	*39*	*25*	*4*
General	5%	8%	8%	0%
Green building	9%	3%	8%	25%
Green training	2%	5%	4%	0%
Manage stormwater runoff	7%	13%	12%	0%
Raise awareness	3%	5%	4%	25%
Recycle	38%	36%	16%	50%
Reduce energy use	17%	23%	20%	25%
Reduce travel	16%	5%	12%	0%
Reduce waste/reuse	31%	18%	8%	25%
Reduce water use	7%	0%	8%	25%
Use clean energy	5%	0%	8%	25%
Use clean vehicles/transportation	7%	13%	8%	25%
Use cleaner products/less raw materials	9%	10%	16%	0%

*Note: Only four businesses with firm sizes ≥100 responded to this question. Percentages are not statistically significant.

Information Sources for Operational Innovation

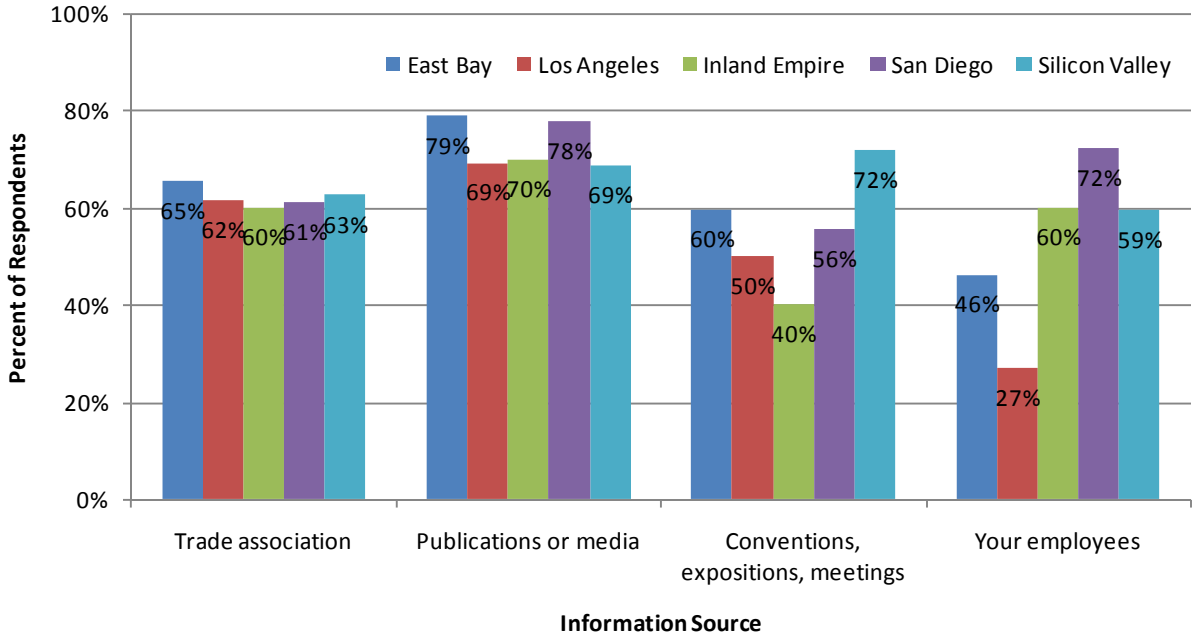
After indicating the ways in which businesses have kept up with changing environmental needs, respondents were then asked to identify where these businesses found information about new technologies and trends. Although there is some variation in information sources for the three business types, there is some general consensus on which sources are used most often. As Figure 6 shows, all business types agreed that *Publications or Media* are the most frequently accessed resource for environmental and innovation information. Over three-quarters of green business participants cited this as a source. Other top information sources, especially for green businesses include *Trade Associations*, *Conventions, expositions and meetings,* and their own *Employees.* All business types agreed that *Local Government* was not as valuable a source of information as other outlets. Among green businesses, only 33% found government to be a useful source.

Figure 6. Environmental Operations Information Sources by Survey



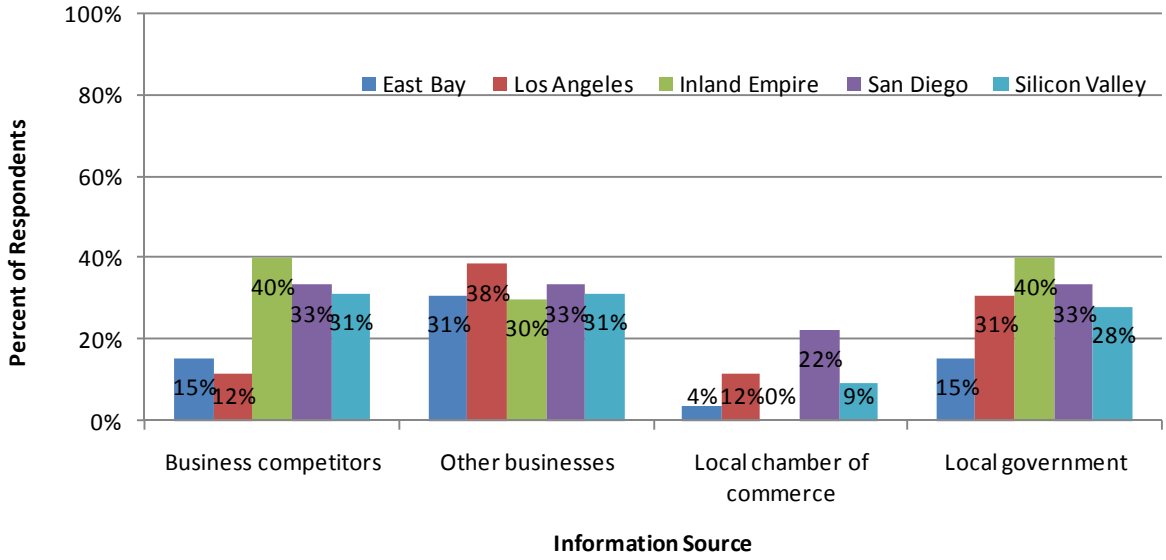
The following two figures, Figures 7 and 8, examine the regional differences among green businesses in terms of green and environmental information sources. The Upper San Joaquin Valley businesses are not included in the figures below because of their low response rate for this particular question. This was a relative consensus among the green businesses in each of the five regions in favor of using both *Trade Associations* and *Publications or Media*. For *Conventions, Expositions and Meetings,* however, the disparity between the regions becomes larger. With a green business average of 62%, only 40% of Inland Empire respondents found this to be a useful resource, while 72% of businesses in Silicon Valley cited getting information from conventions. Only 27% of green Los Angeles businesses found their employees to be a good source of information, compared to 72% of San Diego businesses.

Figure 7. Information Sources for Green Businesses (A)



There is quite a range in how businesses responded to the question in terms of information from *Business Competitors.* Both the East Bay and Los Angeles found competitors to be poor sources of information, while 40.0% of Inland Empire green businesses said that they learn about new products and services from their competitors. This undermines the oft-contested image of "cooperative competition," suggesting that green business operates differently from the high-tech sector. Ironically, while Los Angeles businesses do not seem to learn much from their *Competitors*, 38% of them do cite *Other Businesses* as important sources of information. There is also a lot of regional variation in how much information businesses get from their local *Chambers of Commerce* and *Local Government*. All regions agree that they receive less information from their *Chamber of Commerce* than from the *Government*. While none of businesses in the Inland Empire cited their *Local Chamber of Commerce*, 40% of them credited the *Local Government* with being a valuable source of information. Businesses in San Diego do find their *Chamber of Commerce* to be a better source of information than most regions, however, as 22% of San Diego businesses cited that source, compared to 11% of all green businesses. The business respondents from the East Bay find the *Chamber of Commerce* and the *Local Government* to be less useful than any of the other represented regions.

Figure 8. Information Sources for Green Businesses (B)



Just as with regional differentiation, there is also variation among green business industries, regarding which information sources are most useful (Table 13). A few notable outliers include the *Environmental Services* industry, which found *Trade Associations* and *Conventions, Expositions, or other business meetings* to be less useful than other industries. For the *Environmental Services* industry, as with many others, *Publications or Media* was reported to be one of the more useful sources.

*Table 13. Information Sources for Green Businesses by Industry**

	Arch. And Design	Const.	Energy Research	Env. Services	Mfg.	Recycling
n=	*36*	*67*	*8*	*31*	*18*	*16*
Trade association	69%	79%	63%	45%	50%	81%
Publications or media	78%	88%	100%	77%	50%	63%
Conventions, expositions, meetings	67%	73%	75%	39%	44%	75%
Your employees	42%	34%	75%	71%	67%	38%
Business competitors	17%	28%	38%	10%	28%	50%
Other businesses	25%	31%	38%	32%	39%	56%
Local chamber of commerce	6%	16%	0%	13%	0%	25%
Local government	31%	40%	25%	29%	17%	44%

*Note: Only two businesses in the transportation industry responded to this question. Their responses are thus omitted from the summary because of the sample size's statistical insignificance.

There are few differences among firms of varying sizes when it comes to their information sources for green process innovation. Two differences which do stand out, are that small, green businesses, with fewer than 5 employees are less likely to see both their employees or their local chambers of commerce as sources of information (28% compared with a green business average of 50%, and 4% compared with 12%, respectively).

Business-based Product Innovation

One of the questions regarding innovation that firms were asked, was whether they have introduced a new product or service in the past three years to reduce environmental impact. Fifty-five percent of green businesses responded positively, while only 37% of traditional businesses responded that they have. Surprisingly, more TRI than traditional businesses responded that they have introduced a new environmental product or service over the past three years. Table 14 summarizes the responses.

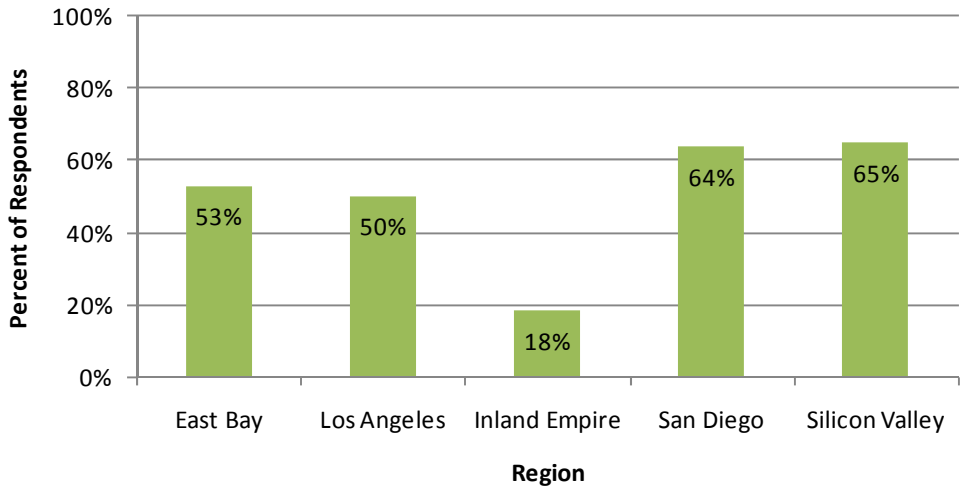
Table 14. Environmental Product or Service Development in Past 3 Years by Survey

	Green Businesses	Traditional Businesses	TRI Businesses
n=	*272*	*137*	*49*
Yes	59%	37%	43%
No	41%	63%	57%

Notable outliers for green businesses at the regional level include the Inland Empire, San Diego and Silicon Valley. While the green business average for this question is 59%, only 18% of green business respondents in the Inland Empire said that they have introduced a new, environmental product or service in the past three years. San Diego and Silicon

Valley, however, are both higher than the business average (64% and 65%, respectively). Figure 9 shows the regional differences for this question. The Upper San Joaquin Valley had too few respondents to be included in the figure.

Figure 9. Environmental Product or Service Development in Past 3 Years by Green Business Region



Among green businesses, some industries are more likely to have introduced a new environmental service or product than others (Table 15). The *Manufacturing* industry had the most positive respondents, 76%, while *Recycling* businesses are least likely to have had a new product or service in the past three years, 32%.

Table 15. Green Product and Service Development by Green Industry

	Arch. and Design	Const.	Energy Research	Env. Services	Mfg.	Recycling	Transp.
n=	*49*	*74*	*16*	*57*	*29*	*19*	*6*
Yes	69%	65%	56%	44%	76%	32%	50%
No	31%	35%	44%	56%	24%	68%	50%

Large green firms are the most likely to have developed an environmental product or service within the past three years (73%) (Table 16). Firms with between 5 and 24 employees are least likely to have introduced a new service or product (48%).

Table 16. Environmental Product or Service Development by Green Firm Size

	<5	5-24	25-99	≥100
n=	*114*	*93*	*42*	*11*
Yes	61%	48%	67%	73%
No	39%	52%	33%	27%

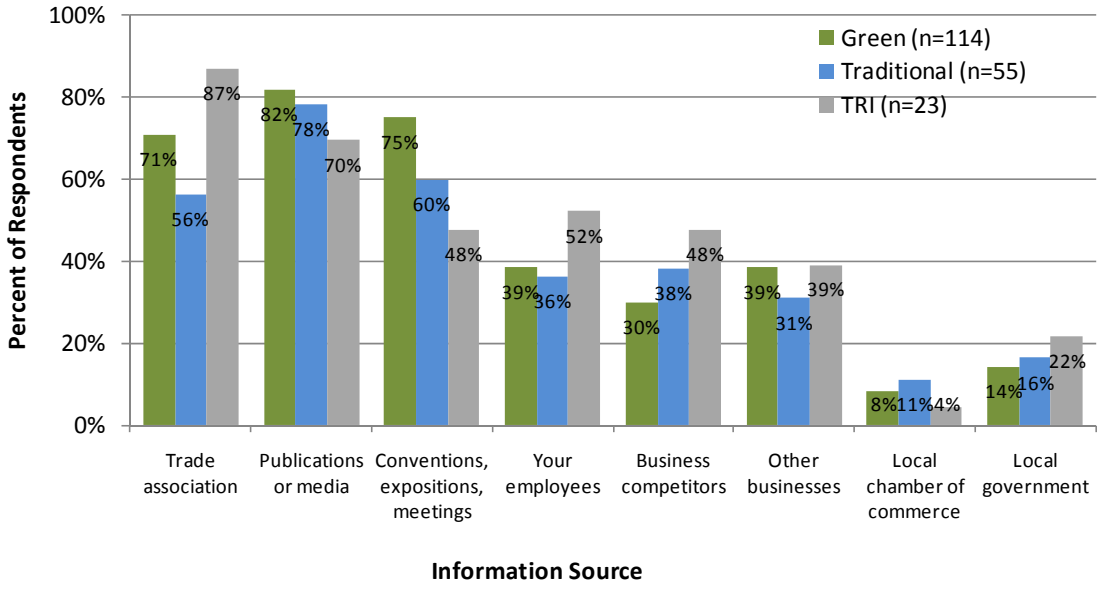
The types of innovations that businesses mentioned include improved solar technologies, new sustainable construction practices, products which produce fewer

emissions, and more energy-efficient products. Because of the response sample size, it is difficult to make conclusive findings about regional variation between green businesses. There are, however, a few differences, which can be presented. Twenty percent of responding green businesses in Los Angeles noted that they had introduced a product with improved *Solar technology* over the past 3 years, compared with just 12% of all green businesses. Twenty-four percent of Silicon Valley respondents wrote that they have introduced a new *Green construction* service or product, while the green business average is just 14%. Los Angeles was also an outlier for services or products which reduce greenhouse gas emissions, 22% compared to 11% for all green businesses which responded.

Information Sources for Product and Service Innovation

Just as with operational innovation, businesses were asked which sources they receive information regarding product and service innovation from. Businesses generally had similar responses for this question as for the previous one about environmental information and innovation. Figure 10 presents the results by business type. One of the notable differences between this set of responses, and the previous one is that here, not all businesses found *Publications or Media* to be the most common source of information. More TRI businesses cited *Trade Associations* as a useful source of information, 87%.

Figure 10. Environmental Product and Services Information Sources by Survey



There appear to be fewer regional differences among regions for product and service information than for environmental regulation and operations information. Regions tend to receive more information from *Trade Associations*, *Publications or Media, Conventions, Expositions* and *Employees* than from *Business Competitors, Other Businesses, Local Chambers of Commerce,* or *Local Government*.

Los Angeles is one of few consistent outliers among the four regions represented in Figures 11 and 12, finding more common sources like *Trade Associations, Publications or Media,* and *Conventions*, less informative than the other regions. Los Angeles-based green business respondents also reported *Business Competitors, Other Businesses,* and *Local Chambers of Commerce* to be better sources of information than the other regions. Also, Los Angeles region businesses responded quite differently for this question about product and service information sources than they did about green operations information sources. *Business Competitors* and *Other Businesses* ranked much more higher among Los Angeles businesses for product and service information than for operations information. This likely reflects the different types of firms engaged in process rather than product innovation. For this question, there were not enough responses from either the Inland Empire or the Upper San Joaquin Valley regions to include in the figures below.

