

Building Green Skills



Mission Verde

A Green Jobs Program for San Antonio



CAEL

The Council For Adult & Experiential Learning

Table of Contents

Executive Summary 2

Introduction..... 6

Summary of Research Findings 8

 The Demand for Green Jobs in San Antonio 8

 Analysis of Green Skills and Credentials 10

 Existing Green Jobs Training Programs in San Antonio 10

 Examples of Other Cities’ Green Jobs Initiatives..... 12

 Analysis of Potential Funding Sources 13

 Putting It All Together 13

Recommendations for Designing and Implementing a Green Jobs Program in San Antonio.. 14

Recommendations for Activities to Support a Green Jobs Program 17

Recommendations for Securing Financial Resources for a Green Jobs Program 21

Conclusion 23

Appendices

- A: The Demand for Green Jobs in San Antonio
- B: Workforce Solutions Alamo Data
- C: Analysis of Green Skills
- D: Inventory of Green Jobs
- E: San Antonio Green Jobs Education Scan
- F: Green Job Initiatives in Other Cities
- G: Green Jobs Funding Opportunities
- H: Individuals Interviewed for This Report

Executive Summary

Dozens of cities, states and regions are contemplating “going green” and taking steps to improve energy efficiency, utilize renewable materials, improve air and water quality and otherwise increase sustainability. The Council for Adult and Experiential Learning (CAEL) is pleased to have been asked to help determine how a successful Green Jobs effort might take shape in San Antonio. Using our experience in developing initiatives around emerging industries, CAEL worked with the City of San Antonio and other area stakeholders to help focus the targets of a Green Jobs Program and to assess San Antonio’s current capacity to maximize the employment benefits of Mission Verde, San Antonio’s Sustainability Plan, and other local Green efforts.

Summary observations from our research include the following:

- **A Green Jobs Program is important for San Antonio at this time** as there appears to be synergy between key local efforts – Mission Verde, DOE Solar Cities designation, and the broader cultural and political momentum supporting Green – all of which offer both the motivation and the means to align local skill-development assets and create new ones that will support Green-related skill development. In addition, San Antonio is fortunate to possess many of the assets necessary to launch and implement an effective Green Jobs effort, in particular a number of leading education and training providers who already have a foundation of programs upon which to build.
- The **demand for Green Jobs** in San Antonio has slowed in recent years but is expected to grow again, perhaps quite dramatically. The current economic climate has put a damper on the building ‘boom’ of the recent past, creating a somewhat stagnant picture for construction-related jobs and skills. Despite these circumstances, some employers in the area cite the need for workers with green skills even in these times, and demand is expected to grow quickly due to investments from the American Reinvestment and Recovery Act (ARRA) and Mission Verde initiative. Public investment in weatherization, retrofit, water conservation, and solar installation will create significant opportunities for San Antonio’s current and emerging workforce. These subsectors are comprised primarily of small, family-owned businesses that are not well-organized or networked. Efforts to leverage job opportunities among these employers will be important for the overall success of a Green Jobs initiative.
- In terms of **green skills and credentials for Green Jobs**, it is not that brand new “Green Job categories” will be created. Rather, existing job categories (along with existing workers and training programs) will need to evolve to incorporate new green skills and components. A noteworthy finding is that currently many San Antonio employers in the weatherization and retrofitting subsectors do not insist on formal validation of skills, but rather rely on informal, on-the-job learning that is not formally validated.
- There are many **existing education and training programs** in San Antonio for a wide range of skill levels, as well as promising developments and partnership among education providers and university research centers. In particular, the Alamo Colleges (AC) offer many learning opportunities in disciplines that support green efforts, and Texas A&M’s Texas Engineering Experiment Station (TEES) and Texas Engineering Extension Service (TEEX) are invaluable resources to the community’s Green Jobs efforts. Even so, “green” skills are only beginning to be institutionalized among the relevant offerings.

- Many **other cities and regions** possess individual “Green Jobs” programs, but very few have integrated job preparation activities with public investments in sustainability. This represents an opportunity for San Antonio to distinguish itself.
- San Antonio possesses the job-creating projects, the skill-development infrastructure, the workforce development funding, and the civic leadership to execute a leading Green Jobs program, but the players within the system are not currently networked to the degree necessary.

Based on the findings of our research and the ideas/challenges learned from local stakeholders and other areas’ Green programs, CAEL has developed recommendations for San Antonio around designing and implementing a Green Jobs program, developing activities that support such an initiative, and fundraising strategies.

Recommendations for Designing and Implementing a Green Jobs Program in San Antonio

1. **Clearly Articulate Sector Priorities for San Antonio (May/June 2009).** CAEL’s research findings suggest that short-term strategies should focus on weatherization and residential energy efficiency, water conservation and residential solar installation/maintenance. Longer-term strategies would focus on higher-skilled engineering jobs for renewable energy and the Smart Grid.
2. **Monitor Employer Demand over the Next 6-9 Months (May 2009 – February 2010).** Because of rapidly-fluctuating economic conditions, it will be critical for a leadership group to work closely with its partners to continue to monitor demand for Green Jobs.
3. **Encourage Greater Recognition Across Education Providers for Integrating Green Skills Certifications into Existing Programs and Career Pathways (June 2009 – December 2010).** While San Antonio’s education systems have a lot to offer, more needs to be done to create a true career pathways system for Green Jobs, in which training and (new green) certifications are linked in a way that makes education and career pathways clear, particularly across providers. In addition, more needs to be done to integrate basic and English language training into the existing programs.
4. **Create and Market New Learning Modules at Public Educational Institutions (June 2009 – June 2011).** To meet the needs of the Green industries in San Antonio, it will also be necessary to develop new programs and pathways for green versions of occupations in this field. New “green” modules could be developed for Green Engineering/Engineering Tech, Green Construction Management, and Utility Project Management with Smart Grid Focus. New courses such as Spanish for Construction, and Entrepreneurship for incumbent workers might also be useful for this new Green Jobs system.
5. **Build Capacity for Career and Educational Advising (June 2009 – December 2010).** Since the field is fast-moving and not easy to navigate, we recommend that the capacity of both AC and Workforce Solutions Alamo be built so that they can provide career and educational advising to high school students, young college students and adult workers interested in this green skills area.

- 6. Create A Living Laboratory Site For Research and Development, Green Skills Training, Internships And Green Building Retrofitting (June 2009 – December 2010).** A living laboratory site on Green Jobs could offer green training and internships, while also demonstrating “building green” or retrofitting for the building itself and for the surrounding neighborhood. The site could then be a model for neighborhood revitalization and green skill-building that has the potential for replication around the City and in other cities as well.