Figure 11. Information Sources for Green Businesses (A)

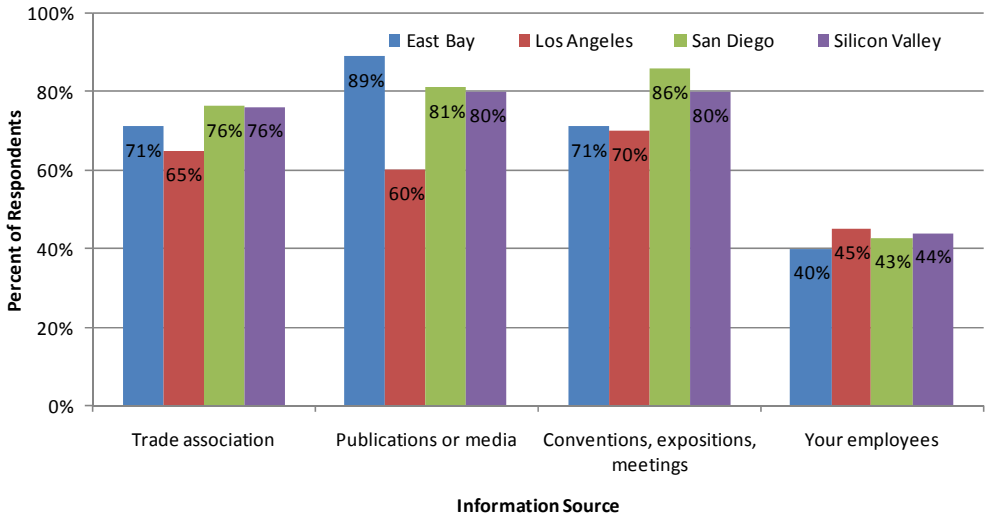
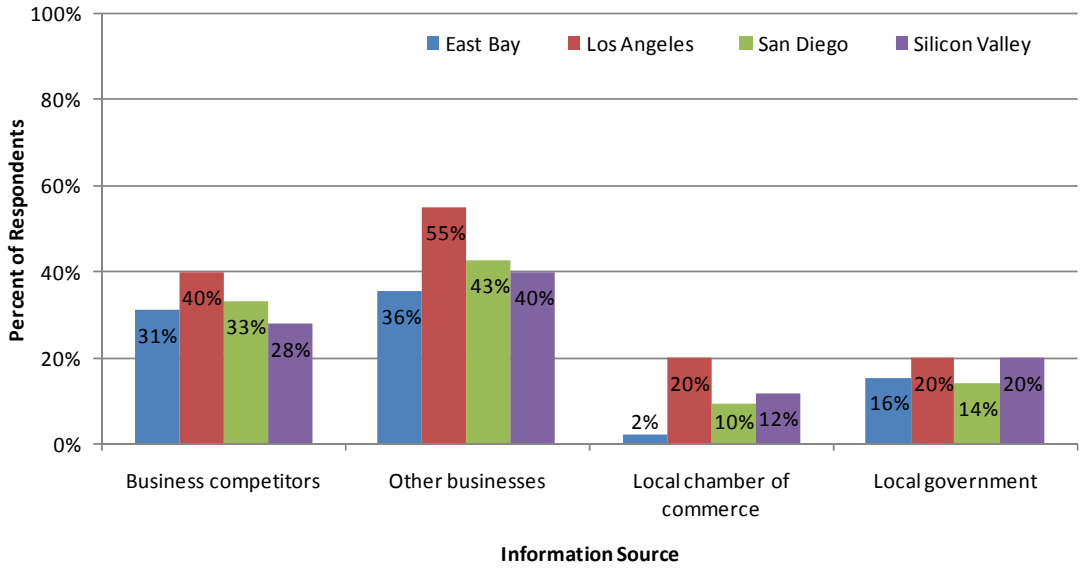


Figure 12. Information Sources for Green Businesses (B)



There is less variation by green industries (Table 17). The *Local Chambers of Commerce* and *Local Government* are the two least cited sources for information about product and service innovation for almost all industries.

*Table 17. Information Sources for Green Businesses by Industry**

	Arch. And Design	Const.	Energy Research	Env. Services	Mfg.	Recycling
n=	34	50	9	26	22	6
Trade association	76%	72%	67%	65%	73%	100%
Publications or media	85%	84%	67%	88%	73%	83%
Conventions, expositions, meetings	82%	80%	56%	65%	73%	83%
Your employees	32%	30%	44%	42%	64%	17%
Business competitors	18%	32%	33%	19%	55%	50%
Other businesses	32%	36%	44%	42%	45%	50%
Local chamber of commerce	0%	14%	0%	8%	5%	33%
Local government	9%	18%	0%	19%	5%	17%

*Note: Only two businesses in the transportation industry responded to this question. Their responses are thus omitted from the summary because of the sample size's statistical insignificance.

Product Innovation vs. Process Innovation

In the survey, a distinction between two types of innovation was made by asking companies about product innovation (Has your firm introduced a new product or service in the past three years to reduce environmental impact?) and process innovation

(Has your firm changed the way it operates in order to reduce environmental impact or meet environmental regulations?).

While green businesses appear to be more *willing* and interested in innovating than their traditional and TRI counterparts, the responses in this section suggest that they have not necessarily done so if we consider these two different types of innovation. An important finding of this section is that green businesses are more likely to innovate by introducing new green products or services than by changing their processes. 59% of green business in the survey said that they have introduced a new green product or service in the last 3 years compared to 37% and 43% of traditional and TRI businesses respectively. However, TRI and traditional businesses show a higher percentage of companies that have changed the way they operate to reduce environmental impact or meet environmental regulations compared to green companies. The fact that TRI companies are the most likely to have implemented operational changes in their production processes might speak to the fact that they are also the most affected by stricter environmental regulations. On the other hand, green companies probably have more environmentally-friendly production processes already in place.

Another finding of this section is that product innovation is more concentrated by industry sector and region than process innovation. Manufacturing, Architecture/Engineering/Design, Construction and Energy Research and Utilities are, according to the survey, the most innovative green industries in terms of product innovation while Recycling, Environmental Services and Transportation are the least innovative. Furthermore, companies located in San Diego and Silicon Valley were more likely to have introduced new green products or services while green companies in the Inland Empire were the least likely. Finally, the survey found out a relationship between company size and product innovation. Larger firms are more likely to have introduced a green product or service within the past three years than smaller firms.

REGIONAL ASSETS

Location Patterns

Product and firm maturity, CEO's residence, government policies, local markets, competitors and suppliers or the quality of the labor pool are, among others, factors that influence where a company locates. Although the dynamics of firm location are specific for each company, the literature on location of firms has identified certain key factors that companies take into account when making location and relocation decisions. Access to skilled labor, a positive business climate and low labor costs together with low taxes and financial or market incentives have traditionally been cited as important factors in firm location models.

Since the 1990s, however, a new lens for the study of firm location has emerged. Recent studies have begun to look more specifically at small and entrepreneurial firms, rather than large companies, showing that less tangible factors such as personal preferences of

entrepreneurs, quality of life or local and regional networks of professional and personal relationships highly influence location and relocation decisions. This new focus in endogenous assets to explain location decisions and economic growth coincides with a worldwide surge in popularity of "new regionalism" and global city-region theories among policymakers and planners. These theories argue that macroeconomic analyses and comprehensive national strategies have lost effectiveness in the context of increasing economic globalization and that the competitive advantage of territories has increasingly come to rely on regional economic *clusters* and networks of firms and institutions.[1] In the current context, local and regional networks of relationships – both personal and professional – are regarded as "important elements in explaining the locational behavior of firms."[2] For instance, an increasing number of independent studies have shown that for entrepreneurial and high-tech firms, which tend to be locally and regionally grown, the most important location factors are executive preferences, quality of life, and access to skilled labor.[3] Small firms tend to have less access to capital and distant markets, and, instead, take advantage of local and regional networks and opportunities.

The results of the survey's location questions concur with this new body of literature (Table 18). The responses in our survey suggest that green companies are mainly influenced by three factors when they decide to locate in a region: the residence of the firm's executives, the existence of a local market for their product, and the quality of life of the region. More specifically, 58% of the companies mentioned "Executives' Residence" as one of the three most relevant factors to locate in a region, followed by "Local Market for Your Product" (56%) and "Quality of Life" (52%). Other relevant factors included the availability and quality of the labor pool in the region (19%) and the availability of space (16%). Interestingly, the existence of other firms in the area (11%), proximity to a university or research institution (13%), the availability of financial capital (12%) and the existence of suppliers (10%) were minor factors in location decisions.

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[1] Porter, M. 2001. Regions and the New Economics of Competition. In *Global City-Regions: Trends, Theory, Policy*, ed. Allen Scott, 139-157. New York: Oxford University Press
Scott, A.J. and M. Storper. 2003. Regions, Globalization and Development. *Regional Studies*, Vol. 37.6&7: 579–593

[2] Stam, Erik. 2007. "Why Butterflies Don't Leave: Locational Behavior of Entrepreneurial Firms." *Economic Geography* 83(1): p. 29.

[3] Haug, Peter. 1991. "The Location Decisions and Operations of High Technology Organizations in Washington State." *Regional Studies* 25 (6): 525-541.
Fulton, William and Paul Shigley. 2001. "Little Chips, Big Dreams." *Governing.*
Stam, Erik. 2007. "Why Butterflies Don't Leave: Locational Behavior of Entrepreneurial Firms." *Economic Geography* 83(1): 27-50.
Gottlieb, Paul D. 1995. "Residential Amenities, Firm Location and Economic Development." *Urban Studies* 32 (9): 1413-1436.

Table 18. Location Factors for Green Businesses

	Most Relevant Factor	2nd Most Relevant Factor	3rd Most Relevant Factor	All 3 Factors Combined
n=	*295*	*266*	*231*	*295*
Executives' Residence	35%	12%	16%	58%
Local Market for your Product	22%	24%	15%	56%
Quality of Life	21%	21%	16%	52%
Labor Pool	2%	9%	10%	19%
Availability of Space	3%	9%	6%	16%
Local University or Research Organization	5%	4%	5%	13%
Availability of Financial Capital	2%	7%	4%	12%
Other Firms in the Area	1%	5%	6%	11%
Suppliers in the Area	2%	4%	5%	10%
Other	5%	6%	16%	23%

Innovative green businesses value Quality of Life and the Existence of a Local Market more than Non-innovative green businesses (Table 19). Furthermore, Executive's Residence does not play such an important role for Innovative firms as it does for non-innovative green firms. Non-innovative firms value factors such availability of space and financial capital less than innovative firms and, surprisingly, they value the proximity to a local university or research institution more than innovative firms.

Table 19: Local Factors for Innovative and Non-Innovative Green Businesses

	Innovative Green Businesses	Non-innovative Green Businesses
n=	*156*	*109*
Executives' Residence	55%	64%
Local Market for your Product	58%	54%
Quality of Life	62%	41%
Labor Pool	22%	15%
Availability of Space	12%	19%
Local University, lab, or other research organization	11%	14%
Availability of Financial Capital	11%	14%
Other Firms in the Area	7%	16%
Suppliers in the area	6%	14%
Other	29%	14%

By region, there are differences worth analyzing (Table 20). For the East Bay, LA, San Diego and Silicon Valley the three factors mentioned above continue to be the most relevant in the same order, with the exception of San Diego where companies value quality of life more than the existence of a local market.

The fourth most mentioned location factor, however, varies within these regions. For the East Bay, it is the availability and quality of its labor pool (mentioned by 19% of green companies); for Silicon Valley, it is the labor pool together with the availability of

financial capital (both 25%): for San Diego, it is the availability of space and the labor pool (both 18%); and for Los Angeles, reflecting its larger size, it is availability of space, labor pool, and the existence of other firms in the area (all 15%).

In the Inland Empire and the Upper San Joaquin Valley, the survey's responses suggest a different location pattern of green companies. In the Inland Empire, only 15% of companies mentioned executive's residence as a relevant factor in establishing a company in the region (compared to the average of 62%), while the most mentioned factor was the existence of a local market (62%), followed by availability of space, the existence of suppliers and other firms in the area, and quality of life (all with 31%). The lack of importance of executives' residence in the Inland Empire reveals a cost-driven location dynamic, confirming a recent study about relocation of California firms generally.[4] The region, which has the greatest share of relocated firms in California, is an attractive location for firms from Los Angeles looking for greater availability of space and reduced facilities costs. By moving to the Inland Empire, LA firms are able to maintain a close proximity to the Los Angeles market and suppliers while enjoying reduced costs.

In the case of the Upper San Joaquin Valley, the most relevant factors were executives' residence (75%) and the availability of space (50%). In the USJ, the existence of suppliers and related firms in the area as well as the proximity to universities or research institutions was least valued.

Table 20. Location Decision Factors for Green Businesses by Region

	EB	**LA**	**IE**	**SD**	**SV**	**USJ**
n=	*94*	*40*	*13*	*34*	*40*	*8*
Executives' Residence	61%	68%	15%	68%	65%	75%
Local Market for your Product	57%	60%	62%	32%	53%	38%
Quality of Life	53%	35%	31%	56%	43%	38%
Labor Pool	19%	15%	15%	18%	25%	25%
Availability of Space	18%	15%	31%	18%	5%	50%
Local University or Research Organization	15%	10%	15%	15%	13%	0%
Availability of Financial Capital	9%	13%	15%	6%	25%	38%
Other Firms in the Area	13%	8%	31%	12%	18%	0%
Suppliers in the Area	10%	15%	31%	0%	13%	0%
Other	17%	20%	46%	32%	13%	38%

These findings suggest the existence of a strong local market for green products in larger cities and metropolitan areas like Los Angeles -including the Inland Empire region because of its proximity- and the San Francisco Bay Area, especially in the East Bay. The Upper San Joaquin Valley trades off the lack of a strong green local demand for the

[4] Chapple, Karen, Sara Hinkley, and Carrie Makarewicz, "Business as Usual in California's Suburbs?: Exploring the Dynamics of Firm Relocation, 1990-2005." UC Berkeley Working Paper, 2008.

availability of space, while San Diego does it for a higher quality of life. Quality of life is also a highly valued factor for green companies located in the East Bay whereas not so relevant for companies in the Inland Empire and Los Angeles.

By industry, most sectors value the three main factors mentioned above the most, except Recycling/Remediation firms, which perceive availability of space as the most important, and Energy Research and Services companies, which consider access to a local university or research institution more important than access to a local market (Table 21). Additionally, green construction firms seems to be less tied to the executives' residence and more to places where there is a strong demand and good quality of life.

Manufacturing companies (31%), Energy Research and Utilities (37%), and Environmental Services (21%) are the sectors that value the availability and quality of the labor pool and the proximity to universities the most. The proximity to research institutions is especially important for Energy Research and Utilities companies (47%) while not so relevant for other firms. On the other hand, Recycling/Remediation, Transportation and Manufacturing firms value availability of space very much (with percentages higher than 30% for the three sectors) while this factor is less important for other sectors. The availability of financial capital is valued by almost all sectors in the same proportion (only slightly higher for Recycling firms). Finally, the existence of other firms in the area is especially relevant for Arch., Construction, Transportation and Recycling companies while the existence of suppliers in the area is most valued by Recycling, Manufacturing and Construction firms.

Table 21. Location Decision Factors for Green Businesses by Industry

	Arch. & Design	**Const.**	**Energy Research**	**Env. Services**	**Mfg.**	**Rec.**	**Trans.**	**Other**
n=	*52*	*80*	*19*	*61*	*32*	*23*	*21*	*6*
Executives' Residence	58%	53%	58%	74%	69%	38%	67%	39%
Local Market for your Product	65%	71%	32%	49%	28%	48%	67%	52%
Quality of Life	69%	71%	37%	39%	38%	29%	33%	35%
Labor Pool	19%	6%	37%	21%	31%	24%	17%	17%
Availability of Space	10%	9%	26%	8%	34%	48%	33%	9%
Local University or Research Org.	10%	5%	47%	16%	13%	0%	0%	22%
Availability of Financial Capital	10%	11%	11%	13%	13%	19%	0%	13%
Other Firms in the Area	17%	8%	5%	7%	6%	19%	33%	13%
Suppliers in the area	4%	10%	0%	7%	19%	33%	33%	0%
Other	12%	31%	16%	21%	22%	19%	17%	39%

By size, as shown in Table 22 below, executives' residence and quality of life is more valued by small firms and less valued as companies become bigger. No significant differences exist for the importance of a local market by size. For larger companies, the quality of the labor pool and the availability of financial capital and space are increasingly important.

Table 22. Location Decision Factors for Green Businesses by Firm Size

	<5	5-24	25-99	≥100
n=	*122*	*101*	*48*	*13*
Executives' Residence	59%	62%	54%	15%
Local Market for your Product	56%	61%	48%	46%
Quality of Life	66%	43%	42%	38%
Labor Pool	7%	22%	38%	38%
Availability of Space	13%	17%	21%	23%
Local University or Research Org.	16%	5%	19%	23%
Availability of Financial Capital	9%	10%	17%	31%
Other Firms in the Area	13%	12%	4%	8%
Suppliers in the Area	11%	11%	8%	8%
Other	23%	17%	27%	38%

When given the chance to comment on other factors behind their location choices (an open-ended question), a large number of green companies (19 out of 54) mentioned personal reasons, such as the relocation of a firm executive's spouse. Other relevant factors included the specific location-dependent character of their activities (12 out of 54) and the prior existence of the business in the area (8 out of 54). For instance, a waste management company located in Los Angeles says, "treating waste generated in LA County, can't be elsewhere." As mentioned above, to better understand the location patterns of a particular firm one needs to look not only at the characteristics of a region, the industry sector or the company itself but also at the personal preferences of the green entrepreneur and/or main executives of the firm. Our survey shows that this is true for both green companies and for businesses that are now 'going green.'

In general terms, the initial place of residence and personal preferences of the firm's main executives together with the existence of a strong green local market and a high level of quality of life seem to be the main factors that would be make a region more attractive for green companies. Yet, 72 out of the 368 green companies in our survey (20%) said that they considered other locations outside their home region. Among those, 65% considered another location within California (47 out of 72), 32% another location within the US, and 3% an international location. When asked about the factors to reject alternative locations, most of the companies referred to higher costs and lower quality of life. Interestingly, many of the alternative locations remained closed to the home region, not only within California but also within the same metropolitan region. For instance, some East Bay companies rejected San Francisco because of higher costs or some companies in Silicon Valley rejected Palo Alto because of higher housing prices. On this topic, an East Bay company that makes environmentally friendly home products says, "San Francisco, rejected because of the higher cost for space." The fact that most of green companies stayed in their home region or considered other locations within the state shows how California is in general considered an attractive location for green businesses. As one wind energy company in the Inland Empire puts it, "it was about finding the optimum place, not rejecting other places. It is that California is one of the best states in the nation in promoting renewable energy. It also is leading the way to

sustainability." These findings suggest a higher level of embeddedness of green companies in their home regions compared to non-green companies.

Non-green companies in our survey show less affection for California. When asked about places where they would most likely move if you were to relocate, only 32% of traditional companies and 16% of TRI companies would consider other Californian locations. In contrast, 59% and 63% respectively would consider other places within the country. For instance, a non-green natural stone fabrication and installation company in Los Angeles complains about the "oppressive California business climate," while a food production and manufacturing company in the Upper San Joaquin Valley points at the "increased cost of regulation compliance" in the state.

In general, there are no significant differences in plans to remain in the region between green and non-green companies. Despite their complaints about California's strict regulation and bad business environment, 98% of traditional companies and 96% of TRI companies plan to stay in their region in the short term (next 1 or 2 years). The percentages are similar to that of green companies (98%). In the long term, around 91% of green and traditional companies plan to stay, compared to 88% of TRI companies. By region, there are no significant differences although San Diego, Upper San Joaquin Valley, and East Bay green companies are the most likely to stay in their regions in the short term. In San Diego and USJV, 100% of green companies that answered the question said they plan on staying in the region in the following two years (SD: 34 out of 34; USJV: 7 out of 7), followed by East Bay green companies with 99% (91 out of 92). The Inland Empire region shows the lowest percentage with 92% (10 out of 11), while Silicon Valley and Los Angeles stand in the middle with 97% (LA: 40 out of 41; SV: 37 out of 38). By industry, it is interesting noting that manufacturing firms are the most likely to leave their region, a finding that confirms other research on how "footloose" manufacturing is.[5] Among the 6 green companies that said they are planning to leave their regions in the near term, 3 were manufacturing firms and there was 1 each in Recycling/Remediation, Architecture, and Construction. In the long term, the firms that show higher desire to stay in their region (and therefore in California) are those in Transportation (100%), Environmental Services (98%), Recycling/Remediation (96%), Construction (92%) and Arch. (91%) while the least likely to stay are firms in Manufacturing (65%) and Energy Research and Utilities (83%).

Among the traditional and TRI businesses that specified a particular reason for wanting to leave their region, all the responses were related to California's perceived bad business environment (15 traditional companies and 9 TRI companies in total). For instance, a traditional manufacturing company in San Diego says, "too many rules on waste and facilities in California and state tax." On the same topic, a non-green construction company in the Upper San Joaquin Valley cites "regulation and cost of business" as their reasons to be willing to relocate. In comparison, green companies are

[5] Chapple et al., 2008; Kolko study at PPIC

less concerned with strict regulations and high taxes in the state. While practically all of the responses of traditional and TRI companies were related to California's perceived bad business environment (whether high taxes and costs of doing businesses or strict regulations), in their responses a lower percentage (75%) of green companies noted the bad business environment. Additionally, when green companies mention bad business environment reasons, these are often more concerned with the high costs of living and taxes than with regulations.

Finally, personal reasons (25% or 6 out of 24) weighed more in relocation decisions of green companies than in non-green companies (0%). In contrast, for traditional and TRI businesses, the business environment, which includes operational expenses, taxes, and the costs of complying with state regulations, influence more their location decisions. In fact, as the following section shows, a high percentage of green companies see strict environmental regulation as an opportunity rather than a threat.

Regional Competitiveness

Green companies have a particular notion of the factors that make their region more competitive, one that does not always coincide with the vision of non-green companies. Table 23 below shows the results of the question *How could your region be more competitive in attracting businesses in your industry?* for the three surveys (green, traditional and TRI businesses).

Table 23. Regional Competitiveness Improvement by Survey

	Green Businesses	Traditional Businesses	TRI Businesses
n=	*204*	*112*	*48*
Lower Cost of Doing Business (esp. labor-related costs or taxes)	22%	40%	48%
Financial Incentives/Tax breaks/Loans	17%	9%	13%
Improve Quality of Life	14%	10%	2%
Improve Public Transportation and Infrastructure	12%	7%	4%
Permit Streamlining/Business-friendly Services	11%	5%	17%
Environmental Market Incentives / Market Education	10%	0%	0%
Less Regulation	10%	16%	38%
Improve Government and Economy	8%	15%	13%
Improve Labor Pool	5%	5%	8%
Environmentally Friendly Regulation	4%	2%	4%
Do Nothing	7%	7%	0%
Other	9%	9%	6%

Note: This was an open-ended question in which answers were coded into one or more categories. This is why the total of percentages could sum up to more than 100%. The sample size is the number of companies that gave one answer at least.

In general terms, green businesses perceive taxes and regulation less negatively than non-green companies. In our survey, 48% of TRI companies and 40% of traditional businesses said that lower costs of doing business (including lower taxes) would make the region more competitive. This compares to a 22% of green businesses. Green businesses ask for more government incentives, not only for businesses (financial incentives) but also to increase the demand of green products among consumers (market incentives/market education). 17% of green businesses thought that more financial incentives would make the region more competitive, while 10% pointed at environmentally-friendly market-related incentives (e.g. green education of consumers). On this topic, a soil remediation and restoration company based in Silicon Valley says, ”there needs to be significantly more education on sustainable landscaping and soil management practices” while a green construction company in the East Bay suggests, “offer incentives to be a green business that are tangible. While it is becoming mainstream, green business is still as much a personal ethical choice of the management, as it may be market driven.” A green architecture firm with more than 100 employees located in Silicon Valley suggests, “provide more energy conservation financial incentives for lower to middle income families and businesses.”

There are also differences regarding the perception of regulation between green and non-green companies. Overall, 38% of TRI and 16% of traditional companies ask for less regulation to make the region more competitive compared to only a 10% of green

companies. In fact, 4% of green companies in the survey saw environmental regulation as a factor that contributes to the region's competitiveness in the green economy.

*Table 24. Responses that support environmental market incentives (first 20 responses) and environmentally friendly regulation (last 9 responses)**

* Note: Response #20 was coded as both environmental market incentives and environmentally friendly regulation

1. Incentivize cogeneration projects

2. Tax credits for consumers buying "green"

3. Offer incentives to be a green business that are tangible. While it is becoming mainstream, green business is still as much a personal ethical choice of the management, as it may be market driven.

4. Incentives for green business

5. There needs to be significantly more education on sustainable landscaping and soil management practices.

6. Educate clients in preferring organic landscape practices, storm water management, minimizing lawn, water efficient planting, etc.

7. Need more marketing.

8. Remodeling and custom home building is a cottage industry and the attraction to business in this area is the wealth of the home owners. There are no local, state or ferderal government based incentives to attract businesses.

9. Provide more energy conservation financial incentives for lower to middle income families and businesses

10. We need to be educated in the Green Industries and have items that our competitors carry but we do not at this time

11. Home energy-efficiency incentives

12. Further small business incentives; local environmental/green incentives for homeowners/businesses

13. More public and private support

14. Better marketing

15. Utility rebates, public awareness

16. 1. Provide subsidies for installing biomass heating and cooling equipment. 2. Become a 5 year tax free zone for alternative energy companies. 3. Tax carbon emmisions from fossil fuels. 4. Increase fees for disposing of waste. 3. Provide grant opportunities.

17. Provide low cost loans for home improvement and sustainability.

18. Encourage implementation of energy efficiency measures

19. Local incentive programs/ rebates/ fast track "green" projects

20 . Reduce cost of starting and expanding factory in line with other regions (Western Europe, East Germany, Eastern Europe, China, ...). 1. Match policies and incentives of other regions (about 30 to 40% disadvantage to be in CA relative to every region of interest in the world). Match incentives in EU for capex (30% gov't funded), low cost loans 3% for working capital. Provide low cost loans for expansion on capex (up to 80% in EU, Russia, China, and simple process). 2. Don't charge sales tax on factory equipment. 3. Create a market for renewables in CA--Significant within US, but pitifully small globally despite one of the best solar resource in the world. 80% of PV is being installed in Spain and Germany which are each nearly 10X larger than US. Given the cost of shipping manufacturing materials and panels abroad, cheaper to build in Europe and avoid political backlash of taking advantage of their renewables policies while in US nothing substantive is being done. The market in US is not large enough to sustain our high capital costs so we plan to export 100% at significant cost disadvantage to competitors in Europe.

21. Moving towards developing and implementing a vision of sustainability (public transit, green spaces, walkable communities, energy and water self-sufficiency)

22. More green waste programs

23. Comprehensive land-use policy over the whole region Permanent regional housing trust fund

24. It will be with wind and solar power opportunities

25. More cities should be promoting green collar job training so that the workforce is there to attract employers

26. Local requirements calling for green building measures and financial incentives for building green

27. No municipalities are interested in anymore auto recycling facilities due to perceived environmental issues. However, our industry is huge in recycling and reusing - if there were no auto recyclers - where would all the "end of life" vehicles go to be processed properly with the environment in mind.

28. If local governments adopted a more coherent set of guidelines and regulations for sustainable construction practices.

Green businesses also give more importance than traditional and TRI companies to issues such as quality of life and public transportation/infrastructure. In order to improve regional competitiveness, a San Diego-based environmental consulting company suggests: "moving towards developing and implementing a vision of sustainability (public transit, green spaces, walkable communities, energy and water self-sufficiency)." 14% of green businesses in our survey mentioned in open-ended responses that improving quality of life with, for instance, better public schools, lower housing costs, less crime or more affordable housing, would make the region more competitive for companies and more attractive for workers. Improving public transportation and infrastructure was also mentioned by 12% of green companies, compared to 7% of traditional companies and 4% of TRI firms.

A relevant aspect that came up for both green and non-green businesses is the necessity of removing barriers and streamline processes and paperwork in order to develop standards and best practices. Standardized processes in different cities and regions would allow companies to scale up their business and have easier access to a larger market. The building and solar manufacturing industries are especially insistent in this area. To make the region more competitive, an East Bay green architectural design company suggests: "more efficient permitting processes at the city level; more consistency from city to city; higher level of service and competency from permitting authorities; greater support for creative/innovative/green design." A waste management company located in Los Angeles says: "streamlined environmental permitting from a system that looks at the whole picture, not just single issue agencies for air, water, etc." Streamlined permitting seems especially relevant for green building and solar manufacturing companies. For the case of solar, in addition to state and national level organizations such as SEIA and Cal SEIA, region-specific industry organizations like SolarTech in Silicon Valley have emerged recently to accelerate the process of permit streamlining and gains associated with economies of scale.

Finally, some firms also suggested that there is no need to make the region more competitive because there is already too much competition. This is especially true for professional and legal services. Out of the 14 green companies included in this category, 5 are Architecture/Design/Engineering firms and 5 are Environmental Services companies. On the other side, 4 out of the 7 traditional companies that responded "Do Nothing" were law firms. Most of the companies that did not wanted their region to

change were located in the Bay Area: 10 out of the 14 green companies were located in the East Bay and 5 out of the 7 traditional companies were based in the Bay Area (3 in the East Bay and 2 in Silicon Valley). As mentioned by an architecture and engineering consultancy company in the East Bay, "Why would I want my region to attract more competitors? There are already too many architects, builders, and real estate businesses around here."

If we distinguish between innovative and non-innovative green firms, some interesting facts arise (Table 25). Innovative firms give, in general, more importance to factors such as lower taxes, quality of life and environmental market incentives to improve the region's competitiveness and less importance to permit streamlining, improved public transportation and infrastructure. Innovative firms also give more importance to environmental market incentives than non-innovative companies (for financial incentives the percentage between innovative and non-innovative is the same).

Table 25: Regional Competitiveness Improvement for Innovative and Non-Innovative Green Businesses

	Innovative Green Businesses	Non-innovative Green Businesses
n=	*110*	*75*
Lower cost of doing business, esp labor-related costs or taxes	23%	19%
Financial incentives/tax breaks/loans	16%	16%
Improve Quality of Life	15%	11%
Improve Public Transportation and Infrastructure	10%	15%
Permit streamlining/business-friendly services	9%	13%
Environmental Market Incentives / Market Education	13%	8%
Less Regulation	8%	8%
Improve Government and Economy	9%	12%
Improve Labor Pool	3%	7%
Environmentally friendly regulation	5%	7%
Do Nothing	6%	9%
Other	9%	8%

By region (Tables 26 and 27), San Diego and Los Angeles show a higher percentage than average of green companies that ask for lower taxes and less regulation to improve regional competitiveness (in contrast to the East Bay and Silicon Valley). Also, in the two Bay Area regions, improving quality of life, often meaning reducing housing and rent costs, often comes up in green companies' responses. On this topic, an environmental consulting company in Silicon Valley notes, "housing costs are in issue in the Bay Area, one that makes it hard to attract new employees."

Table 26. Regional Competitiveness Improvement for Green Businesses by Region

	EB	LA	IE	SD	SV	USJ
n=	*64*	*30*	*9*	*25*	*34*	*6*
Lower Cost of Doing Business (esp. labor-related costs or taxes)	23%	27%	0%	36%	21%	0%
Financial Incentives/Tax breaks/Loans	11%	20%	22%	24%	21%	0%
Improve Quality of Life	16%	3%	22%	4%	18%	17%
Improve Public Transportation and Infrastructure	16%	17%	0%	12%	9%	17%
Permit Streamlining/Business-friendly Services	8%	17%	22%	8%	9%	0%
Environmental Market Incentives / Market Education	3%	3%	11%	16%	21%	17%
Less Regulation	6%	10%	0%	16%	9%	17%
Improve Government and Economy	5%	23%	22%	0%	6%	0%
Improve Labor Pool	3%	10%	0%	0%	6%	33%
Environmentally Friendly Regulation	8%	0%	11%	4%	3%	17%
Do Nothing	16%	7%	0%	4%	3%	0%

Table 27. Regional Competitiveness Improvement for Traditional Businesses by Region

	EB	LA	IE	SD	SV	USJ
n=	*22*	*36*	*6*	*20*	*19*	*9*
Lower Cost of Doing Business (esp. labor-related costs or taxes)	32%	47%	0%	55%	47%	11%
Financial Incentives/Tax breaks/Loans	5%	14%	0%	5%	16%	0%
Improve Quality of Life	9%	11%	0%	10%	16%	0%
Improve Public Transportation and Infrastructure	0%	8%	17%	10%	5%	11%
Permit Streamlining/Business-friendly Services	0%	0%	33%	10%	5%	11%
Environmental Market Incentives / Market Education	0%	0%	0%	0%	0%	0%
Less Regulation	14%	17%	0%	15%	16%	33%
Improve Government and Economy	23%	14%	33%	5%	16%	11%
Improve Labor Pool	0%	3%	17%	10%	5%	11%
Environmentally Friendly Regulation	0%	0%	17%	5%	0%	0%
Do Nothing	9%	6%	0%	5%	16%	0%

By industry (Table 28), Energy Research and Utilities companies and Manufacturing companies ask relatively more frequently for lower taxes and labor-related costs while Recycling/Remediation and, again, Manufacturing companies ask for less regulation. The case of the Recycling/Remediation industry is paradoxical because although they demand less regulation in general, it is the sector that is most likely to support environmentally friendly regulation (most likely because it increase the demand for recycled products).

Table 28. Regional Competitiveness Improvement for Green Businesses by Industry

	Arch. & Design	**Const.**	**Energy Research**	**Env. Services**	**Mfg.**	**Rec.**	**Trans.**	**Other**
n=	*32*	*60*	*15*	*40*	*23*	*14*	*15*	*4*
Lower cost of doing business, esp labor-related costs or taxes	13%	22%	27%	20%	52%	7%	25%	14%
Financial incentives/tax breaks/loans	13%	15%	33%	10%	30%	13%	25%	14%
Improve Quality of Life	16%	15%	0%	20%	4%	13%	0%	29%
Improve Public Transportation and Infrastructure	13%	2%	13%	30%	4%	13%	25%	7%
Permit streamlining/business-friendly services	16%	8%	27%	5%	4%	27%	25%	0%
Improve Government and Economy	6%	15%	7%	15%	0%	7%	0%	14%
Environmental Market Incentives / Market Education	9%	17%	0%	5%	9%	0%	0%	7%
Less regulation	6%	3%	7%	8%	17%	20%	25%	0%
Environmentally friendly regulation	0%	12%	0%	3%	13%	13%	0%	0%
Improve labor pool	3%	2%	0%	10%	4%	7%	0%	7%
Do nothing	16%	3%	7%	13%	0%	0%	0%	7%
Other	6%	10%	13%	8%	9%	13%	0%	7%

Improvements in quality of life are more valued by Environmental Services green companies while permit streamlining is relatively more relevant for Recycling/Remediation and Energy Research companies. Construction firms are the ones that support more strongly environmental market incentives. Construction show high support for environmentally friendly regulations, as do Manufacturing and Recycling companies.

By size, green larger firms show stronger support for permit streamlining than small firms. See table 29 for more detail.