Recommendations for Activities to Support a Jobs Program

- 7. Develop New Mechanisms for Communication, Such As an Information Clearinghouse for Employers, Job Seekers, Educators and Economic Developers (June 2009 – June 2010).** CAEL recommends that Mission Verde create a mechanism – a Contractors’ Network – as a means of distributing information about the new training programs to employers. In addition, a comprehensive outreach plan for the workforce is needed to teach workers about career paths, job opportunities and training programs.
- 8. Support Public Policy that Provides Incentives to Grow Green Industry (June 2009 – June 2011).** While ARRA funding is expected to be an important driver of growth for several Green Jobs categories, state and local funding and other incentives can also be used to drive new demand, particularly in the newer areas such as solar energy. To maximize employment opportunities and benefit to the San Antonio community, it will be critical to coordinate the public investments and the skills-development efforts, so workforce development is aligned with job creation.
- 9. Strategically Use Public Investments to Institutionalize Skill Development in the Emerging Green Opportunities (June 2009 – June 2010).** Currently employers report that most skill development takes place on the job and is not formally validated. This informal view of education and training not only hinders advancement of workers, but reduces the degree to which the community is confident that the contractor community can address the energy efficiency factors being targeted. CAEL recommends that as a requirement of eligibility for public weatherization funding and permit issuance, each contractor must ensure that at least one person on each crew possess a certification, degree or certificate pertaining to the relevant discipline.
- 10. Create an Organized and Consistent Green Jobs Leadership Group (June 2009 – June 2011).** We recommend appointment of a Green Jobs Leadership Group to oversee and publicize this initiative. This leadership group should have its first meeting as early in the Summer of 2009 as is feasible, and should assist the new Mayor in providing program leadership.
- 11. Designate An Intermediary To Manage All Aspects Of The Green Jobs Program (June 2009 – June 2011).** We recommend that Alamo College serve as the intermediary to manage the overall Green Jobs Program, working in collaboration with area universities, Workforce Solutions Alamo and other stakeholders as needed to move the initiative forward after the initial Energy Efficiency efforts are underway.
- 12. Document and Disseminate Success Stories and Outcomes from the Initiative (June 2009 – June 2011).** As the Green Jobs Program matures it will be important to maintain its visibility and communicate its impact. Only by documenting, disseminating and reinforcing the value of the investment can San Antonio continue to leverage resources to support it.

Recommendations for Securing Financial Resources for a Green Jobs Program

- 13. Alamo Community College Should Secure ARRA Formula Funds (May/July, 2009).** A specific training grant for each of the energy efficiency-related areas mentioned in our report should be negotiated by AC with Workforce Solutions Alamo, as well as for the work on the articulation between AC and San Antonio Water System (SAWS) training and certification.
- 14. Submit Green Jobs Proposal to the US Department of Labor (July/August, 2009).** Our research shows that \$500 million in competitive grants will be awarded for Green Jobs Programs, and we believe San Antonio is well-positioned to apply for and receive one of them.
- 15. Seek Funding from Other Sources (May—September, 2009).** AC should also seek funding from the National Science Foundation’s Advanced Technology Education initiative, from the Texas Workforce Commission (TWC), from the Rockefeller Brothers Climate Prosperity Cities program, and other philanthropic funders. Unlike the Workforce Investment Act (WIA) Act’s formula funds, the Texas Workforce Commission’s funds are more flexible and could help with the training in the skills areas identified by CAEL as “Intermediate Term Opportunities”.

Conclusion

Mission Verde and San Antonio’s sustainability initiatives are happening at the right time, and San Antonio possesses the assets necessary to make it a success, both environmentally and economically. In San Antonio, there is a movement towards sustainability and a desire to act upon that movement to ensure that the benefits accrue to the City, its people, and the environment in which they live and work. Green skills and Green Jobs are an essential aspect of this process and the recommendations contained in this report should serve as a beginning for this important dimension of Mission Verde.

Introduction

Dozens of cities, states and regions are contemplating “going green” and taking steps to improve energy efficiency, utilize renewable materials, improve air and water quality and otherwise increase sustainability. There is no shortage of ways to enhance sustainability and there are diverse reasons for doing so. Whether the motivation is economic or environmental or both, there is much to be gained from such efforts.

Proposed to the San Antonio City Council in January 2009, **Mission Verde**, San Antonio’s Sustainability Plan, provides a framework by which “Green” is defined in San Antonio. Mission Verde sets forth a plan and resources aimed at increasing the City’s sustainability in energy usage, water conservation, economic development, building practices, transportation and land use. Each of the plan’s priorities has implications for workforce and skill development. Education and training providers and the public workforce system therefore must also work to understand what the implications are and how the workforce is to be prepared for these changes.

The Council for Adult and Experiential Learning (CAEL) is pleased to have been asked to help determine how a successful Green Jobs effort might take shape in San Antonio. Using our experience in developing initiatives around emerging industries, CAEL worked with the City of San Antonio and other area stakeholders to help focus the targets of a Green Jobs Program and to assess San Antonio’s current capacity to maximize the employment benefits of Mission Verde and other local Green efforts.

Context

A Green Jobs Program is important for San Antonio at this time as there appears to be synergy between the local efforts – Mission Verde, DOE Solar Cities designation – and the broader cultural and political momentum supporting Green, specifically with the goal of creating new job opportunities and developing new career pathways for more traditional roles that somehow address sustainability factors. The efforts (not to mention the local and federal funding available to support them) offer both the motivation and the means to align local skill-development assets and create new ones that will support Green-related skill development. This infrastructure – already formidable – will benefit from the alignment and coordination in a way that will enable San Antonio to address effectively this and subsequent opportunities for talent to drive economic and business development.

The development of San Antonio’s Green Jobs Program is connected to the other priorities of Mission Verde as well as other sustainability investments tied to the American Recovery and Reinvestment Act (ARRA). The investments in energy and resource efficiency – weatherization and home retrofit – will require both increased demand for energy efficiency workers, and for some of those workers to develop new skills. Later phases of the effort will address the building of solar facilities, distributed energy and “smart metering” and associated skills.

Fortunate to possess many of the assets necessary to launch and implement an effective Green Jobs effort, San Antonio also must confront substantial challenges to ensure that the assets are effectively leveraged to create and enhance employment and career opportunities.

Methodology

To specify the Green Skills needed to have a positive impact on both the environment and the economy, CAEL conducted both qualitative and quantitative research, including:

- Reviewing employment data from the Bureau of Labor Statistics (BLS) and Workforce Solutions Alamo
- Researching existing skill development programs in other cities
- Examining existing job descriptions and skill requirements of firms in San Antonio and elsewhere
- Conducting in-depth interviews with firms in San Antonio who currently do or expect to create Green Jobs in San Antonio with Green Skills needs

Among the interviewees were individuals representing 21 employers in the construction, weatherization, heating, ventilation, and air conditioning (HVAC), energy rating, photo-voltaic, solar-thermal, and building products sectors, as well as San Antonio's local water and power utilities – San Antonio Water System (SAWS) and CPS Energy. CAEL also interviewed associations, intermediaries and advocates for green building and renewable energy in San Antonio. A list of all those interviewed during this project is provided as Appendix H.

As skills needs are determined, it is also important to understand San Antonio's current capacity to deliver Green Skills development services. CAEL identified education and training providers in San Antonio and determined current capacity by (1) reviewing course catalogs and degree offerings, and (2) conducting interviews with relevant staff at local colleges, universities and training programs.

During both initial literature review and the interviews of stakeholders in San Antonio, informants referred to other sustainability and Green Jobs Programs taking place in other parts of the country. CAEL conducted web-based research and interviewed leaders of these programs (and specifically the education and training components of them) to develop a perspective on current thinking about Green Jobs efforts, and on what lessons San Antonio can incorporate into its Green Jobs effort.

Recommendations

Based on the findings of our research and the ideas/challenges learned from local stakeholders and other areas' Green programs, CAEL has developed recommendations for San Antonio around designing and implementing a Green Jobs program, developing activities that support such an initiative, and fundraising strategies.

Our recommendations are presented in detail in this report, following a summary of our research findings.

Summary of Research Findings

CAEL's research yielded a wealth of information about San Antonio's Green Jobs industries, job opportunities, and training programs. Summary observations and findings that shape CAEL's recommendations for future action are listed below, presented as follows:

- The demand for Green Jobs in San Antonio
- Analysis of green skills and credentials
- Existing Green Jobs training programs in San Antonio
- Examples of other cities' Green Jobs initiatives
- Analysis of potential funding sources
- Other factors to consider

The Demand for Green Jobs in San Antonio

While there is a general consensus in San Antonio and the US that the numbers of Green Jobs will increase, specifying current employment levels is inherently challenging, and numerous variables affecting job growth and job creation make creating reasonable projections even more challenging. While CAEL has developed some estimates of Green employment based on employer interviews and review of existing labor market data, it is important to consider the following factors which affect the ability to confidently state either current employment levels or projected growth:

- As with any emerging field, jobs are created before commonly used labor market data tools create categories to track them. Current labor market data analysis tools such as those provided by the Bureau of Labor Statistics (BLS) make no distinction between traditional jobs and their Green counterparts, and quantifying current employment levels is dependent largely on anecdotal information.
- While some useful information has been gathered by employers and employer intermediaries, there are many small employers (especially in weatherization and retrofit) whose staffing may not be accurately reflected in the available data. It is not possible to determine whether the employers who did contribute to this study reflect the broader realities of such a large and fluid employer community.
- The current economic downturn has put a chilling effect on the market for Green retrofits and consequently hiring activity. Currently, employers appear to be taking a very conservative stance when it comes to anticipating hiring activity. They are waiting to see the effect of the public sector's investments in energy efficiency and how that increases activity.
- The degree to which the American Recovery and Reinvestment Act (ARRA) and similar public investment will stimulate the market for Green services and the need for Green-skilled workers is likely positive but difficult to quantify at this time.

Given all of those challenges, CAEL has worked to define employer demand as follows:

Through data analysis as well as through interviews with employers and labor researcher/experts, CAEL learned that three key Green Job categories in San Antonio are Construction,

Power/“Smart Grid,” and Renewable Energy. Overall, economic conditions have reduced worker demand across the economy, including in these three priority sectors (See data in Appendix A). Complicating our understanding of the demand is the fact that **in San Antonio, many of the employers of the construction and other trade jobs are small, family-owned businesses.** Often a number of job functions are filled by one person, especially when the business is small and operated by the owner.

Despite the negative impact from a stagnant economy, there are several important drivers that are projected to change the demand picture considerably. In particular, the American Recovery and Reinvestment Act (ARRA) and Mission Verde will create the conditions for more active markets, more consumer demand and more demand for talent in terms of both workers and skills.

The specific projects sponsored by the City of San Antonio with ARRA and related funds are likely to be significant drivers of skill and worker demand in the near term, such as:

- \$12.3 Million in weatherization funding to be administered by the City of San Antonio, and a \$12 million increase in weatherization funding to be administered by the Alamo Area Council of Governments (AACOG)
 - \$8.6 Million in Neighborhood Stabilization funds plus \$900,000 in energy efficiency
 - \$12.9 million in Energy Efficiency Block Grants, including
 - \$2 million for Solar Photo-Voltaic installations
 - \$3.5 million for municipal retrofits
 - \$2.5 million for community retrofits, primarily lighting
- (Source: City of San Antonio, Office of Environmental Policy)

While it is difficult to determine the exact numbers of workers that will be needed for the total of these projects, we estimate that demand for key occupations and skills will increase substantially in a very short period of time for some key job titles/categories. Table 1, below, illustrates estimated demand today and over the next two years.

Table 1

Job Category	Current Employment Numbers	Estimated Employment Demand 2009-2011
Weatherization (includes carpenters, plumbers, HVAC workers)	Approximately 12 weatherization efforts are currently underway. In 2008, there were 2683 plumbers/pipefitters/steamfitters.	A minimum of 8 general contractors and an unknown number of subcontractors in plumbing, insulation, heating and cooling, painting, and other services will be needed to weatherize a citywide target goal of 3,000 homes
Energy Raters (a subcategory of Weatherization)	There are approximately 18-25 certified raters	Approximately 100-200 certified energy raters
Water Conservation (includes landscape technicians, landscape architects, and plumbers)	In 2008, there were 2683 plumbers/pipefitters/steamfitters.	Approximately 500 plumbers will require training in this area to meet expected demand.
Residential Solar Installation (includes electricians with solar photo-voltaic certifications)	Approximately 36 contractors ranging in size from one-man operations to 11-person teams	A minimum of 171 new skilled employees will be needed in this area.

If the San Antonio incumbent workforce is not prepared to take these jobs, and/or if San Antonio does not take the necessary steps to train new workers, contractors will bring in workers from outside the area to fill jobs, and an opportunity to build the skills of the cities' workforce will be lost.

For more details on employment projections, please see Appendix A, The Demand for Green Jobs in San Antonio. In addition, please see Appendix D, Inventory of Green Jobs, for detailed information about the specific jobs in each Green Job family, what skills are needed for those jobs, and what education/credentials are needed for those jobs. The inventory also provides information on potential career pathways within and across the job families.

Analysis of Green Skills and Credentials

CAEL has examined each of the recommended subsectors for immediate focus and has identified where there is possible consensus on “green” skills along with degrees, certifications and certificates that indicate proficiency in the particular areas.

We found that in most instances, the Green Jobs will be a more specific version of the non-Green Jobs. **Very rarely will an entirely new occupation need to be considered.** Of the employers who provide weatherization, retrofit and related services, virtually all exhibit or anticipate a need for skill development in a number of categories: Technician Skills, Design and Planning Skills, Communication Skills and Assessment Skills. In each application, contractors need to be able to evaluate homes' current level of energy efficiency, design and plan a response, communicate the value of the proposed work to the homeowner/client, perform the recommended activity, and measure its effectiveness. (Please see Appendix C for more information on Green Skills and Appendix D for the Inventory of Jobs, which provides information about what skills and credentials are needed for specific jobs in the target industry subsectors.)

An important finding from our discussions with employers in the construction and home rehabilitation sectors, however, is that these employers typically place little emphasis on formal validation of skills. Instead, they rely predominantly on on-the-job training and other informal learning. This approach to learning is especially prevalent at the lower levels of the career paths, but also characterizes many of the higher-level occupations with more specific green-skill demands. Of the formal learning that they do pursue, much of it is not accessed through the local education and training system but is purchased through commercial training vendors, many of whom are not based in San Antonio. As the green sector matures, it will be critical that emerging skills and certifications are available to the local workforce, and preferable that AC and other providers offer options locally for skill development and prior learning assessment/skill validation. An ideal solution would be for AC and some of the commercial providers to link and articulate their offerings, which could provide a more diverse array of options for workers.