Table 29. Regional Competitiveness Improvement by Size

	Green Businesses				Traditional Businesses			
	<5	**5-24**	**25-99**	**≥100**	**<5**	**5-24**	**25-99**	**≥100**
n=	*82*	*71*	*33*	*9*	*18*	*57*	*28*	*6*
Lower cost of doing business (esp. labor-related costs or taxes)	18%	27%	24%	11%	44%	47%	25%	33%
Financial Incentives / Tax Rreaks / Loans	17%	11%	27%	22%	11%	7%	14%	0%
Improve Quality of Life	15%	15%	9%	33%	0%	11%	14%	17%
Improve Public Transportation and Infrastructure	9%	15%	9%	11%	6%	7%	11%	0%
Permit Streamlining / Business-friendly Services	10%	6%	18%	33%	6%	5%	7%	0%
Environmental Market Incentives / Market Education	9%	13%	6%	11%	0%	0%	0%	0%
Less Regulation	13%	8%	6%	11%	17%	16%	11%	33%
Improve Government and Economy	10%	3%	9%	11%	22%	16%	11%	0%
Improve Labor Pool	4%	4%	12%	0%	6%	4%	7%	17%
Environmentally Friendly Regulation	1%	6%	9%	11%	0%	2%	4%	0%
Do Nothing	12%	6%	0%	0%	6%	5%	11%	17%
Other	7%	10%	12%	11%	11%	11%	4%	17%

Organizations

The survey asked businesses which organizations they belong to (Table 30). Berkeley-based Build It Green is the most cited organization by green businesses in our survey. Among the most cited organizations also figure USGBC (US Green Building Council), AIA (American Institute of Architects), different local chambers of commerce, NARI (National Association of Remodeling Industries), BBB, SEIA (US Solar Energy Industry Association), ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers), IEEE (Institute of Electrical and Electronics Engineers), CalSEIA (California Solar Energy Industry Association), CBPCA (California Building Performance Contractors Association), ASES (American Solar Energy Society), and AWEA (American Wind Energy Association). The names of the associations suggest that the building, solar, and wind industries are the most active industries in organizing themselves.

*Table 30. Membership in Professional Organizations for Green Businesses, Total and By Industry**

	Total	Arch. & Design	Const.	Energy Research	Env. Services	Mfg.	Rec.	Trans.	Other
n=	*243*	*48*	*70*	*15*	*45*	*25*	*16*	*5*	*19*
BIG	30%	48%	59%	-	9%	4%	-	-	21%
USGBC	16%	29%	26%	-	7%	8%	-	-	5%
AIA	12%	46%	6%	-	2%	4%	-	-	-
NARI	6%	4%	17%	-	-	-	-	-	-
BBB	5%	-	13%	-	-	-	-	-	11%
SEIA	4%	2%	4%	13%	2%	8%	-	-	-
ASHRAE	3%	6%	1%	13%	2%	4%	-	-	-
CalSEIA	3%	2%	9%	-	2%	-	-	-	-
IEEE	2%	2%	-	-	2%	8%	-	-	11%
CBPCA	2%	-	6%	-	2%	-	-	-	5%
ASID	2%	2%	3%	-	-	4%	-	-	5%
Local Chamber of Commere	2%	-	1%	-	2%	-	13%	20%	-
ACS	2%	-	1%	7%	7%	-	-	-	-
ASES	2%	2%	1%	-	2%	4%	-	-	-
NAHB	2%	4%	3%	-	-	-	-	-	-
NKBA	2%	2%	3%	-	-	-	-	-	5%
CHEERS	2%	-	1%	-	7%	-	-	-	-
ULI	2%	4%	1%	-	-	-	-	-	5%
AWEA	2%	-	-	13%	-	8%	-	-	-
ADPSR	1%	4%	1%	-	-	-	-	-	-
Builders Exchange	1%	-	4%	-	-	-	-	-	-
Efficiency First	1%	-	3%	-	2%	-	-	-	-
NFIB	1%	-	3%	-	2%	-	-	-	-
AEP	1%	2%	-	-	4%	-	-	-	-
ASCE	1%	4%	-	-	-	4%	-	-	-
ISRI	1%	-	-	-	-	-	19%	-	-
StopWaste.org	1%	-	3%	-	-	-	6%	-	-
WEF	1%	-	-	7%	-	8%	-	-	-
CA Chamber of Commerce	1%	-	-	7%	-	4%	6%	-	-

By industry, most Architecture/Design/Engineering and Construction companies belong to BIG and USBGC. However, a number of Architecture companies belong also to AIA and ASHRAE (since engineering companies are included in this category) while Construction companies belong more to NARI and BBB. Energy and Utilities companies in our survey mostly belonged to ASHRAE and AWEA. Environmental Services companies mentioned CBPCA the most and then BIG, USGBC, local chambers of commerce, and CHEERS. Green Manufacturing companies mentioned AWEA, CalSEIA, SEIA, and Stopwaste.org. Recycling companies and Transportation companies mostly mentioned local chambers of commerce (maybe due to the lack of well established green organizations in these sectors or maybe due to the small sample of our survey for those sectors).

POLICY PERCEPTIONS AND IMPACT

This section analyzes the perceived impact of policies on the different businesses that took part in the survey. The answers to the policy questions in our survey confirm the findings in the regional section: green businesses have, in general, a less negative perception of policies and regulation than non-green companies. To the open-ended question *Which city, county, or state policies have had a direct impact on your business?* a total of 170 green businesses, 84 traditional businesses and 26 TRI businesses described the impact of different policies. This question was coded to reflect the level of policy that businesses referred to (federal/state/local) and also, when mentioned, the perceived positive or negative impact of that policy.

In our survey, 21% of the green companies mentioned negative policy impacts on their business, compared to 37% of traditional companies and 35% of TRI companies (Table 31). Further, a remarkable 55% of green companies saw policies having a positive impact, compared to 30% of traditional companies and 4% of TRI companies. On this topic a solar installation firm from Berkeley says, "city solar programs like Berkeley and San Francisco have increased business. State incentives also directly impact our business."

Table 31. Perceived Positive/Negative Impact of Policies on Businesses by Survey

	Green Businesses	Traditional Businesses	TRI Businesses
n=	*170*	*84*	*26*
Positive	55%	30%	4%
Negative	21%	37%	35%
Impact Not Specified	24%	33%	61%

By level of policy (Tables 32 and 33), there were no significant differences in the impact of policies among the three surveys. State, local, and federal are, in this order, the most mentioned levels. Within these three levels, however, green companies seem to be relatively more affected by local policies and less by state policies than traditional companies. Innovative firms are less affected by Federal policies and more by state and local

*Table 32. Policy Impact by Level of Policy by Survey**

	Green Businesses	Traditional Businesses	TRI Businesses
n=	*170*	*84*	*26*
Federal	27%	25%	12%
State	67%	79%	62%
Local	51%	34%	54%

Note: This was an open-ended question and therefore there could be two or more coded answers per company. Since the sample size is the number of companies that answered the question, percentages may sum up to more than 100%

Table 33: Policy Impact by Level of Policy for Innovative and Non-innovative Green Businesses

	Innovative	Non-innovative
n=	*94*	*58*
Federal	18%	33%
State	70%	67%
Local	57%	45%

Green companies perceived federal and state policies as having a much more positive impact in their business than traditional companies did (Tables 34 and 35). Interestingly, the local level is the only policy level that green companies perceived more negatively than traditional companies. This is probably related to issues with building permits/zoning approvals. For instance, a company located in Silicon Valley says, "business permits are difficult to obtain; construction permits are difficult to obtain." On the other hand, this might be a business opportunity for other companies. For instance, a green architecture company from the East Bay states, "zoning, building codes, energy efficiency standards, difficult city approval processes create a demand for our services."

Table 34. Perception of Policy Impact by Policy Level by Survey

	Green Businesses	**Traditional Businesses**	**TRI Businesses**
n=	*170*	*84*	*26*
Federal Positive	15%	8%	0%
Federal Negative	3%	5%	0%
State Positive	20%	12%	0%
State Negative	9%	19%	19%
Local Positive	18%	6%	4%
Local Negative	9%	13%	15%

Table 35. Green Business Perception of Policy Impact by Policy Level by Industry

	Arch. & Design	**Const.**	**Energy Research**	**Env. Services**	**Mfg.**	**Rec.**	**Trans.**	**Other**
n=	*34*	*52*	*8*	*33*	*13*	*11*	*3*	*14*
Federal	18%	27%	13%	45%	38%	0%	0%	36%
State	65%	73%	100%	79%	38%	73%	33%	36%
Local	59%	56%	13%	36%	62%	55%	67%	64%
Positive	44%	67%	50%	52%	54%	27%	33%	71%
Negative	19%	17%	25%	33%	19%	9%	33%	7%

AB32

Our survey asked green, traditional and TRI companies about the specific impact of two policies especially relevant for green businesses: California's Assembly Bill 32 (AB32) and the recent Federal Stimulus Package. Surprisingly, the percentage of green companies that answered that these policies had no impact at all in their business is rather high (49% for AB32 and 66% for the Stimulus Package) (Table 36). It is important to note that while AB 32 was passed in August of 2006, it has still not yet been fully implemented. Thus, the spread of responses might also be an effect of its incomplete implementation. As many respondents pointed out, it may still be too soon to tell what the full effects of the bill will be. The Stimulus Package was recently passed in February 2009.

Table 36. AB32 Impact by Survey

	Green Businesses	**Traditional Businesses**	**TRI Businesses**
n=	*270*	*53*	*55*
Very much	20%	19%	25%
Only slightly	31%	23%	40%
Not at all	49%	58%	35%

Interestingly, AB 32 has affected relatively more TRI companies in the survey than green companies (Table 37). 25% of TRI companies said that AB 32 has affected them *Very Much* compared to 19% of green companies. This however can be explained because green companies have anticipated regulation or have higher standards than those established by AB 32. For instance, a green building company in Silicon Valley says: "Our 'green' direction was implemented and already set a higher goal than those regulations". 49% of green companies said they were not affected at all by AB32 compared to 58% of traditional and 35% of TRI. The response to AB 32 emphasizes different perceptions among firms, with green firms seeing it as an opportunity for increased demand, and the others mostly as a new set of requirements. An open-ended question reflects that while the effect of AB32 for green companies is related to increased demand (43%), for traditional and TRI, its impact has mostly materialized in new guidelines and requirements.

Table 37. Effect of AB 32 by Survey (open-ended)

	Green Businesses	Traditional Businesses	TRI Businesses
n=	*117*	*21*	*27*
Increased demand	43%	10%	4%
Increased cost	15%	14%	22%
New guidelines/requirements	12%	43%	48%
None/minor	9%	0%	11%
Not yet	9%	0%	7%
Unsure	8%	14%	0%
Other	7%	24%	7%

A green construction firm in the East Bay commented on the increased demand associated with AB 32 by writing, "people have become more interested in installing solar panels not only for the savings but also for environmental reasons." Meanwhile, a typical response from a traditional business comes from a construction firm from the Upper San Joaquin Valley, "the processing time for environmental impacts has been lengthened. Future neighborhoods have additional requirements, which translates into cost to the home buyer." On the other hand, a San Diego environmental consulting company that design and build cogeneration for biogas and natural gas applications and answered *Very Much* sees increased demand for their products as a result of AB32, "new interest from large producers of biogas to capture this gas and convert to cogen[eration]"

It is also interesting noting that green innovative firms are more affected by AB32 than non-innovative firms.

Table 38: Effect of AB 32 for Innovative and Non-Innovative Green Businesses

	Innovative Green Businesses	Non-innovative Green Businesses
n=	*155*	*110*
Very Much	23%	15%
Only slightly	32%	25%
Not at all	42%	57%

By region, LA and Inland Empire companies seem to be the least affected by AB 32 while green firms in Silicon Valley and San Diego are the most affected (see table below).

*Table 39. AB 32 Impact by Region for Green Businesses**

	EB	LA	IE	SD	SV	USJV
n=	*86*	*37*	*11*	*35*	*38*	*8*
Very much	16%	18%	0%	29%	24%	13%
Only slightly	37%	18%	27%	17%	29%	50%
Not at all	47%	64%	73%	54%	47%	38%

When the responses are analyzed by size, we find a strong relationship between firm size and impact of AB32. The smaller the company, the more likely that AB32 has had no impact. A small environmental consulting company from LA that said that AB32 had not have any effect at all in its business says, "we are a relatively small company to start with." Another quote that shows the relationship between size and impact of AB32, this time from a TRI company: "This plant has relatively low emissions; we've replaced fork lifts, reduced energy consumption and implemented an anti-idling policy. The greater firm has taken more significant steps."

Table 40. AB32 Impact for Green Businesses by Size

	Green Businesses				Traditional Businesses			
	<5	**5-24**	**25-99**	**≥100**	**<5**	**5-24**	**25-99**	**≥100**
n=	*111*	*93*	*43*	*11*	*13*	*24*	*11*	*4*
Very much	14%	20%	28%	36%	8%	13%	36%	25%
Only slightly	25%	31%	33%	45%	23%	17%	27%	50%
Not at all	60%	48%	40%	18%	69%	71%	36%	25%

Stimulus Package

As mentioned earlier, there are also high percentages of companies that said they were not affected at all by the Stimulus Package within green (66%), traditional (73%), and TRI companies (66%) (Table 41). As with AB 32, the effects of the Stimulus Package have not yet been fully realized. However, in contrast to AB 32, green companies show higher percentages of companies that were very much affected by the Stimulus Package (12%); a percentage higher than both TRI and traditional companies (4% both).

Table 41. Stimulus Package Impact by Survey

	Green Businesses	**Traditional Businesses**	**TRI Businesses**
n=	*273*	*56*	*53*
Very much	12%	4%	4%
Only slightly	22%	23%	30%
Not at all	66%	73%	66%

The Stimulus Package has benefited most of the companies in our survey. Green companies have benefited from both increased demand and increased funding/tax credits, which is not a surprise, considering that the stimulus is directed in large part towards them (Table 42). TRI companies do not see increased demand, which seems logical, but they see increased possibilities to access funding. Surprisingly, traditional companies mentioned increased demand in a higher percentage than green companies. The expectation of increased demand from traditional businesses may have to do either with the hope that the stimulus will speed recovery of the economy, or that traditional construction firms will benefit from expected new projects.

Table 42. Effect of Stimulus Package on Businesses by Survey

	Green Businesses	Traditional Businesses	TRI Businesses
n=	*123*	*16*	*14*
Not yet, but potential for increased funding / demand	28%	0%	29%
No impact	24%	25%	36%
Increased funding / tax credit	19%	25%	14%
Increased demand	15%	0%	0%
Other	6%	13%	14%
Negative impact	5%	25%	7%
Unsure	4%	13%	0%

By industry (Table 43), Green Manufacturing, Construction and Arch. businesses have seen their demand increased in relatively higher percentages as a result of the Stimulus Package. Additionally, a remarkable 46% of green Architecture/Design/Engineering said that the Stimulus Package has increased their funding and tax credit possibilities. It is also remarkable the high percentages of companies in all sectors that have not seen the effect of the Stimulus Package materialized but they still expect it to increase their funding possibilities and/or demand.

Table 43. Stimulus Package Impact for Green Business by Industry

	Arch. & Design	Const.	Energy Research	Env. Services	Mfg.	Rec.	Trans.	Other
n=	*21*	*37*	*10*	*28*	*15*	*3*	*1*	*7*
Increased demand	14%	16%	10%	7%	33%	0%	0%	14%
Increased funding / tax credit	33%	11%	30%	18%	13%	0%	0%	29%
Negative impact	0%	5%	10%	7%	7%	0%	0%	0%
No impact	19%	30%	10%	25%	20%	33%	100%	14%
Not yet, but potential for increased funding / demand	24%	27%	40%	32%	20%	33%	0%	29%
Unsure	10%	5%	0%	0%	0%	33%	0%	0%
Other	0%	5%	0%	11%	7%	0%	0%	14%

Innovative and non-innovative green businesses seem to be equally affected by the stimulus package (Table 44).

Table 44: Stimulus Package Impact for Innovative and Non-Innovative Green Businesses

	Innovative	Non-innovative
n=	*156*	*110*
Very Much	12%	11%
Only slightly	20%	23%
Not at all	66%	64%

As with AB32, there seems to be a relationship between the effect of the Stimulus Package and the size of the company, having more effect on larger than smaller companies. 8% of green companies with less than 5 full-time employees said that the Stimulus Package had affected them very much compared to 45% of companies with

100 or more full-time employees (Table 45). Also, 75% of green companies with less than 5 full-time employees said that it had no effect at all in their business, compared to 45% in green companies with 100 or more employees.

Table 45. Stimulus Package Impact by Size

	Green Businesses				Traditional Businesses			
	<5	**5-24**	**25-99**	**≥100**	**<5**	**5-24**	**25-99**	**≥100**
n=	*115*	*94*	*42*	*11*	*13*	*25*	*12*	*5*
Very much	8%	6%	26%	45%	8%	0%	8%	0%
Only slightly	17%	28%	26%	9%	8%	24%	17%	60%
Not at all	75%	66%	48%	45%	85%	76%	75%	40%

Training

Green companies said they need more specialized training than traditional and TRI companies, according to the survey (Table 46). Additionally, while TRI and traditional companies seem to rely more on in-house and internal training, green companies often have more specialized training needs related to higher education.

Table 46. Need for Employee Training (beyond standard high school or college education), by Survey

	Green Businesses	**Traditional Businesses**	**TRI Businesses**
n=	*225*	*144*	*51*
Yes	62%	57%	45%
No	38%	43%	55%

In absolute terms, the most frequently mentioned specialized training needs mentioned by green companies were technical/scientific degrees (incl. Engineering), specific environmental training or environmental certificate, and green building skills (Table 47). Within technical/scientific degrees, Biology, Chemical Engineering, and Electrical Engineering were the most mentioned.

Training needs for specific certificates or to comply with environmental requirements is often mentioned by green companies. LEED is frequently mentioned along with other kinds of environmental training and certifications. For instance, a green company located in the East Bay says, “trained in Asbestos and Lead base paint abatement. This training takes only 1 week with a yearly refresher.”

*Table 47. Specific Need for Specialized Employee Training by Survey**

	Green Businesses	**Traditional Businesses**	**TRI Businesses**
n=	*123*	*72*	*19*
Engineering or technical/scientific degree	28%	10%	16%
Environmental Training or Certificate in a Specific Sector	24%	24%	16%
Graduate Degree	9%	14%	5%
Green Building/Construction Practices	12%	0%	5%

In house Training			
Local Government	11%	21%	32%
Legal, Auditing, and Accounting	3%	13%	0%
Non-environmental Training or Non-Environmental Certificate	8%	8%	11%
Solar Panel Installation	5%	1%	0%
Training on how to operate the company's equipment	6%	11%	21%
Other	2%	10%	11%

*Note: Open-ended Question (2 or more coded answers per company possible)

When asked about whether existing programs satisfy their needs (Table 48), 79% of green companies said yes compared to 77% of traditional and 89% of TRI. Here, a cross analysis by size and survey reveals how small green companies are more satisfied with existing programs than are larger green companies. The opposite is true for traditional businesses, where small firms are less satisfied than large firms with existing training programs.

Table 48. Sufficient Training Program Availability by Firm Size

	Green Businesses				**Traditional Businesses**			
	<5	**5-24**	**25-99**	**≥100**	**<5**	**5-24**	**25-99**	**≥100**
n=	*79*	*73*	*36*	*9*	*24*	*59*	*31*	*9*
Yes	77%	86%	72%	67%	71%	76%	77%	89%
No	23%	14%	28%	33%	29%	24%	23%	11%

The survey asked unsatisfied companies with existing training programs were asked to specify why not (in an open-ended answer). Among the most common responses were: college graduates have no practical experience or knowledge (6 companies); lack of competent training programs nearby (6 companies); and training programs are expensive (3) or outdated (2). When there is a lack of effective training programs, companies sometimes choose to hire people with prior experience. For instance, a green architecture and building company in the East Bay says: "architectural students do not know how to build a building, no knowledge of real construction. We usually hire people with 10+ [years] experience. A recycling/waste management company almost screams, "need more hands on programs."

Two green companies complained about outdated educational programs sponsored by institutions and government agencies. An energy and solar consulting company in the Upper San Joaquin Valley says: "energy, green and solar knowledge and experience is not advanced enough for us to take graduates and make them productive without at least 12 months of on job experience." Here, in-house training also substitutes for the lack of effective/updated training programs nearby.

While in-house training remains the overwhelming preference of firms across types (Table 49), our survey suggests that green companies rely more on external programs and organizations (See table below). For instance, a number of solar installation firms stated their reliance on solar installation workshops/programs. A solar panel installation

company located in the East Bay suggests, "it would be great to have a statewide solar training program that focuses on the solar specific skill set."

*Table 49. Employee Training Source by Survey**

	Green Businesses	Traditional Businesses	TRI Businesses
n=	248	*133*	*50*
We train our employees ourselves	82%	94%	100%
We work with a local organization to provide training	30%	19%	24%

*Note: Not open-ended but multiple answers possible, percentages may sum up more than 100%

Additionally, many green building companies mentioned their reliance in external organizations such as *Build It Green* and educational institutions in the area. A green residential building company from Silicon Valley says: "The schools in this area have removed trade shops (wood working, metal shop etc). The kids do not understand manual labor and they do not know how to build anything. Currently without the Hispanic workforce the residential building industry would come to a halt". A quality assurance and risk management for builders company in San Diego describe their needs as: "extensive building code, building science and specialized training for our ISO approved systems."

By industry (Table 50), Arch., Construction, and Environmental Services companies rely on external organizations for training, while Manufacturing, Energy and Recycling firms tend to rely more on internal training.

Table 50. Employee Training Source By Industry

	Arch. & Design	Const.	Energy Research	Env. Services	Mfg.	Rec.	Trans.	Other
n=	*38*	*67*	*14*	*50*	*26*	*17*	*5*	*38*
We train our employees ourselves	76%	82%	100%	80%	92%	100%	100%	76%
We work with a local organization to provide training	39%	36%	21%	42%	15%	18%	0%	39%

By size (Table 51), larger firms – both green and traditional – rely more on external organizations than smaller firms. Small green firms are more likely to use external local organizations than small traditional businesses.

Table 51. Employee Training by Size

	Green Businesses				Traditional Businesses			
	<5	**5-24**	**25-99**	**≥100**	**<5**	**5-24**	**25-99**	**≥100**
n=	*93*	*84*	*39*	*9*	27	62	32	9
We train our employees ourselves	81%	87%	92%	78%	85%	97%	91%	78%
We work with a local organization to provide training	34%	26%	31%	44%	22%	8%	38%	44%

When asked to specify where their workers' training currently comes from (open-ended question), green companies often mentioned *University/College* (34%), *industry organizations or industry events* (25%), and *workers with prior experience* (19%) among others. Among the specific organizations, Build it Green, USGBC, and PG&E Pacific Energy Center are often mentioned as sources for skills training and education, both in this question and in general in the training-related questions. An interesting response that reflects specific regional dynamics comes from a solar company based in Silicon Valley: "We hire highly talented employees who are available due to general high tech decline in semiconductors and disk drives." Some green companies also mentioned webinars and the Internet as their source of training (e.g. Lynda.com).

Innovative green firms need more specialized training than non-innovative green firms. Furthermore, innovative firms use more external training.

Table 52. Need for Specialized Training for Innovative and Non-Innovative Green Businesses

	Innovative	Non-innovative
n=	*150*	*109*
Yes (Firm needs specialized training)	69%	58%
No (Firms does not need specialized training)	31%	42%

Table 53. Employee Training for Innovative and Non-Innovative Green Businesses

	Innovative	Non-innovative
n=	*135*	*92*
We train our employees ourselves	85%	86%
We work with a local organization to provide training	34%	28%

REGIONAL NETWORKS

Networks, both within industries and between firms and other actors in the regional innovation system, are key to innovation and economic development. This section analyzes inter-firm relationships and networks within and outside the region based on the answers of green, traditional, and TRI companies that took part in the survey.

Market type and location

The first question regarding networks in our survey was related to the type and location of the companies' primary markets. Companies were asked to state their primary market type in one column and the location of the market in another column (for example: "private firms within your city or region" or "private households throughout California"). Although there was initially space for 4 columns for each category (8 in total), in order to avoid the overrepresentation of firms that gave the same response for two or more columns, only the primary market and location (first column in each category) were considered.

Table 54. Primary Market Type by Survey

	Green Businesses	Traditional Businesses	TRI Businesses
n=	*266*	*141*	*47*
Private Firms	36%	51%	64%
Private Households	48%	27%	13%
Local Government	7%	5%	4%
Other Public Sector	9%	16%	19%

Table 55. Primary Market Location by Survey

	Green Businesses	Traditional Businesses	TRI Businesses
n=	*266*	*141*	*47*
Within Your City or Region	54%	42%	17%
Throughout California	15%	16%	21%
Throughout the Country	14%	21%	26%
Throughout the World	16%	20%	38%

Green businesses in our survey show a different pattern of market type and location than traditional and TRI businesses. While private firms, private households, other public sector and local government are, in this order, the largest market for traditional companies, green companies show a higher percentage of companies serving private households (48% compared to 27% of traditional firms and 13% of TRI firms) and local governments (7% compared to 5% of traditional firms and 4% of TRI firms). Green companies are also more likely to serve markets within their cities or regions than traditional and TRI companies. These facts relate back and confirm the higher rate of embeddedness of green companies in local and regional networks as described in previous sections. TRI companies are most likely to serve world markets (probably

because of their larger size and the manufacturing character of most TRI companies in our survey sample).

When market and location are combined, the analysis gives us a more precise idea of what kinds of markets are served and where they are located. Table 50 below shows that while green firms are more likely to serve private households in local/regional markets than traditional businesses, traditional and TRI businesses are more likely to serve private households in the US market.

Table 56. Combined Analysis by Survey

	Green Businesses	**Traditional Businesses**	**TRI Businesses**
n=	*266*	*141*	*47*
Private Firms / City or Region	7%	14%	11%
Private HH / City or Region	41%	21%	2%
Local Gov. / City or Region	3%	2%	0%
Other Public / City or Region	3%	4%	4%
Private Firms / California	9%	9%	17%
Private HH / California	3%	2%	2%
Local Gov. / California	2%	1%	2%
Other Public / California	2%	4%	0%
Private Firms / US	8%	16%	15%
Private HH / US	2%	1%	6%
Local Gov. / US	1%	1%	2%
Other Public / US	3%	4%	0%
Private Firms / World	13%	12%	21%
Private HH / World	2%	3%	2%
Local Gov. / World	0%	1%	0%
Other Public / World	2%	4%	15%

Innovative green firms serve more private households and less private firms than Non-innovative green firms. They also serve less local governments and other public sector than non-innovative firms. Innovative green firms' markets are also much more likely to be located within the city and region (59% for innovative vs. 45% for Non-innovative)

Table 57. Market Type and Location for Innovative and Non-innovative Green Businesses

	Innovative Green Businesses	Non-innovative Green Businesses
n=	*156*	*102*
MARKET: Private Firms	35%	40%
MARKET: Private Households	53%	38%
MARKET: Local Government	5%	10%
MARKET: Other Public Sector	6%	12%
LOCATION: Within Your City or Region	59%	45%
LOCATION: Throughout California	12%	21%
LOCATION: Throughout the Country	14%	14%

LOCATION: Throughout the World	13%	21%

Firm market areas vary by region, among both green and traditional firms. As shown in Table 58, green businesses in San Diego and the Inland Empire have lower shares of regional customers. San Diego green firms reported a higher share of private firm/world-wide customers, while Inland Empire green firms reported comparatively high shares of California private firms as customers—half of Inland Empire firms reported California firms as the primary market area and customer type. Upper San Joaquin Valley green businesses were more likely to have local government as customers than were green firms in other regions.

Table 58. Combined Analysis for Green Businesses, by Region

	EB	**LA**	**IE**	**SD**	**SV**	**USJ**
n=	*86*	*35*	*10*	*32*	*36*	*8*
Private Firms / City or Region	7%	14%	10%	3%	8%	0%
Private HH / City or Region	35%	34%	10%	16%	53%	38%
Local Gov. / City or Region	5%	3%	0%	0%	6%	13%
Other Public / City or Region	3%	3%	0%	0%	0%	0%
Private Firms / California	10%	6%	50%	9%	0%	13%
Private HH / California	6%	3%	10%	0%	0%	0%
Local Gov. / California	2%	3%	0%	6%	3%	0%
Other Public / California	3%	0%	0%	0%	3%	0%
Private Firms / US	9%	11%	0%	13%	3%	13%
Private HH / US	1%	0%	10%	6%	0%	0%
Local Gov. / US	1%	3%	0%	0%	0%	13%
Other Public / US	3%	0%	0%	6%	3%	0%
Private Firms / World	10%	11%	10%	34%	14%	13%
Private HH / World	1%	0%	0%	3%	6%	0%
Local Gov. / World	0%	3%	0%	0%	0%	0%
Other Public / World	1%	3%	0%	3%	3%	0%

In contrast, as shown in Table 59, local households within the city or region were the most frequent customers/market area for San Diego and Inland Empire traditional businesses. Traditional Upper San Joaquin Valley businesses reported no public sector clients. Silicon Valley green businesses had the highest reported share of local private households as customers (Table 51), while the region's traditional businesses reported a very low share of private household local customers, concentrating instead on private firms both region- and world-wide and public agencies in the city and region.

Table 59. Combined Analysis for Traditional Businesses, by Region

	EB	**LA**	**IE**	**SD**	**SV**	**USJ**
n=	*30*	*42*	*9*	*23*	*25*	*11*
Private Firms / City or Region	10%	17%	0%	13%	20%	18%
Private HH / City or Region	27%	14%	44%	30%	12%	18%
Local Gov. / City or Region	7%	2%	0%	0%	0%	0%
Other Public / City or Region	0%	2%	0%	4%	16%	0%
Private Firms / California	13%	10%	0%	9%	4%	9%

Private HH / California	3%	0%	0%	0%	4%	9%
Local Gov. / California	3%	0%	11%	0%	0%	0%
Other Public / California	0%	7%	11%	4%	0%	9%
Private Firms / US	17%	17%	33%	9%	12%	18%
Private HH / US	0%	2%	0%	0%	0%	0%
Local Gov. / US	0%	0%	0%	4%	0%	0%
Other Public / US	0%	5%	0%	13%	0%	0%
Private Firms / World	13%	14%	0%	4%	20%	9%
Private HH / World	0%	5%	0%	4%	4%	0%
Local Gov. / World	0%	0%	0%	0%	4%	0%
Other Public / World	7%	2%	0%	4%	4%	9%

There are distinct differences in market areas and customer types among green firms by industry (see Table 60). Green Manufacturing firms were the least likely to serve private households and the most likely to serve world-wide markets. The great majority of green manufacturing firm customers are other private firms. Green Construction firms were the most likely to have a customer base of city or regional private households, followed by green architecture and design firms. Green Energy Research firms have a broad-based clientele of both households and firms, spread locally, nationally and worldwide. Environmental Services firms have a mix of public and private customers at every geographic level.

Table 60. Combined Analysis for Green Businesses, by Industry

	Arch. & Design	**Const.**	**Energy Research**	**Env. Services**	**Mfg.**	**Rec.**	**Trans.**	**Other**
n=	*47*	*75*	*14*	*56*	*30*	*20*	*17*	*5*
Private Firms / City or Region	4%	4%	7%	11%	10%	18%	0%	5%
Private HH / City or Region	55%	76%	14%	13%	3%	35%	40%	40%
Local Gov. / City or Region	0%	1%	0%	11%	0%	6%	0%	0%
Other Public / City or Region	2%	0%	0%	2%	0%	6%	20%	15%
Private Firms / California	9%	7%	0%	13%	10%	6%	20%	5%
Private HH / California	6%	3%	0%	4%	0%	0%	0%	0%
Local Gov. / California	2%	0%	7%	7%	0%	0%	0%	0%
Other Public / California	2%	1%	0%	5%	0%	0%	0%	0%
Private Firms / US	6%	1%	21%	13%	13%	6%	0%	10%
Private HH / US	0%	0%	0%	5%	0%	0%	0%	0%
Local Gov. / US	6%	1%	7%	2%	7%	0%	0%	5%
Other Public / US	2%	3%	0%	2%	3%	0%	0%	0%
Private Firms / World	4%	3%	14%	7%	50%	24%	20%	20%
Private HH / World	0%	0%	21%	2%	0%	0%	0%	0%
Local Gov. / World	0%	0%	0%	2%	0%	0%	0%	0%
Other Public / World	0%	0%	7%	4%	3%	0%	0%	0%

Traditional firms had quite a different profile of customers and market areas by industry. Traditional Architecture, Design, and Engineering firms (Arch.) had a higher share of customers worldwide, primarily firms, and a lower share of local customers. These firms also had far fewer households as customers than did their green counterparts. Traditional Construction firms also had a lower share of household

customers (but still, one third reported city or regionwide households as customers) and a larger share of private firms as customers. The very large majority of traditional Energy Research firms were city/region based with private households as customers. Traditional Manufacturing firms had a similar customer base to their green counterpart, but somewhat fewer serve worldwide customers

*Table 61. Combined Analysis for Traditional Businesses, by Industry**

	Arch. & Design	**Const.**	**Energy Research**	**Mfg.**	**Transp.**	**Other**
n=	*14*	*24*	*11*	*32*	*6*	*53*
Private Firms / City or Region	14%	21%	0%	19%	0%	13%
Private HH / City or Region	7%	33%	82%	0%	17%	21%
Local Gov. / City or Region	14%	0%	0%	0%	0%	2%
Other Public / City or Region	7%	13%	0%	0%	0%	4%
Private Firms / California	7%	13%	0%	9%	17%	8%
Private HH / California	7%	0%	0%	0%	17%	2%
Local Gov. / California	0%	0%	9%	0%	0%	2%
Other Public / California	7%	8%	0%	6%	17%	0%
Private Firms / US	7%	0%	0%	31%	17%	19%
Private HH / US	0%	0%	0%	3%	0%	0%
Local Gov. / US	0%	4%	0%	0%	0%	0%
Other Public / US	0%	4%	0%	3%	0%	6%
Private Firms / World	21%	4%	0%	22%	0%	11%
Private HH / World	7%	0%	9%	0%	17%	2%
Local Gov. / World	0%	0%	0%	3%	0%	0%
Other Public / World	0%	0%	0%	3%	0%	9%

The smallest firms, with fewer than five employees, were most likely to be locally based with household customers. However, local household customers were also a primary market base for 30 percent of large traditional businesses with 100 employees or more as shown in Table 62. Larger green businesses (25 or more employees) were more likely to have a worldwide customer base than their smaller counterparts, but a share of smaller green firms also reported worldwide customers.

Private firms worldwide was the second largest customer category reported by green firms with fewer than 5 employees. Large traditional businesses (100 employees or more) had the highest shares of customers spread throughout the US, compared to both their smaller counterparts and to green businesses. Smaller traditional businesses were more likely to have worldwide customers than were large traditional businesses.