Existing Green Jobs Training Programs in San Antonio

Although employers in our target subsectors tended to rely on informal training for Green Jobs, a growing field will necessitate a more formal approach to training and certification of skills. Within the city of San Antonio there are multiple education and training programs and providers that relate to Green Jobs and green skills in the energy efficiency and renewable and distributed energy sectors. Because many of the “green” skills and some jobs are new and emerging, current

programs that provide education and training in the underlying skill sets of multiple occupations will need to be enhanced or revised to meet new certification and skill requirements. That is already underway in some areas and will need attention and new resources in other areas. The major providers for these skills and certifications are diverse and include: the K-12 education system; colleges and universities; union and trade association training programs; and commercial vendors of training.

- **The K-12 Education System**

Northside Independent School District, the most diverse of the San Antonio School Districts and with a total student population of 88,500 students, is currently developing a new Career Academy school with a focus on Construction. They will enroll their first students in the school this fall and anticipate an entering class of 150 students. The Career Academy will be housed in an existing high school that is being renovated into a green building and will include programs in electrical, air conditioning, HVAC, and the construction trades. Students will be able to attain trade certifications and junior apprenticeship standing as well as their diplomas. The Academy is actively articulating with AC and is being partially funded through federal Perkins funds. This Career Academy presents a great opportunity to infuse green skills and provide educational and career counseling to students on green careers and jobs. This could be developed into a centerpiece program for the Green Jobs Program within the Mission Verde initiative.

- **Colleges and Universities**

Both public and private colleges and universities in San Antonio offer a range of programs and initiatives related to training workers for Green Jobs.

- **Alamo Colleges (AC).** The AC campuses have degree and certificate programs as well as continuing education opportunities in many areas that provide education and training for jobs in the sectors that will be in demand as a result of the Mission Verde initiatives. Programs in Engineering (electrical, civil and construction, manufacturing and mechanical), Engineering Technology, Construction and Home Building Technology, Electrical Trades, Air Conditioning and Heating (refrigeration, HVAC), Advanced Water Treatment, and Architecture are among the areas of focus. In particular, two AC colleges, St. Phillip's and San Antonio, have taken a lead in integrating and incorporating green skills and programs.
- **University of Texas, San Antonio (UTSA).** UTSA has both undergraduate and graduate programs in Architecture and Engineering. Both have the potential to address Green Jobs and green skills in San Antonio. UTSA's role will serve skill needs in clean and renewable energy jobs that require higher degrees, and new companies will need the research engine of UTSA. UTSA has current articulation agreements with AC for engineering programs.
- **Texas A & M University.** Texas A & M University's San Antonio campus may develop an "energy" focus based on the decision to move a solar demonstration facility—the Solar Decathlon House—to San Antonio. That, along with A&M's **Texas Engineering Experiment Station (TEES)** site in San Antonio, provides a unique opportunity for integrated research, teaching, learning and training in Green Energy. In addition, A&M's **Texas Engineering Extension Service (TEEX)** in San

Antonio is delivering training programs for energy-related jobs. These programs can be articulated with area community colleges and can lead to certificates. Both TEES and TEEEX receive State appropriations for their work and could become important players in the San Antonio Green Jobs Program.

- **Private Postsecondary Institutions.** There are two major private colleges in San Antonio that could have a relation to education and training in ‘green’ areas. The **University of the Incarnate Word** has a BA degree in Environmental Science—the only 4 year degree in this area currently operating in the city. **Trinity University** offers a BS degree in Engineering and a design sequence within that program has focused on green areas in the past. The University is currently thinking about adding specific green coursework to its curricula.

For a detailed list of existing training programs at San Antonio colleges and universities, and for additional information about these leading colleges and universities, please see Appendix E.

- **Other Training Programs**

From our interviews with employers and associations within San Antonio, we learned that employers and employer/employee associations also provide training for emerging “green” skills in response to market needs. Governmental standards can and will drive additional training that is available from certifying organizations to the local workforce. Key training providers are the **Greater San Antonio Builders Association (GSABA)**, the **Build San Antonio Green** organization, and trade unions such as the **National Electrical Contractors Association (NECA)**, which has developed a complete solar curriculum to supplement their current electrician programs. In addition, there are many training vendors operating nationally whose offerings align with the various certifying entities’ standards.

In summary, the San Antonio workforce has access to multiple programs that lead to the required knowledge and skills for entry level and advanced jobs in the construction and building trades. Major education and training providers are aware of the changes and enhancements needed to educate and train the workforce in green skills including green certifications. Some are in the process of implementing additional green- or energy-related components; others are waiting for increased demand for the skills to implement programs. A clear and focused jobs initiative, initially driven by the retrofit programs with estimates of workers who would benefit from targeted training programs, would provide the impetus to move these programs forward at a faster rate. There is also a need to ensure that collaborations between and among providers are rewarded and that those workers targeted for additional education and training are aware of the options available to them.

Examples of Other Cities’ Green Jobs Initiatives

The San Antonio Green Jobs Program and its partners can be informed by what other cities are doing in this arena. Two initiatives are of particular interest for San Antonio are in Chicago and Richmond.

- The **Chicago Green Jobs Strategy and Green Collar Jobs Program** grew out of a city-wide Climate Action Plan and the drive to ensure that the city has an appropriately skilled

workforce for the direction it seeks in regard to green activities. It also seeks to connect green collar jobs to underserved populations and those in need of jobs skills and well as support the growth of green businesses within the city. The initiative is new and still in the planning stage at several levels.

- The **Richmond BUILD** initiative is a pre-apprenticeship Construction Skills and Solar Installation Training program in Richmond California using a partnership model between the city’s Employment and Training Department and other private and public partners. The ten week program has trained 150 participants since its inception 2 years ago.

One lesson from looking at the full range of Green Jobs initiatives – not only in Chicago and Richmond, but also in California, Austin, Houston, Milwaukee, Gainesville and Knoxville – is that while many cities and regions are in the throes of individual “Green Jobs” programs, *very few have integrated job preparation activities with public investments in sustainability*. This represents an opportunity for San Antonio to distinguish itself.

To learn more about Green Jobs initiatives in other cities, please see Appendix F.

Analysis of Potential Funding Sources

CAEL researched possible public funders for the Green Jobs Program at the local, state and federal level, as well as potential philanthropic sources of support. The full list of funders is provided as Appendix G to this report. It was reviewed with San Antonio stakeholders in early April.

CAEL agreed to develop a revised draft template proposal to emphasize the activities that need to be carried out under the Green Jobs umbrella. In this revised draft, CAEL will link requests for funding to specific activities rather than to specific timeframes. As soon as the design elements of the Green Jobs Program that are outlined in this report are approved, CAEL will complete the new draft proposal and will send initial information to national funders listed in Appendix G—and then the fundraising will be handled by either AC or another entity identified by AC.