Table 62. Combined Analysis by Company Size

	Green Businesses				Traditional Businesses			
	<5	**5-24**	**25-99**	**≥100**	**<5**	**5-24**	**25-99**	**≥100**
n=	*112*	*90*	*43*	*9*	*30*	*63*	*34*	*10*
Private Firms / City or Region	5%	9%	9%	11%	17%	14%	15%	0%
Private HH / City or Region	57%	33%	19%	22%	30%	19%	18%	30%
Local Gov. / City or Region	2%	6%	2%	0%	3%	3%	0%	0%
Other Public / City or Region	2%	1%	2%	22%	0%	2%	9%	20%
Private Firms / California	6%	11%	9%	11%	10%	6%	12%	0%
Private HH / California	2%	2%	5%	11%	7%	2%	0%	0%
Local Gov. / California	2%	2%	5%	0%	3%	2%	0%	0%
Other Public / California	0%	3%	5%	0%	3%	5%	6%	0%
Private Firms / US	4%	12%	12%	0%	13%	13%	21%	30%
Private HH / US	1%	2%	5%	0%	0%	2%	0%	0%
Local Gov. / US	0%	2%	2%	0%	0%	0%	0%	10%
Other Public / US	3%	7%	0%	0%	3%	5%	3%	0%
Private Firms / World	12%	8%	21%	22%	7%	21%	0%	10%
Private HH / World	2%	0%	2%	0%	0%	3%	6%	0%
Local Gov. / World	1%	0%	0%	0%	0%	2%	0%	0%
Other Public / World	2%	1%	2%	0%	3%	3%	9%	0%

In summary, green businesses serve a broad range of private household and firm customers, and almost one in ten serve primarily public agency customers. Compared to traditional firms, green firms are more embedded in local markets. Almost one half of green businesses primarily serve customers in local or regional markets, but between fifteen and twenty percent of green firms report primary markets in each of California, the US and world.

Market areas and customers of green businesses vary by region, by industry, and by size of firm. San Diego and the Inland Empire green firms have less locally based market areas than other locations or than their traditional counterparts. Upper San Joaquin Valley firms are more reliant on public clients than are most other firms. Green energy research and environmental services have the most diverse customer and market bases, while green construction firms are the most locally and household based, and green manufacturing firms the most likely to have worldwide firms as customers.

Competitors

In the question about where your competitors are located, again we have the same dilemma as in the previous question as there were four columns to respond. Here, again, only the two first columns were considered unless results given by the total of four columns are interesting to note.

Table 63. Main Location of Competitors by Survey

	Green Businesses	**Traditional Businesses**	**TRI Businesses**
n=	*266*	*132*	*65*
Within Your City or Region	59%	57%	22%
Throughout California	16%	11%	12%
Throughout the Country	15%	21%	25%
Throughout the World	9%	11%	17%

In general, green companies seem to be competing primarily with businesses located within the city or regional area, especially in comparison to TRI companies. However there are significant variations by region, as shown in Tables 57 and 58. More than half of green businesses in the East Bay, Los Angeles, Silicon Valley and the Upper San Joaquin Valley compete mainly with other businesses within the region. In contrast, almost two thirds of Inland Empire green firms are competing with firms spread throughout California, and almost half of San Diego green firms are competing with firms spread throughout the country. While Silicon Valley firms primarily compete locally, almost one fifth face global competition. Interestingly, Silicon Valley and San Diego are the regions in which green companies are more exposed to international competition. The local-global dynamic of Silicon Valley is especially interesting. Traditional firms also report primarily facing regional competition, with the exception of the Inland Empire, where as many report facing statewide as regional competition. In contrast to the regional patterns for green firms, traditional Los Angeles firms face among the highest nationwide and worldwide competition, and East Bay traditional firms also are more likely to be competing with nationwide or global firms than are their green counterparts.

Table 64. Main Location of Competitors for Green Businesses by Region

	EB	**LA**	**IE**	**SD**	**SV**	**USJ**
n=	*87*	*34*	*11*	*31*	*36*	*8*
Within Your City or Region	69%	56%	9%	23%	64%	75%
Throughout California	13%	18%	64%	16%	6%	25%
Throughout the Country	13%	15%	18%	45%	11%	0%
Throughout the World	6%	12%	9%	16%	19%	0%

Table 65. Main Location of Competitors for Traditional Businesses by Region

	EB	LA	IE	SD	SV	USJ
n=	*28*	*40*	*8*	*20*	*25*	*11*
Within Your City or Region	57%	50%	38%	60%	72%	55%
Throughout California	7%	5%	38%	10%	8%	27%
Throughout the Country	18%	30%	25%	20%	16%	9%
Throughout the World	18%	15%	0%	10%	4%	9%

Table 66 illustrates that patterns of competition vary even more widely by industry type. While most green firms face competition primarily within their region, green energy research firms face competition primarily at the national level, green manufacturing firms primarily face worldwide competition, and green environmental services firms face a mix of regional, statewide and nationwide competition.

Table 66. Main Location of Competitors for Green Businesses, by Industry

	Arch. & Design	Const	Energy Research	Env. Services	Mfg.	Rec	Transp	Other
n=	*48*	*74*	*17*	*55*	*29*	*17*	*5*	*19*
Within Your City or Region	81%	85%	12%	45%	17%	76%	60%	42%
Throughout California	13%	7%	29%	29%	3%	18%	20%	21%
Throughout the Country	6%	8%	53%	20%	24%	0%	0%	21%
Throughout the World	0%	0%	6%	5%	55%	6%	20%	16%

Smaller firms are most likely to face competition from other firms within the region. As Table 67 shows, there is a strong relationship between firm size and the location of competitors for both green and traditional firms. Less than half of firms with 25 or more employees face primarily regionwide competition, competing instead in state, national or worldwide markets.

Table 67. Main Location of Competitors, by Company Size

	Green Businesses				Traditional Businesses			
	<5	5-24	25-99	≥100	<5	5-24	25-99	≥100
n=	*111*	90	44	10	29	63	30	7
Within Your City or Region	67%	62%	45%	30%	66%	59%	50%	29%
Throughout California	11%	17%	20%	40%	10%	6%	20%	14%
Throughout the Country	18%	13%	16%	10%	21%	21%	20%	43%
Throughout the World	5%	8%	18%	20%	3%	14%	10%	14%

External Suppliers

Supply networks rely on a mix of regional, statewide, national and international resources, as shown in Table 68. Green and traditional firm supply networks are very similar, while TRI firms are more likely to draw from nationwide as compared to statewide sources.

Table 68. Main Location of External Suppliers by Survey

	Green Businesses	Traditional Businesses	TRI Businesses
n=	*211*	*118*	*48*
Within Your City or Region	53%	46%	46%
Throughout California	14%	17%	6%
Throughout the Country	18%	21%	35%
Throughout the World	16%	16%	13%

Table 69 shows that Inland Empire green businesses, consistent with economic characteristics mentioned earlier, have less access to local suppliers and rely instead primarily on suppliers elsewhere in California. On the other hand, the East Bay, Los Angeles, and Silicon Valley are the regions where suppliers are most likely to be found within the region's boundaries. San Diego green businesses are the most likely to seek supplies out of the state and out of the country. Silicon Valley's green businesses show here again a local-global dynamic in the location of external suppliers similar to the location of competitors.

Table 69. Main Location of External Suppliers for Green Businesses by Region

	EB	LA	IE	SD	SV	USJ
n=	*69*	*28*	*9*	*26*	*28*	*5*
Within Your City or Region	64%	54%	0%	23%	50%	40%
Throughout California	14%	0%	56%	19%	7%	40%
Throughout the Country	12%	29%	22%	31%	21%	20%
Throughout the World	10%	18%	22%	27%	21%	0%

Partners

When partnering with other firms or organizations, green firms are slightly more likely than traditional firms and much more likely than TRI firms to choose partners within the local region or within California, as seen in Table 70. However, fourteen percent reported worldwide locations as the primary location of partners.

Table 70. Main Location of Partners by Survey

	Green Businesses	Traditional Businesses	TRI Businesses
n=	*166*	*73*	*20*
Within Your City or Region	63%	59%	45%
Throughout California	10%	7%	5%
Throughout the Country	12%	22%	25%
Throughout the World	14%	12%	25%

Silicon Valley and San Diego green businesses had the highest shares of worldwide partners (Table 71). In contrast, no Upper San Joaquin Valley green businesses reported the primary locations of their partners as being outside of California or the US. East Bay and Los Angeles green businesses also reported relatively high shares of partners within the region or state, and relatively low shares out-of-state.

Table 71. Main Location of Partners for Green Businesses by Region

	EB	LA	IE	SD	SV	USJ
n=	*50*	*19*	*6*	*26*	*21*	*5*
Within Your City or Region	72%	63%	50%	42%	67%	60%
Throughout California	8%	21%	17%	15%	0%	40%
Throughout the Country	8%	5%	17%	19%	10%	0%
Throughout the World	12%	11%	17%	23%	24%	0%

Green innovative firms have a strong local/regional nature. Competitors, external suppliers and partners of innovative green firms are more likely to be located within the city or region or throughout the world than non-innovative green companies. An important finding of the survey is that green firms are more embedded in local/regional networks and markets than traditional firms and, at the same time, green innovative firms are even more locally/regionally embedded compared to green non-innovative firms. In other words, innovation does not necessarily comes from state-wide or national-wide companies but rather from companies that know how to use the markets, innovation systems and networks at their home city/region.

At the same time, there is also a trend of green innovative firms being more connected with networks and markets throughout the world than non-innovative firms. Both findings point at an interesting local-global dynamic of green innovative firms: in order to innovate they use both local/regional and global networks/markets more intensively than state or national networks/markets.

Table 72: Main Location of Competitors for Innovative and Non-Innovative Green Businesses

	Innovative Green Businesses	Non-innovative Green Businesses
n=	*152*	*104*
Within Your City or Region	63%	55%
Throughout California	13%	22%
Throughout the Country	13%	18%
Throughout the World	12%	5%

Table 73: Main Location of External Suppliers for Innovative and Non-Innovative Green Businesses

	Innovative Green Businesses	Non-innovative Green Businesses
n=	*126*	*81*
Within Your City or Region	59%	44%
Throughout California	13%	16%
Throughout the Country	13%	26%
Throughout the World	16%	14%

Table 74: Main Location of Partners for Innovative and Non-Innovative Green Businesses

	Innovative Green Businesses	Non-innovative Green Businesses
n=	*99*	*62*
Within Your City or Region	69%	56%
Throughout California	9%	13%
Throughout the Country	7%	19%
Throughout the World	15%	11%

Interactions and frequency of interactions

Green and traditional businesses for the most part show very similar patterns of interactions among different types of organizations, while TRI businesses had far fewer interactions in general with the organizations listed, as shown in Table 75 and Figure 13.

Table 75. Frequency of Interaction with Organizations by Survey

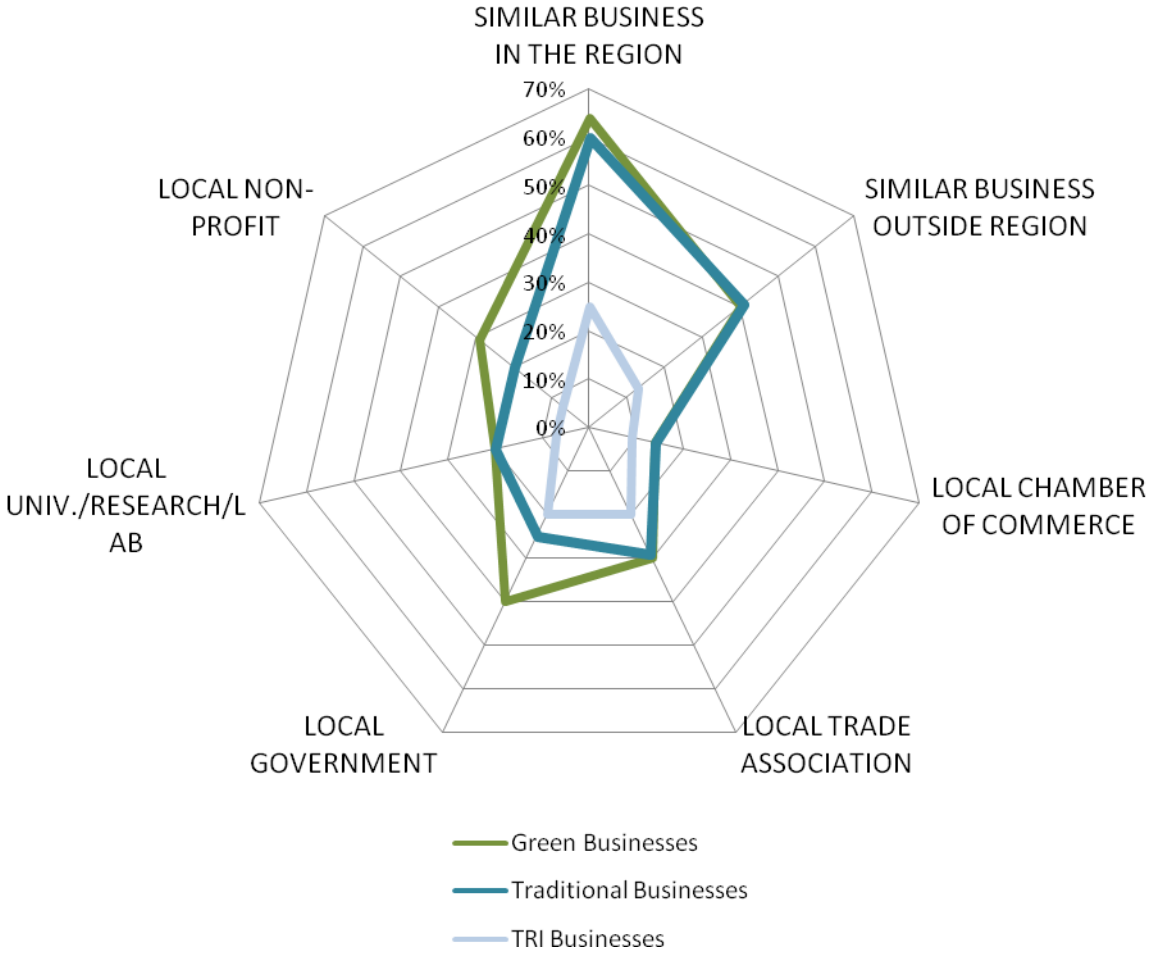
	Green Businesses	Traditional Businesses	TRI Businesses
n=	*286*	*167*	*76*
SIMILAR BUSINESS IN THE REGION: Week/Monthly	**65%**	**60%**	**25%**
SIMILAR BUSINESS IN THE REGION: Quarter/Yearly	17%	22%	28%
SIMILAR BUSINESS IN THE REGION: Rare or Never	17%	18%	16%
SIMILAR BUSINESS OUTSIDE REGION: Week/Monthly	**38%**	**41%**	**13%**
SIMILAR BUSINESS OUTSIDE REGION: Quarter/Yearly	36%	31%	36%
SIMILAR BUSINESS OUTSIDE REGION: Rare or Never	26%	26%	20%
LOCAL CHAMBER OF COMMERCE: Week/Monthly	**17%**	**14%**	**9%**
LOCAL CHAMBER OF COMMERCE: Quarter/Yearly	19%	19%	16%
LOCAL CHAMBER OF COMMERCE: Rare or Never	64%	63%	42%
LOCAL TRADE ASSOC.: Week/Monthly	**33%**	**29%**	**20%**
LOCAL TRADE ASSOC.: Quarter/Yearly	29%	30%	26%
LOCAL TRADE ASSOC.: Rare or Never	37%	38%	20%
LOCAL GOVERNMENT: Week/Monthly	**30%**	**25%**	**20%**
LOCAL GOVERNMENT: Quarter/Yearly	45%	26%	36%
LOCAL GOVERNMENT: Rare or Never	25%	44%	13%
LOCAL UNIV./RESEARCH/LAB: Week/Monthly	**35%**	**20%**	**7%**
LOCAL UNIV./RESEARCH/LAB: Quarter/Yearly	20%	25%	0%
LOCAL UNIV./RESEARCH/LAB: Rare or Never	45%	52%	46%
LOCAL NON-PROFIT: Week/Monthly	**24%**	**20%**	**7%**
LOCAL NON-PROFIT: Quarter/Yearly	31%	28%	13%
LOCAL NON-PROFIT: Rare or Never	45%	45%	47%

Note: All percentages are based on the respondent's first choice of organization

As shown in Figure 13 below, green businesses have, in general, more frequent interactions with other organizations than traditional and TRI businesses. This is especially true for green businesses in the case of interactions with similar businesses in the region, local non-profits, and local governments. Traditional and green businesses however have the same level of frequent interactions with similar businesses outside the region, local chambers of commerce and local trade associations.

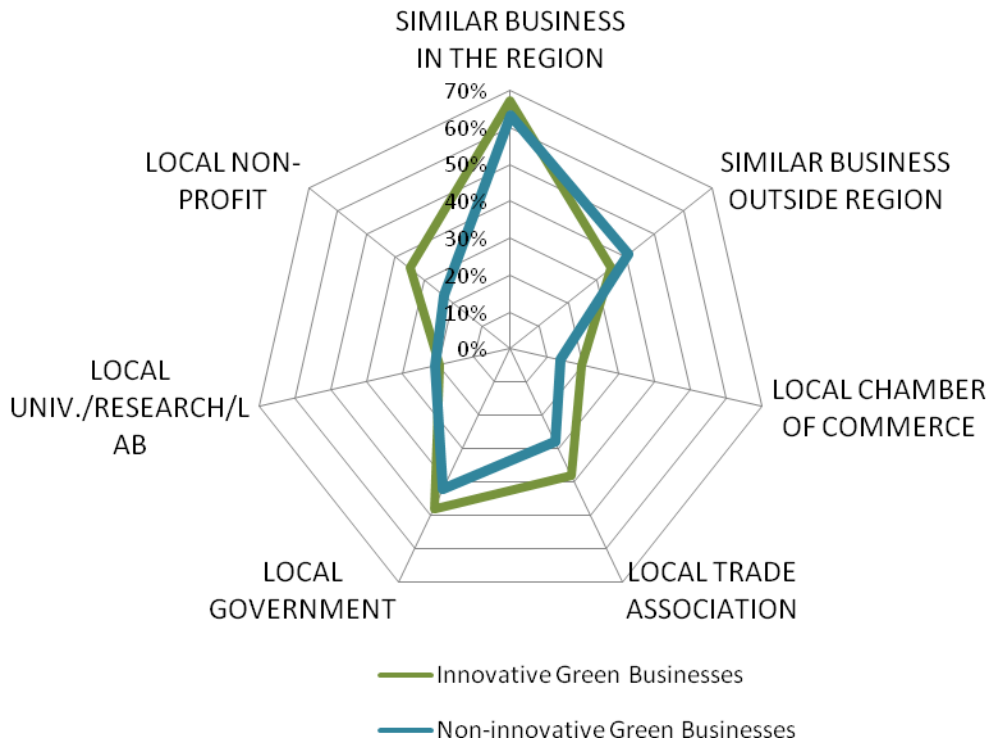
Green and traditional businesses have the greatest frequency of interactions with similar businesses within the region, followed by similar businesses outside the region and, for green firms, local government. Local universities and local chambers of commerce show the lowest rates of interaction, with two thirds of green firms stating they never or rarely interact with local chambers of commerce, and forty percent of green businesses and over half of traditional businesses never or rarely interacting with local universities and research labs.

Figure 13. Week/Monthly Interactions with Organizations by Survey



If we distinguish between innovative and non-innovative green firms, interesting results were found. Innovative green firms tend to interact more frequently with similar businesses in the region, local non-profits, local trade associations and local governments than non-innovative firms. Non-innovative green firms on the other hand interact more with similar businesses outside the region. Surprinsingly, frequent contact with universities and research labs are similar for both innovative and non-innovative green firms, suggesting that product innovation is more likely to derive from frequent interaction with local/regional-based actors (non-profits, businesses, trade associations, chamber of commerce and local governments) than from interaction with universities and/or research institutions.

Figure 14. Week/Monthly Interactions with Organizations for Innovative vs. Non-innovative Green Companies



The case study regions show many similarities in green business interactions with other organizations and businesses (Table 76). All but San Diego green business interact most frequently with similar businesses within the region. Although the differences were not significant, slightly more San Diego businesses reported interacting with similar businesses outside of the region than within the region. Significantly more Upper San Joaquin Valley businesses interacted with local chambers, while significantly fewer East Bay businesses relied on this linkage. Local trade associations were more important to

San Diego and Upper San Joaquin Valley businesses than to green businesses in other regions. Upper San Joaquin Valley businesses also interacted more with local government and with local nonprofits. Silicon Valley firms also interacted fairly frequently with nonprofits, while East Bay and Los Angeles green businesses were the most likely to have only rare or no interactions with local universities and research organizations.

Table 76. Frequency of Interaction with Organizations for Green Businesses by Region

	EB	LA	IE	SD	SV	USJ
n=	*91*	*39*	*12*	*34*	*40*	*8*
SIMILAR BUSINESS IN THE REGION: Week/Monthly	**68%**	**59%**	**67%**	**50%**	**68%**	**75%**
SIMILAR BUSINESS IN THE REGION: Quarter/Yearly	20%	15%	8%	21%	15%	0%
SIMILAR BUSINESS IN THE REGION: Rare or Never	12%	26%	25%	29%	18%	25%
SIMILAR BUSINESS OUTSIDE REGION: Week/Monthly	**35%**	**41%**	**42%**	**53%**	**35%**	**63%**
SIMILAR BUSINESS OUTSIDE REGION: Quarter/Yearly	31%	31%	42%	26%	38%	25%
SIMILAR BUSINESS OUTSIDE REGION: Rare or Never	32%	26%	17%	24%	28%	13%
LOCAL CHAMBER OF COMMERCE: Week/Monthly	**5%**	**18%**	**17%**	**26%**	**13%**	**50%**
LOCAL CHAMBER OF COMMERCE: Quarter/Yearly	20%	21%	33%	6%	20%	25%
LOCAL CHAMBER OF COMMERCE: Rare or Never	74%	59%	50%	71%	65%	25%
LOCAL TRADE ASSOC.: Week/Monthly	**27%**	**23%**	**25%**	**38%**	**33%**	**50%**
LOCAL TRADE ASSOC.: Quarter/Yearly	44%	31%	33%	18%	45%	0%
LOCAL TRADE ASSOC.: Rare or Never	27%	41%	33%	47%	18%	50%
LOCAL GOVERNMENT: Week/Monthly	**37%**	**41%**	**33%**	**32%**	**48%**	**75%**
LOCAL GOVERNMENT: Quarter/Yearly	32%	28%	33%	38%	25%	13%
LOCAL GOVERNMENT: Rare or Never	29%	28%	33%	32%	23%	13%
LOCAL UNIV./RESEARCH/LAB: Week/Monthly	**18%**	**15%**	**25%**	**24%**	**25%**	**13%**
LOCAL UNIV./RESEARCH/LAB: Quarter/Yearly	34%	26%	42%	47%	38%	50%
LOCAL UNIV./RESEARCH/LAB: Rare or Never	46%	54%	33%	32%	28%	38%
LOCAL NON-PROFIT: Week/Monthly	**25%**	**23%**	**25%**	**18%**	**45%**	**63%**
LOCAL NON-PROFIT: Quarter/Yearly	31%	13%	33%	9%	23%	13%
LOCAL NON-PROFIT: Rare or Never	38%	56%	33%	76%	25%	25%

Figure 15. *Frequency of Interaction with Organizations for Green Businesses by Region (USJ excluded)*

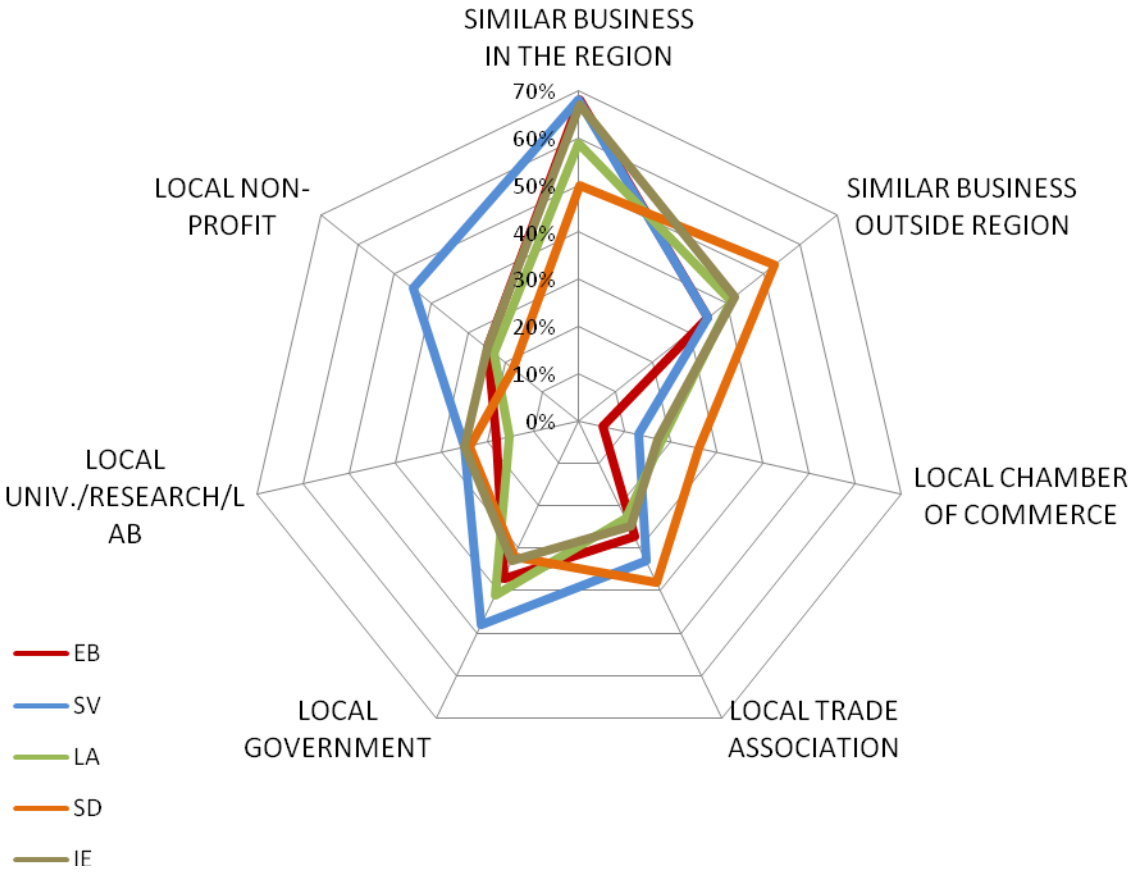
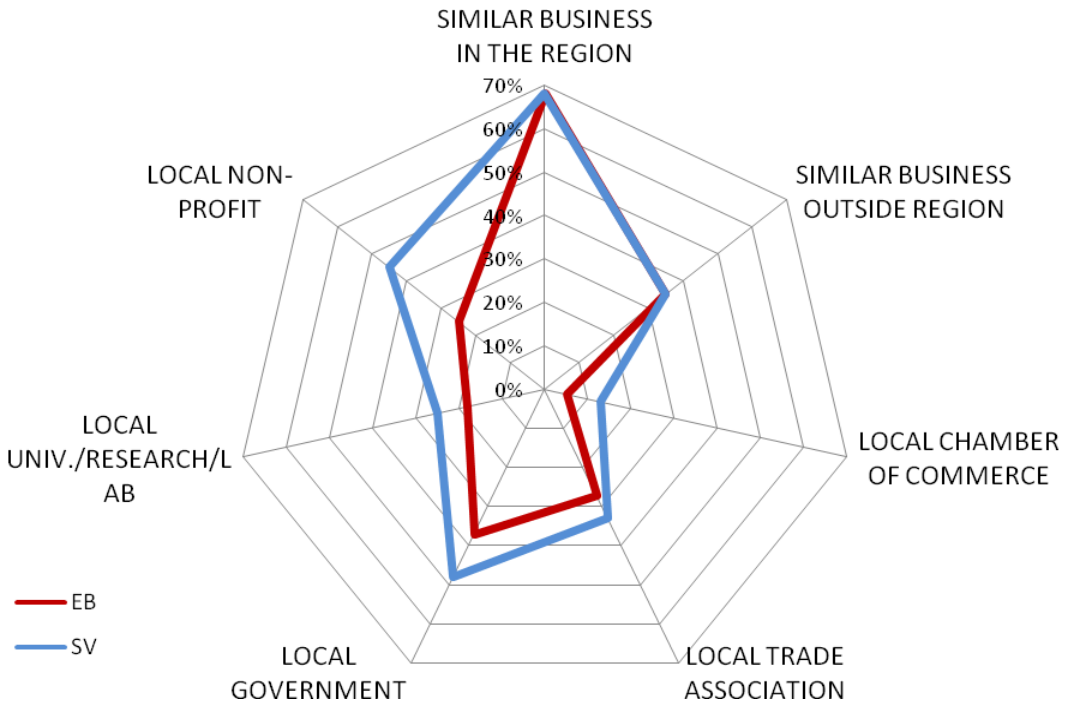


Figure 16. *Frequency of Interaction with Organizations for Green Businesses in the East Bay and Silicon Valley*



Greater variation in interactions among organizations is apparent when we compare industries as shown in Table 77. Recycling firms are most likely to interact frequently with similar businesses both within and beyond the region. Recycling firms are also among the most likely to interact with local chambers of commerce. Green architecture and design services are most likely to interact with local government, with local trade organizations, and with local nonprofits. Green energy research firms interact less with similar businesses, especially in the region, and more with universities, research organizations and laboratories. Manufacturing firms interacted most frequently with similar businesses outside the region.

Table 77. Frequency of Interaction with Organizations for Green Businesses by Industry

	Arch. & Design	Cons.	Energy	Env. Serv.	Mfg.	Rec.	Trans.	Other
n=	*49*	*78*	*20*	*61*	*30*	*17*	*6*	*23*
SIMILAR BUS, REGION: Week/Monthly	**73%**	**76%**	**45%**	**61%**	**47%**	**82%**	**50%**	**61%**
SIMILAR BUS, REGION: Quarter/Yearly	18%	10%	30%	21%	17%	6%	0%	30%
SIMILAR BUS, REGION: Rare or Never	8%	14%	25%	18%	37%	12%	50%	9%
SIMILAR BUS, OUTSIDE REG: Wk/Monthly	**22%**	**25%**	**35%**	**47%**	**60%**	**63%**	**33%**	**45%**
SIMILAR BUS, OUTSIDE REG: Quarter/Yearly	43%	41%	40%	34%	17%	25%	33%	45%
SIMILAR BUS, OUTSIDE REG: Rare or Never	35%	34%	25%	19%	23%	13%	33%	9%
LOCAL COC: Week/Monthly	**17%**	**22%**	**15%**	**13%**	**3%**	**25%**	**17%**	**29%**
LOCAL COC: Quarter/Yearly	15%	25%	15%	18%	13%	25%	17%	14%
LOCAL COC: Rare or Never	69%	53%	70%	69%	83%	50%	67%	57%
LOCAL TRADE ASSOC.: Week/Monthly	**31%**	**37%**	**33%**	**38%**	**40%**	**19%**	**50%**	**19%**
LOCAL TRADE ASSOC.: Quarter/Yearly	48%	46%	33%	23%	10%	38%	0%	33%
LOCAL TRADE ASSOC.: Rare or Never	21%	17%	33%	38%	50%	44%	50%	48%
LOCAL GOVERNMENT: Week/Monthly	**17%**	**27%**	**60%**	**36%**	**33%**	**24%**	**17%**	**27%**
LOCAL GOVERNMENT: Quarter/Yearly	70%	52%	15%	48%	10%	47%	17%	41%
LOCAL GOVERNMENT: Rare or Never	13%	21%	25%	16%	57%	29%	67%	32%
LOCAL UNIV./RES/LAB: Week/Monthly	**38%**	**33%**	**50%**	**37%**	**37%**	**31%**	**0%**	**32%**
LOCAL UNIV./RES/LAB: Quarter/Yearly	19%	9%	40%	28%	13%	19%	17%	36%
LOCAL UNIV./RES/LAB: Rare or Never	44%	59%	10%	35%	50%	50%	83%	32%
LOCAL NON-PROFIT: Week/Monthly	**33%**	**21%**	**22%**	**29%**	**10%**	**25%**	**20%**	**18%**
LOCAL NON-PROFIT: Quarter/Yearly	42%	34%	11%	25%	10%	38%	40%	55%
LOCAL NON-PROFIT: Rare or Never	25%	45%	67%	46%	80%	38%	40%	27%

Comparing traditional and green businesses by industry (Table 77 and 78), the most striking differences are with architecture and design businesses. Traditional architecture and design businesses were much less likely than their green counterparts to interact with similar businesses outside the region and also showed far fewer ties to other types of local organizations (chambers of commerce, trade associations, nonprofits). Traditional energy research businesses had more ties to similar businesses than did their green counterparts and fewer interactions with universities and research organizations. Traditional manufacturing businesses interacted less with similar businesses outside the region than did their green counterparts, while traditional transportation businesses interacted more with businesses beyond the region than did green transportation businesses.