Putting It All Together

In addition to the above assets and resources, San Antonio’s local Workforce Investment Board, Workforce Solutions Alamo, will have an important role to play in the City’s Green Jobs efforts. Federal workforce development funding for San Antonio has increased dramatically as a result of the ARRA. Workforce Solutions Alamo is the recipient and manager of that funding stream. While these workforce development funds are not necessarily Green Jobs funds, Workforce Solutions can direct these to support development of Green Skills among its client population. The level of funds available for Green Skills training will depend on the degree to which the coordinated initiative can increase the level of certainty of required outcomes such as job placement, job retention and wage improvement.

In summary, San Antonio possesses the job-creating projects, the skill-development infrastructure, the workforce development funding, and the civic leadership to execute a leading Green Jobs Program. Many critical components are in place and are ripe for further development

in anticipation of the projected growth in demand. However, a challenge for San Antonio may be putting it all together in a seamless way.

We have observed that the players within the system are not currently networked to the degree necessary; many of the players are offering portions of a solution but those efforts are not connected to one another. Efforts to increase instructional offerings, for example, are taking place within both K-12 and Community College venues, but conversations between them are limited, increasing the possibility of redundancy or missing opportunities to create articulation between them. Employer intermediaries are collecting valuable information about jobs and skills needs, but that information is not reaching the education and training providers so decisions about volume and content of instruction are ill-informed. The City has access to employers through its permitting and compliance process, while access to those same employers remains a key challenge for education and training providers. Establishing better connections and communication between and among these various players will be important for a successful Green Jobs initiative.

Recommendations for Designing and Implementing a Green Jobs Program in San Antonio

A Green Jobs program for San Antonio will require strategic consideration of critical sectors and job categories so that training investments are made where they will create the greatest benefit to the community and meet the greatest needs – both short term and long term. Once that is done, existing education and training programs can be expanded and new ones created to meet the need. Advising services will help workers make decisions, and innovative approaches such as a Living Laboratory site can help to bring the project alive to generate excitement and interest in the initiative.

1. Clearly Articulate Sector Priorities for San Antonio (May/June 2009)

The first step in the development of a Green Jobs program is to understand fully the jobs that will be needed in the future and to make decisions about which jobs to target for training initiatives in the short term, intermediate term and long term.

Short term. For example, in the short term, due to the imminent influx of ARRA funds and other public sector investments, job targets would include

- Weatherization and residential energy efficiency, which includes carpenters, plumbers, HVAC workers, and energy auditors
- Water conservation, which includes water saver landscape technicians, water saver landscape architects, and green plumbers
- Residential solar installation and maintenance, which includes electricians with solar photovoltaic certifications

Intermediate term. In the intermediate term, the focus might be on jobs needed for the “Smart Grid,” which may take 3 to 5 years to achieve completely. The associated employment opportunities at this time are few and concentrated at the higher levels of engineering, research and development and thus not a high-value target for the early stages of the San Antonio Green

Jobs Program. However, since they will be needed for this important energy initiative, training and career pathways for these jobs should be factored into the planning for education and training programs in the region.

Long term. Eventually, investments in San Antonio made by the Multi-Tech Venture Fund (one of the Mission Verde initiatives) are expected to create new firms and new jobs in clean and green technology companies. As this takes place, linkage of the Green Jobs Program to the Fund and its ventures will inform additional workforce development programming. While some discussion is underway on developing manufacturing facilities for solar and wind power components (perhaps in partnership with high-technology firms in the Austin – San Antonio corridor), not enough information is available about the opportunities, possibilities and timeframe to begin a meaningful skills-development conversation. It is important to note however, that companies make decisions about site location based on resources including a skilled workforce. Finding ways to up-skill the existing workforce quickly to the skill level demanded by these new firms needs to be considered in the jobs initiative—perhaps through pathway programs to higher levels of skill as they come into demand.

2. Monitor Employer Demand over the Next 6-9 Months (May 2009 – Feb 2010)

The analysis of demand for Green Jobs contained in this report provides important information for the initial planning activities for a comprehensive Green Jobs Program for San Antonio. However, because of rapidly-fluctuating economic conditions and the changes due to ARRA funding that we can only estimate at this time, it will be critical for a leadership group to work closely with AC's advisory committee, the city's Economic Development Department, and others to continue to monitor employer demand in the Green Jobs industry subsectors.

3. Encourage Greater Recognition across Education Providers for Integrating Green Skills Certifications into Existing Programs and Career Pathways (June 2009 – December 2010)

San Antonio's education systems have in place a number of training and degree programs that can form a strong foundation upon which to build a Green Jobs initiative. The Alamo Colleges in particular have taken steps toward identifying and incorporating green skills certifications into their existing programs. Yet, more needs to be done to create a true career pathways system for Green Jobs, in which training and (new green) certifications are linked in a way that makes education and career pathways clear, particularly across providers. This is important for helping San Antonio's workforce think about longer-term career trajectories and thus build a skilled workforce for San Antonio. In addition, more needs to be done to integrate basic and English language training into the existing programs, particularly since so many of San Antonio's Green Jobs workforce will initially be employed at small, family-owned businesses operated by Spanish-language speakers.

Specific new components to introduce into existing programs include:

- Introduce WorkKeys testing at AC in three key subjects that are the core of the National Career Readiness Certificate (NCRC), and equip participants in the training with an NCRC when they are finished. Though WorkKeys testing is underway at one site, the link to the NCRC has not yet been fully made.

- Link basic construction and utility-related training such as weatherization to other training, such as for energy auditors, so that career pathways are created rather than dead-end jobs
- Include Entrepreneurship and Business Management as a critical element of construction-related programs
- Include SAWS education and training programs within Construction Career Academy, AC offerings, and WIA-eligible training
- Include basic skills features and English as a Second Language (ESL) components in Green Skills education and training efforts

And to continue the good work that is already underway, the Green Jobs Program should support ongoing efforts such as the following:

- In the high and moderate priority occupational sectors, ensure that green training modules exist for every relevant job category
- Teach to national standards relevant to the discipline
- Facilitate and fund testing for relevant certifications
- Create internship programs with CPS and SAWS at the technician, engineering and operations levels

4. Create and Market New Learning Modules at Public Educational Institutions (June 2009 – June 2011)

To meet the needs of the Green industries in San Antonio, it will also be necessary to develop new programs and pathways for green versions of occupations in this field. Specific recommendations are to:

- Create a skills panel of key industry leaders with the AC, UTSA, and others to further define gaps and priority needs.
- Incorporate national standards into the construction-related offerings, for both for-credit and non-credit programs.
- Create Residential Energy Services Network (RESNET)-certified energy auditor programs throughout the AC system
- Create Building Science programs at AC Campuses (designed to articulate to engineering and construction management programs at UTSA and other area four-year universities)
- Develop “green” modules for existing training programs, such as:
 - Green Engineering/Engineering Tech
 - Green Construction Management
 - Utility Project Management with Smart Grid Focus
- Increase instruction in applied math and computer technology within existing technician programs
- Offer Entrepreneurship and Business Management programs to incumbent workers, linked with Small Business Administration (SBA) and other financing programs
- Develop “Spanish for Construction” courses for team leaders and contractors, to enhance communication with subcontractors
- Create articulation agreements between construction and pre-engineering programs with engineering degree offerings at UTSA
- Create articulation agreements between SAWS education and training programs and the Construction Career Academy, AC offerings, and related WIA-eligible training

5. Build Capacity for Career and Educational Advising (June 2009 – December 2010)

Since the field is fast-moving and not easy to navigate, we recommend that the capacity of both AC and Workforce Solutions Alamo be built so that they can provide career and educational advising to high school students, young college students and adult workers interested in this green skills area. The career pathways that we have identified in Appendix D need to be well understood by career counselors who have linkages to the employer network and can assist jobseekers to understand this field. CAEL can provide such capacity-building training for the career counseling staffs if desired.