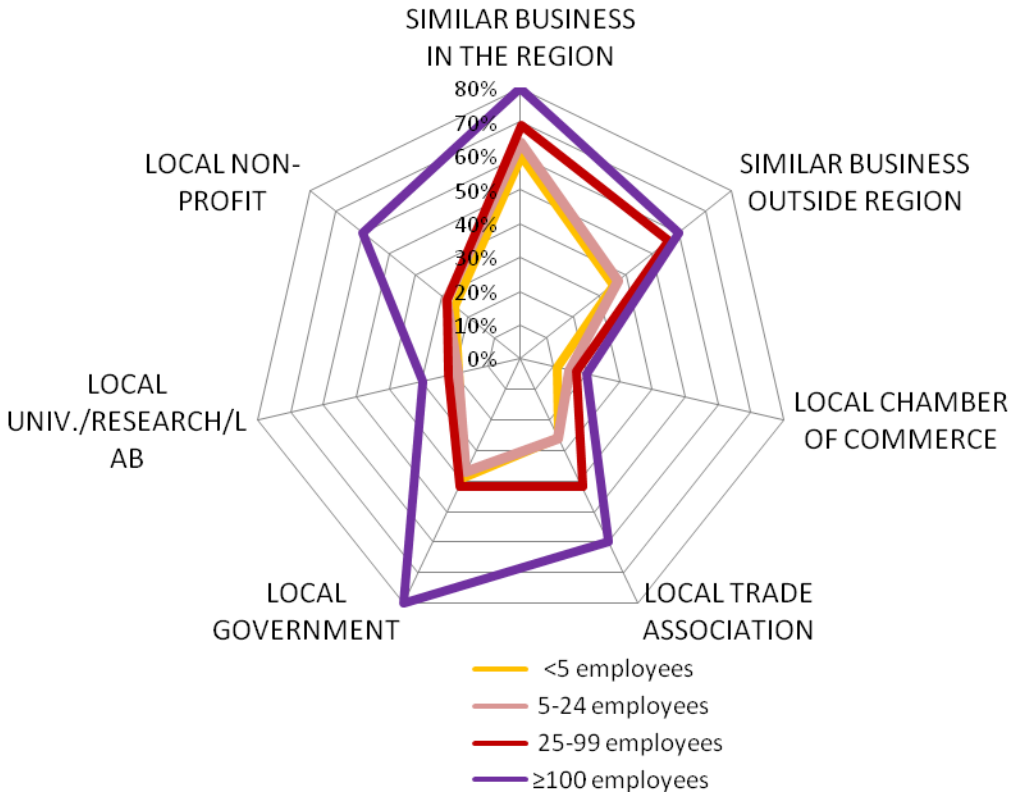
*Table 78. Frequency of Interaction with Organizations for Traditional Businesses by Industry**

	Arch. & Design	**Cons.**	**Energy**	**Mfg.**	**Trans.**	**Other**
n=	*15*	*29*	*12*	*39*	*7*	*65*
SIMILAR BUS, REGION: Week/Monthly	**27%**	**66%**	**75%**	**56%**	**57%**	**65%**
SIMILAR BUS, REGION: Quarter/Yearly	53%	17%	17%	18%	29%	20%
SIMILAR BUS, REGION: Rare or Never	20%	17%	8%	26%	14%	15%
SIMILAR BUS, OUTSIDE REG: Wk/Monthly	**20%**	**24%**	**50%**	**33%**	**71%**	**54%**
SIMILAR BUS, OUTSIDE REG: Quarter/Yearly	53%	48%	33%	26%	0%	25%
SIMILAR BUS, OUTSIDE REG: Rare or Never	27%	28%	17%	38%	29%	20%
LOCAL COC: Week/Monthly	**0%**	**31%**	**25%**	**13%**	**14%**	**8%**
LOCAL COC: Quarter/Yearly	27%	14%	42%	15%	29%	15%
LOCAL COC: Rare or Never	73%	52%	25%	69%	57%	69%
LOCAL TRADE ASSOC.: Week/Monthly	**27%**	**45%**	**25%**	**26%**	**29%**	**26%**
LOCAL TRADE ASSOC.: Quarter/Yearly	33%	31%	50%	26%	43%	26%
LOCAL TRADE ASSOC.: Rare or Never	40%	24%	25%	46%	29%	42%
LOCAL GOVERNMENT: Week/Monthly	**27%**	**45%**	**67%**	**13%**	**14%**	**17%**
LOCAL GOVERNMENT: Quarter/Yearly	27%	21%	17%	31%	43%	26%
LOCAL GOVERNMENT: Rare or Never	47%	31%	17%	49%	43%	52%
LOCAL UNIV./RES/LAB: Week/Monthly	**20%**	**21%**	**8%**	**18%**	**14%**	**23%**
LOCAL UNIV./RES/LAB: Quarter/Yearly	53%	14%	50%	23%	14%	22%
LOCAL UNIV./RES/LAB: Rare or Never	27%	66%	42%	56%	71%	49%
LOCAL NON-PROFIT: Week/Monthly	**7%**	**21%**	**33%**	**8%**	**14%**	**29%**
LOCAL NON-PROFIT: Quarter/Yearly	33%	31%	42%	18%	29%	28%
LOCAL NON-PROFIT: Rare or Never	47%	48%	25%	67%	57%	32%

*Environmental Services and Recycling companies are not included in traditional survey

Figure 17 shows how larger green firms are more involved in all types of interactions with external organizations compared to smaller firms. The largest green businesses are more likely to interact frequently with local trade associations, local governments, local nonprofits and similar businesses outside the region.

Figure 17. *Frequency of Interaction with Organizations for Green Businesses by Company Size*



In summary, networks affecting green business vary by geography, industry, and business characteristics. Networks within the region affect green businesses in many different ways. Regional networks play an important role for marketing and supply links, and also are major sources of both partners for business activities and competitors.

Several regions have unique relationships to networks beyond the region. The San Diego area, with an international border, has stronger national and international interactions than most other regions. The Inland Empire, as a less diversified economy, relies more on other parts of the state for its market, supplies, and partners. The Upper San Joaquin Valley, although also less diversified, is more isolated as well, and remains closely linked to networks within the region, relying more on public sector opportunities than do many other regions.

Networks vary by industry type as well. Green manufacturing and energy research businesses face greater competition from nationwide or international businesses than do other green businesses. Green manufacturing firms also interact particularly with similar businesses outside the region. In contrast, green recycling firms show many interactions within the region, interacting frequently with similar regional businesses, local chambers of commerce and trade associations, local governments and local nonprofits. Green architecture and design firms also show strong local linkages, including both private sector and government interactions.

Universities, research organizations and laboratories were among the least connected organizations with many of the green businesses and in many of the regions, although 20 percent of businesses reported interacting weekly with these types of institutions. The Upper San Joaquin Valley and Los Angeles areas showed the lowest levels of interaction with this category of organization, while as many as 39 percent of energy research firms reported weekly interactions with universities, research organizations or laboratories. Local government and local nonprofits played a more important role for green businesses than for either traditional or TRI businesses, in terms of frequency of interactions.

SUMMARY OF FINDINGS AND CONCLUSIONS

Green Practices, Activities and Innovation

When compared to traditional and TRI businesses, green businesses certainly seem more competitive and positioned for economic growth. The work that they do is becoming increasingly visible and marketable to the general public. Over half of all green businesses reported that they had introduced a new environmental product or service in the past three years, compared with roughly forty percent of TRI and traditional businesses. Through incentives from the federal stimulus bill and new demand created by other regulations, green businesses are also more likely to expect to grow in the next year than other business types, and reported more plans to expand their green practices and services. Not surprisingly, green businesses also tend to see green practices as very important in their own operations.

However, when their level of participation in such green practices and activities are compared to traditional and TRI firms in the six California regions, the perception of green businesses as more environmentally conscious begins to fade. While green businesses view green practices as important, when it comes to the actual implementation of green operations, they are not necessarily more likely to do so than other firm types. The survey shows that traditional and TRI businesses are also equally likely to participate in green activities, such as recycling and reduction of energy use. The one activity in which green businesses *are* more likely to engage in is the use of clean energy sources. Surprisingly, TRI businesses are generally more aware and up to date on current practices than traditional firms. This is likely due to the fact that environmental laws and regulations generally more heavily affect their particular businesses.

In addition to their green practices, green, traditional and TRI firms tend to share views on the barriers to green practices in California. Green businesses, do, however, feel that access to information about green practices is less of a barrier for them than for other firms. Publications or media, conventions, and trade associations appear to be the most valuable sources of green information for green businesses. Conversely, government and local chambers of commerce are never among the top information sources for any of the business types.

For the most part, there is regional consensus among green businesses on various issues. There are some differences, however. In general, Silicon Valley and San Diego green businesses tend to be better informed and more active in pursuing green practices and activities. Green businesses in the East Bay and Los Angeles also rank highly in their responses about green practices and perceptions. Not surprisingly, the less dynamic Inland Empire and the Upper San Joaquin Valley regions consistently had lower positive response rates for product development, innovation and green practice and activity processes.

Among green industries there are a few notable differences that seem to be consistent throughout. The architecture, construction and transportation industries tend to be at the forefront of environmental awareness and practice implementation. Businesses within the environmental services industry were often among the least environmentally progressive and proactive.

Firm size seems to affect environmental attitudes in as much as larger firms have more financial capacity to implement larger changes, while smaller firms seem to be better able to implement grass roots changes in their operations and services. Larger firms in our study are more likely to rate the implementation of green practices as *very important*.

Regional Assets

Our survey confirms that three main factors guide green businesses in location and relocation decisions: executives' residence, the existence of a strong green local market and quality of life. The existence of a strong local market for green products is especially relevant for green businesses to locate in the East Bay, LA, and Silicon Valley. In the Inland Empire and the Upper San Joaquin Valley, the responses to the survey suggest a different location pattern for green companies. Green businesses in the Inland Empire tend to be more dependent and interrelated to the LA metropolitan region while green businesses in the Upper San Joaquin Valley are less driven by the existence of a strong market and value more the availability of space and quality of life.

A relevant finding that came up in both location factors and networks questions is that green businesses seem to be more embedded in local / regional networks than their non-green counterparts. The fact that most of green companies chose to stay in their home region in the long term or considered other locations within the state shows how California is considered an attractive location for green businesses. Non-green companies in our survey show less affection for California. In general terms, there are no significant differences between plans to remain in the region between green and non-green companies. Despite complaints about California's strict regulation and bad business environment, 98% of traditional companies and 96% of TRI companies plan to stay in their region in the near term. The percentages are similar to that of green companies (98%). In the long term, around 90% of green and traditional companies plan to stay, compared to 88% of TRI companies.

Regional Competitiveness

An important finding in the survey is that green businesses perceive taxes and regulation less negatively than non-green companies. 48% of TRI companies and 40% of traditional businesses said that lower costs of doing business (including lower taxes) would make the region more competitive. This compares to just 22% of green businesses. There are also differences regarding the perception of regulation between green and non-green companies. A high percentage of TRI (38%) and traditional (16%) companies asked for less regulation as a way to make their region more competitive,

compared to only 10% of green companies. Green businesses also give more importance than traditional and TRI companies do to issues such as quality of life and public transportation and infrastructure By size, larger green firms benefit more from permit streamlining whereas smaller firms show more preference for environmental market incentives. Larger firms also seem to benefit more from improvements in the region's labor pool than smaller firms

Organizations

The solar, wind, and green building industry seem to be the most organized industry sectors with relevant sector organizations such as SEIA, Cal SEIA (for solar) or Build It Green and USGBC for green building. In contrast, Recycling/Remediation and Transportation companies mostly mentioned more general organizations such as the local chamber of commerce than a specific sector organization.

Policy Perceptions and Impact

The policy questions in our survey confirm the findings in the regional section: green businesses have, in general, a less negative perception of policies and regulation than non-green companies. 21% of the green companies mentioned negative policy impacts on their business, compared to 37% of traditional companies and 35% of TRI companies. Further, a remarkable 55% of green companies saw policies having a positive impact (such increase of demand of green products), compared to 30% of traditional companies and 4% of TRI companies. By level of policy, there were no significant differences in the impact of policies among the three surveys. State, local, and federal are, in this order, the most mentioned levels. Within these three levels, however, green companies seem to be relatively more affected by local policies and less by state policies than traditional companies are.

AB32 and Stimulus Package

One conclusion that can be drawn from our survey is that it is still early to evaluate the impact of AB32 and the Stimulus Package. A high percentage of companies did not know whether their business was affected or not. Interestingly, AB 32 has affected relatively more TRI companies in the survey than green companies. An open-ended question reflects that while the effect of AB32 for green companies is related to increased demand (45%), for traditional and TRI firms, its impact has mostly materialized in new guidelines and requirements. When the responses are analyzed by size, we find a strong relationship between firm size and impact of AB32. The smaller the company, the more likely that AB32 has had no impact.

In contrast to AB 32, green companies show higher percentages of companies that were affected by the Stimulus Package; a percentage higher than both TRI and traditional companies. The Stimulus Package has benefited most of the companies in our survey. Green companies have benefited from both increased demand and increased funding/tax credit, which is not surprisingly, considering that the stimulus is directed in large part towards them. TRI companies do not see increased demand, which seems

logical, but they see increased possibilities to access funding. Surprisingly, traditional companies mentioned increased demand in a higher percentage than green companies. The expectation of increased demand from traditional businesses may have to do either with the hope that the stimulus will speed recovery of the economy, or that traditional construction firms will benefit from expected new projects. As with AB32, there seems to be a relationship between the effect of the Stimulus Package and the size of the company, having more effect on larger than smaller companies.

Training

In absolute terms, the most mentioned specialized training needs by green companies beyond high school and college were technical/scientific degrees (incl. Engineering), specific environmental training or environmental certificate, and green building skills. Within technical/scientific degrees, Biology, Chemical Engineering, and Electrical Engineering were the most mentioned. While in-house training remains the overwhelming preference of firms across types, our survey suggests that green companies rely slightly more on external programs and organizations, mostly established certification programs such as LEED.

Regional Networks: Market type and location

While private firms, private households, other public sector and local government constitute, in this order, the largest market for non-green companies, green companies show a higher percentage of companies serving private households and local governments. Green companies in our survey are also more likely to serve markets within their cities or regions than traditional and TRI companies. These facts relate back and confirm the higher embeddedness of green companies in local and regional networks as described in the previous section on location factors. TRI companies are the ones that are most likely to serve world markets (probably because of their larger size and the manufacturing character of most TRI companies in our survey sample).

Competitors

In general, green companies seem to be competing primarily with businesses located within the city or regional area, especially in comparison to TRI companies. However there are significant variations by region. More than half of green businesses in the East Bay, Los Angeles, Silicon Valley and the Upper San Joaquin Valley compete mainly with other businesses within the region. In contrast, San Diego and Silicon Valley are the regions that show a higher level of competition at the international level. While in the case of San Diego, the proximity to the Mexican border is definitely a factor to take into account, Silicon Valley firms show an interesting awareness of global competition complemented by strong local and regional markets, external suppliers and competitors.

External Suppliers, Partners and Frequency of Interaction with Organizations
The importance of local areas to green businesses is shown further in the location of suppliers, partners, and organizations. Close to half of green business responded that their major suppliers are located within the local region, with an additional 14 percent drawing from California. Among the study regions, the East Bay has the highest share of green businesses using primarily suppliers from the local region (almost two thirds of responses), while at the other extreme, no Inland Empire firms listed the city and region as the primary location of suppliers. San Diego is the only other large region where less than half of green businesses reported the region as the primary location of suppliers.

Partners come primarily from the region as well for green businesses. Over sixty percent of green businesses primarily partner with businesses within the region. In contrast, half of TRI businesses primarily partner with businesses located nationally or worldwide. By this measure the San Diego area again is less locally based, and more globally based than other study regions.

Responses regarding interactions with other organizations show further the local nature of many green businesses. Almost two thirds of green businesses reported weekly or monthly interactions with similar businesses in the region. Green businesses also had relatively high shares of frequent interactions with local trade associations, local government and local nonprofits.

Despite the importance of innovation to green sectors, interactions with local universities, research organizations and laboratories were relatively low. Green businesses interacted with education and research organizations no more frequently than traditional businesses (although both have more frequent interactions with educational and research institutions than TRI businesses). For green businesses, San Diego and Silicon Valley regions show the highest share of interaction with local Universities, while for traditional businesses, the East Bay and Silicon Valley show closest university and research institution ties.

Conclusions
The survey results indicate that innovation of green products and practices occurs in a broad range of settings. Green businesses introduce products and services that enhance customer satisfaction or reach new customers, while traditional businesses and TRI businesses incorporate innovative green practices and products into their operations to reduce costs, meet regulatory requirements, or enhance customer satisfaction.

How innovation occurs appears linked to the types of resources available to support innovative activity. Green businesses in the San Diego and Silicon Valley regions showed the highest levels of new product and service introduction in the past three years, perhaps drawing on existing innovation networks and resources in related industries. In addition, new product and service innovation has been more heavily concentrated in a few industries, including green manufacturing, building and energy related businesses.

The survey did not directly ask about drivers of green innovation directly, but asked about location advantages to the business as well as barriers to incorporating green practices. Personal reasons such as the location of the executive's residence, local demand for the product, and quality of life were the relevant factors to a large number of firms. Some respondents emphasized the California focus on environmental quality as a benefit to operating a green business in the area. Cost, lack of demand from customers, and lack of information were the main barriers cited to incorporating green practices, while regulations were seen as a barrier to some businesses (by increasing cost of doing business) and an opportunity for others (by driving demand). It was too soon to evaluate whether AB32 or the federal stimulus spending would increase green business and green innovation, but between one fourth and half of the green businesses were optimistic about the effects of both measures. Universities and other research organizations had direct effects only on a minority of green businesses. However, in some industry sectors, energy research, for example, almost 40 percent of businesses interacted at least monthly with some type of university or research institutions.

Prevailing attitudes in California towards environmental quality also provided networks for building green businesses or for incorporating green innovations in traditional and TRI businesses. Green businesses primarily drew information on environmental operations from trade associations; publications and media; conventions, expositions and business meetings; and the businesses' own employees. Traditional and TRI businesses also relied heavily on trade associations and media for environmental operations information. Interactions with similar businesses in the region and outside of the region, as well as some local government interactions were also important, particularly to green businesses.

Businesses in all three surveys primarily found policies at the state and local levels to have the greatest impact their operations. More than half of green businesses describing impacts mentioned positive effects, including direct support for product development and operations, incentives to customers to use green products or practices, or regulations requiring environmental protection measures. Far fewer traditional and TRI businesses had positive reactions to public policy measures, although less than half of either group responded with negative examples. Negative examples included barriers to building and increased costs of operations.

Some of the findings of the survey relate specifically to the effect of green innovation on distressed regions. The impacts vary by the type of distressed region. Green innovation appears to be an important resource for recovery in Silicon Valley, where the resources for supporting innovation are strong and underutilized in periods of high unemployment and weakness in other high-tech sectors. In the Upper San Joaquin Valley and the Inland Empire, green innovation would need to interact with the broader industrial base to offer opportunities to generate new industries or reduce distress. In the Inland Empire many of the linkages, including business generating factors, the supplier base, and

support organizations are located elsewhere in California, while some of the key resources (residential building activity, open space for solar and wind facilities) are located within the region. Focus on using green innovation as a recovery strategy for the region would require working with the distant companies and organizations, but bringing the activities into the region. The Upper San Joaquin Valley region appears more specialized and locally based. There, a strategy that partners new resources with local traditional and TRI businesses may help to generate new jobs from green innovation or to preserve the competitiveness of existing sectors.

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[i] In the green business survey there was a branch for businesses, which clicked We are not a green business. This branch led these businesses to the traditional survey. There were two businesses, which selected this option, but upon further inspection of their detailed business description and their green practices they were included in the green survey.