6. Create a Living Laboratory Site for Research and Development, Green Skills Training, Internships and Green Building Retrofitting (June 2009 – December 2010)

One valuable approach would be the opening of a living laboratory site on Green Jobs, where both youth and adults can get involved in green training and internships, and where “building green” or retrofitting is underway for the building itself and for the surrounding neighborhood. Whether the site is one of the schools in a low-income neighborhood or another facility, one of the hallmarks of the laboratory would be to involve students in training and internships and equip them to undertake the retrofitting and weatherization of all the homes in the neighborhood around the facility. The site could then be a model for neighborhood revitalization and green skill-building that has the potential for replication around the City and in other cities as well.

Recommendations for Activities to Support a Green Jobs Program

While increasing instructional opportunities is critical, their creation alone will not ensure that individuals will take advantage of them, that employers will value them, or that the job creation opportunities are maximized for the benefit of San Antonio’s citizens. How the key players within the workforce development ecosystem interact – employers, job seekers, education and training providers, managers of public projects, permitting and compliance officers – will determine to what degree the benefits of any given effort are leveraged to support other efforts, and vice versa. To ensure that education and training investments achieve maximum impact, CAEL offers several recommendations around communication, public policy, leadership, and documentation of success.

7. Develop New Mechanisms for Communication, Such As an Information Clearinghouse for Employers, Job Seekers, Educators and Economic Developers (June 2009 – June 2010)

Employer Communication

The creation of new and enhanced education and training offerings does not ensure that contractors and their crews will take advantage of them. This community of employers is made up of hundreds of small independent firms and is not well organized. While their numbers may

be substantial, access to them is difficult. CAEL recommends that the Green Jobs Program create a mechanism – a Contractors’ Network – as a means of distributing information about the residential retrofit and weatherization programs, marketing skill development opportunities, and increasing both contractor access to workers and training, as well as job seeker access to employment opportunities. The primary current point of connection with this community is the permitting and compliance process, which can be leveraged as an initial opportunity to communicate the availability of new funding opportunities and the availability of public-sector recruitment and training programs.

Communication with Job Seekers and Incumbent Workers

A variety of interventions are needed as part of the Green Jobs Program to attract high school students, young college students and incumbent workers into the green skills training and jobs. Green Jobs information materials need to be developed that clearly spell out the career paths available. There should also be regularly scheduled job and career fairs at AC locations and workforce one-stop centers that explain this emerging field and the career advancement opportunities. Workforce Solutions Alamo’s one stop centers could also pilot special initiatives for displaced workers and those that have been unemployed for a long time. These initiatives should all include career and educational advising so that prospective participants can understand the green skills field and its career ladders or pathways.

8. Support Public Policy that Provides Incentives to Grow Green Industry (June 2009 – June 2011)

While ARRA funding is expected to be an important driver of growth for several Green Jobs categories, state and local funding can also be used to drive new demand, particularly in the newer areas such as solar energy. Rebates for solar panels was once a driver for growth and can be again. In addition, there are approximately 60 bills currently being considered in the Texas legislature to provide incentives for solar energy. These kinds of public investments and incentives will be important for ensuring continued growth of these newer fields and demand for Green Jobs. To maximize employment opportunities and benefit to the San Antonio community, it will be critical to coordinate the public investments and the skills-development efforts, so workforce development is aligned with job creation.

9. Strategically Use Public Investments to Institutionalize Skill Development in the Emerging Green Opportunities (June 2009 – June 2010)

Public investments related to the target sectors will create employment opportunities, but without meaningful connection between them, San Antonio residents may not be well-positioned to take advantage of them, and preparation activities (education and training) may not align well with the needs of the project. The substantial public investments create an opportunity to address skills and training among the priorities of the project. CAEL recommends using this public funding arena as a way to institutionalize skill development and skill validation in the Green disciplines.

Using ARRA to Encourage Greater Use of Skill Validation

As with any public program, there is much thought going into the process by which funds will be released and what will be the standards for contractors providing the services. By making skill

validation a part of the contractor certification process, skills will become a formal part of the City initiative.

In our conversations with employers, most weatherization and retrofit (construction) employers reported that most skill development takes place on the job. This casual, informal view of education and training not only hinders advancement of workers, but reduces the degree to which the community is confident that the contractor community can address the energy efficiency factors being targeted. There is no validation that the contractor crews have the skills to increase energy efficiency. In order for the market to thrive and create jobs after the public subsidies are no longer available, San Antonio should move for skill factors to be institutionalized as just as important as safety, licensure and compliance with municipal codes.

CAEL recommends that as a requirement of eligibility for weatherization funding and permit issuance, each contractor must ensure that at least one person on each crew possess a certification, degree or certificate pertaining to the relevant discipline. Institutionalization of skill validation will encourage skill development and enhance trust. (Note: This is not to say that on-the-job learning is not valuable. To the contrary, it is sometimes the most valuable and effective learning strategy. Validating the skills acquired while on the job through prior learning assessment methods can be a way to reconcile on-the-job learning with a formal credentialing system.) During this initial period, subsidy via ARRA (and potentially philanthropic sources) will make this a funded mandate and drive traffic towards the new offerings, increase awareness of Build San Antonio Green (BSAG), and offer new methods of communicating with the dispersed contractor community. The City could also couple the requirement suggested earlier in this paragraph with an incentive, through which the City could promise to expedite or fast-track permits and other requirements based on whether a contractor can prove that they employ local individuals who are certified or are seeking certification in a discipline related to the work.

This integration can be accomplished initially by the funding and project authorities (City, CPS Energy, SAWS, ARRA projects) including workforce system and/or AC representatives in the development of RFP's for weatherization, utility rebate and other Mission Verde and ARRA related funding,

10. Create an Organized and Consistent Green Jobs Leadership Group (June 2009 – June 2011)

A focus on Green Jobs for San Antonio's workforce will need continued leadership at a high level. We recommend appointment of a Green Jobs Leadership Group (GJLG) to oversee and publicize this initiative. Membership on this GJLG should include leaders from AC, Workforce Solutions Alamo, the City's Office of Environmental Policy, the City's Economic Development Department, CPS Energy (its new Vice President for Sustainability would be ideal), the Water Conservation office of SAWS, University of Texas at San Antonio, the Clean Energy Forum, Build San Antonio Green, the Greater San Antonio Builders Association, the National Electrical Contractors Association, the Texas Engineering Experiment Station, San Antonio branch, which is a part of Texas A&M, and two or three employers in the areas of solar or wind energy. This leadership group should have its first meeting as early in the Summer of 2009 as is feasible, and should assist the new Mayor in providing program leadership. Some of the activities that the Leadership Group should undertake include:

- Serving as a Board/Advisory Group for the intermediary managing the initiative

- Designing a marketing campaign for this initiative
- Suggesting policy interventions and regulations, both at the local and state level, that will stimulate the growth in Green Jobs
- Fundraising for the implementation and expansion of the initiative
- Monitoring of employer demand for green skills as federal and state legislation passes
- Leading the creation of the living laboratory site for students and workers
- Encouraging the expansion of “green” elements within existing construction and utility industry-related technical training
- Naming a “green skills panel” of university, community college and industry representatives that will identify needed new “green” learning modules in engineering, construction management, entrepreneurship, business management and utility industry project management
- Overseeing the formation of the Contractors’ Network

11. Designate an Intermediary To Manage All Aspects of the Green Jobs Program (June 2009 – June 2011)

In addition to leadership, there will also be a need for sustained management as the initiative moves forward. The role of a Green Jobs Intermediary will be to coordinate green skill development efforts across the city and serve as a link between the job-generating projects and the associated education and training activities. We recommend that Alamo Colleges serve as the intermediary to manage the overall Green Jobs Program, working in collaboration with area universities, Workforce Solutions Alamo and other stakeholders as needed to move the initiative forward after the initial Energy Efficiency efforts are underway. AC is currently creating a Green Institute in which the City’s Green Jobs program could be housed, and there is a natural fit between AC’s curricula—both actual and planned—and the goals of the short term green skills training needed. AC would also be an appropriate home for the fundraising efforts to the Texas Workforce Commission, the United States Department of Labor and other federal agencies, and philanthropic funders.

12. Document and Disseminate Success Stories and Outcomes from the Initiative (June 2009 – June 2011)

As the Green Jobs Program matures it will be important to maintain its visibility and communicate its impact. Only by documenting, disseminating and reinforcing the value of the investment can San Antonio continue to leverage resources to support it.

Documentation

Typically, program operators are so consumed in doing the work of program management that they fail to capture the rich experience of launching the program and capturing knowledge about how it was executed and what the outcomes and benefits are. As components of the initiative are launched, it will be important to establish the goals up-front, track the resources and methods used to implement, document to what degree the goals are met, and highlight any unexpected or ancillary accomplishments and outcomes. The Green Jobs Program must be able to “tell the story” of how it has affected peoples' lives, the broader goals of Mission Verde, and the value of the skill development system.

Internal Dissemination

As the stories are captured, they can be used to both increase capacity within the system, as well as leverage new resources from the outside. Especially useful methodologies, tactics or partnerships used by one component of the initiative may be applicable in other parts of the initiative, but this can only happen if there is communication among the Green Jobs Program partners. Mechanisms for sharing this type of information include creation of shared web-based portals, periodic (quarterly) program operator convenings, and periodic e-mail communications.

External Dissemination

The collection of successes and outcomes can be used to maintain the visibility of the initiative, maintain existing support and leverage new investments. The Intermediary would be the appropriate entity to collect and synthesize the program successes and challenges and to construct a broader story. This aggregated information can populate a public-facing website and printed collateral, and inform a media strategy that will keep the Green Jobs Program prominent among the public and political supporters, as well as philanthropic investors.

Recommendations for Securing Financial Resources for a Green Jobs Program

While we continue to develop the fundraising strategy for philanthropic organizations, CAEL recommends the following regarding next steps to secure public funding:

13. Alamo Colleges Should Secure ARRA Formula Funds (May-July, 2009)

Alamo Colleges should proceed to secure ARRA formula funds, which are already available through Workforce Solutions Alamo, for several components of the Energy Efficiency-related training initiatives, including Weatherization, Retrofitting and Water Conservation. Since demand for workers in each of these areas will be growing due to City-led initiatives and/or SAWS-led initiatives, it would be useful for AC to meet with both the City and SAWS and determine level of demand and specific training required, and then apply to Workforce Solutions Alamo for the training funding, and to apply for the funding to articulate with SAWS training and certification that is already being offered in areas such as Water Saver Landscaper and Licensed Irrigator. For example, SAWS mentioned a need to train 500 plumbers on Green Plumbing techniques; in this case, funding could be sought from Workforce Solutions Alamo by AC to support plumbers in the City who need to take Green Plumber training through an international organization and then have that training certified by AC.

A specific training grant for each of the energy efficiency-related areas mentioned in our report should be negotiated by AC with Workforce Solutions Alamo, as well as for the work on the articulation between AC and SAWS training and certification. This would allow AC to assist the contractors and crews to master basic skills necessary for certification, and then achieve a credential at the end of the SAWS training. This would move the Green Jobs agenda forward more rapidly.

In all cases where there is a national or commercial provider of training such as in the Green Plumbers area, we would suggest that AC apply for ARRA funds to support the work of creating

an articulation with the provider's training and enabling the workforce to receive certification through AC.

14. Submit Green Jobs Proposal to the US Department of Labor (July - August, 2009)

In addition to seeking funding from the Workforce Investment Act's formula funds, AC should work with the City, Workforce Solutions Alamo, SAWS, and perhaps Austin Community College and the Austin Workforce Board to create a proposal for the Green Jobs RFP which is expected to be issued by the United States Department of Labor in June. Our research shows that \$500 million in competitive grants will be awarded for Green Jobs Programs, and we believe the San Antonio/Austin region is well-positioned to apply for and receive one of them.

15. Seek Funding from Other Sources (May - September, 2009)

AC should also seek funding from the National Science Foundation's Advanced Technology Education (NSF-ATE) initiative. It provides funding for the planning and implementation of educational programs in key technical fields and could be a source of ongoing support for AC's Alternative Energy focus. CAEL has already spoken with NSF-ATE about this Green Jobs Program and they are prepared to receive a proposal from AC.

After CAEL's meeting with representatives of the Texas Workforce Commission in Austin, we are convinced that the TWC would look favorably on a proposal from AC and a group of small private sector employers for providing needed training in solar installation and maintenance or other alternative energy areas. Unlike the WIA formula funds, the TWC's funds are more flexible and could help with the training in the skills areas identified by CAEL as "Intermediate Term Opportunities". We would be happy to assist with the development of this proposal as well.

We are also aware of a new program of the Rockefeller Brothers Foundation, in which twelve cities have already been given seed funding to become a Climate Prosperity City, and we would suggest that San Antonio apply to Rockefeller to join this initiative when appropriate. We also recommend a continued push for other national philanthropic funding.

Conclusion

The proposals for Mission Verde and San Antonio’s sustainability initiatives are happening at the right time, and San Antonio possesses the assets necessary to make them a success, both environmentally and economically. In San Antonio, there is a movement towards sustainability and a desire to act upon that movement to ensure that the benefits accrue to the City, its people, and the environment in which they live and work. A Green Jobs program is an essential component of this effort. There is a “will,” and this report aims to describe a “way” by which San Antonio can move forward. The Green Jobs recommendations contained in this report should serve as a beginning – a point around which much discussion and even disagreement is necessary. However the constellation of partners choose to act, it is important that they act now to create synergies between the environmental goals, economic objectives and a rich set of resources now becoming available.

Appendix A: The Demand for Green Jobs in San Antonio

The Demand for Green Jobs in San Antonio

Through data analysis as well as through interviews with employers and labor researcher/experts, CAEL examined the following questions: What are the important “Green” Industries for San Antonio? Which job categories are facing growing demand?

Three key Green Job categories in San Antonio are Construction, Power/“Smart Grid,” and Renewable Energy. Overall, current economic conditions have reduced worker demand across the economy, including in these three priority sectors. The data in the following table show pre-downturn growth in the occupational categories that support construction and utilities in general, as well as the greening of these sectors. Noteworthy, however, is that San Antonio’s construction sector prior to the downturn was experiencing serious skill and worker shortages. Such shortages are expected to return as the national economy recovers.

Occupation	% Change 2007-2008		
	Bexar County	Texas	US
Construction and Related Occupations			
Carpenters	2%	1%	-4%
Construction Laborers	2%	2%	-4%
Insulation Workers	3%	3%	-4%
Plumbers	3%	1%	-3%
Electricians	2%	0%	-4%
HVAC Mechanics and Installers	2%	1%	-3%
Power and "Smart Grid" Related Occupations			
Computer Engineers	1%	3%	3%
Electrical Engineers	0%	2%	0%
Electric/Electronic Engineering Technicians	-1%	1%	-1%
Operating Engineers	3%	3%	-2%
Power Line Installers, Repairers	8%	4%	0%
Electrical Engineers	0%	2%	0%
Renewable Energy (Wind and Solar) Related Occupations			
Environmental Engineers	1%	4%	2%
Structural Iron and Steel Workers	3%	2%	-3%
Millwrights	4%	2%	-3%
Electricians	2%	1%	-4%
Industrial Machinery Mechanics	2%	3%	0%
Installation, Maintenance and Repair Workers	3%	2%	-1%

Source: Workforce Solutions Alamo

Our interviews with employers in these sectors revealed job growth expectations that were moderate at best, and in some cases stagnant or declining. (This was especially acute among the residential solar installation companies whose viability is largely dependent upon consumers' ability to leverage subsidy via CPS rebate programs to offset the substantial equipment and installation cost.) However, some of these areas continue to see demand, even in these slower economic times. Skilled and experienced Plumbers and HVAC mechanics and installers, for example, were mentioned by some as still being in demand.

Despite the stagnant economy, there are several important demand drivers that are projected to change the demand picture considerably. The American Recovery and Reinvestment Act (ARRA) and Mission Verde will create the conditions for more active markets, more consumer demand and ultimately more demand for talent (people and skills). For example, while many decisions have yet to be made about use of ARRA funds, increased funding for weatherization (increasing homes' energy efficiency) has already increased demand for skills and workers in that subsector. Other likely beneficiaries are subsectors like home retrofit (increasing homes' HVAC, energy and other systems' efficiency) and home energy auditing/rating, which, according to interviews with weatherization contractors, is expected to experience a four-fold increase in demand.

Similarly, the Green Jobs industries will support and be supported by the other elements of Mission Verde. Mission Verde's proposed Multi-Tech Venture fund, for example, will create a vehicle to support the development of new companies with a focus on energy, and this in turn will create new jobs to the benefit of San Antonio. A workforce trained and ready with skills in this industry will both help to attract new industry and to ensure the success of the firms seeded and the fund itself. Before renewable energies can become efficient in replacing current forms of energy, existing homes and buildings must be brought up to higher standards of energy efficiency. Weatherization firms and their employees will be instrumental in reducing energy consumption and greenhouse gasses, while increased and enhanced weatherization activities will create opportunities for entry level workers.

While it is difficult to determine the exact numbers of workers that will be needed for the total of these projects, we estimate that demand for key occupations and skills will increase substantially in a very short period of time, keeping with the national projections. According to a discussion paper developed by the National Association for State Community Services Program (NASCS), there is the potential for a nearly seven-fold increase in the number of homes weatherized each year, from 150,000 to 1,000,000, which will result in a commensurate increase in crew labor, energy auditing, quality control inspections, vehicle and equipment purchases, training services, and other support.¹

To get an estimate of the current employment conditions and projected demand for the coming years, we spoke with 25 individuals in San Antonio from various capacities ranging from private contracting firms; agencies such as the Alamo Area Council of Governments, the Texas Renewable Energies Association, and the Greater San Antonio Builder's Association; and CPS Energy. A complete list of contacts can be found in Appendix H.

¹ Source: National Association for State Community Services Program, Weatherization Assistance Program Economic Stimulus Expansion Plan : Discussion Paper <http://www.waptac.org/si.asp?id=1244>

A Closer Look at Construction Jobs

- **Weatherization and Residential Energy Efficiency**

There are currently a number of weatherization programs running in San Antonio. These include;

- AACOG Weatherization Assistance Program
- Bexar County Housing Rehabilitation Program
- Bexar County Comprehensive Energy Assistance Program (CEAP)
- CPS Energy Weatherization Program
- Department of Community Initiatives, CPS, Bexar County Residential Energy Assistance Program (REAP)
- Housing and Neighborhood Services lead Based Paint Hazard Program
- Housing and Neighborhood Services Housing Rehabilitation and Reconstruction Programs
- SAHA General Energy Efficiency Efforts
- SAWS Plumbers to People Program, and the Direct Install Program

The agencies were unable to provide an approximate number of contractors working in weatherization. However, according to one local contractor, the number of experienced workers is not nearly enough to handle the current work load. This contractor noted that there is a deficiency in capacity of skilled workers, resulting in a danger of leaving jobs incomplete, and missing the final steps such as quality assurance and verification.

Conversations with AACOG and CPS Energy confirmed that the demand for skilled contractors in weatherization will increase significantly over the next two years. CPS Energy and the City of San Antonio together plan to launch a new weatherization program this summer, estimating the program will weatherize a total of 1,400 homes within the next two years. CPS estimates they will need a minimum of 3-4 general contractors to meet this demand. The general contractors will sub-contract work to other contractors in plumbing, insulation, heating and cooling, painting, and other services. In addition, AACOG is estimating that their program will weatherize a total of 1,600 homes within the next two years, requiring a slightly higher number of general contractors to meet the demand. One contractor, with a total of 16 employees on staff, estimates that the work will continue to grow, and demand in this area will quadruple in the next two years.

In the energy auditing area, there are approximately 5 certified companies serving the San Antonio market with a total of 18-25 certified employees. Energy auditing is currently referred to as a “niche” market, but contractors in this area are busy, and predict a sharp spike in employment. One company we contacted referred to the current demand in his company as “intense” due to a staffing shortage and a lack of capacity of trained and certified contractors. The company currently has three employees working, but needs two additional certified employees to handle the workload. IBS Advisors, an energy auditing company that also

develops and delivers trainings in energy auditing and weatherization, estimates that in two years the San Antonio area will need 100-200 energy auditors.

With four-fold increases in federal weatherization funding, there is the opportunity to develop a strong market for skilled individuals at weatherization firms as well as firms which examine and rate homes for energy efficiency. While many of the jobs in the weatherization category do not require advanced skills or training, they will require knowledge of green practices and materials and a San Antonio Green Jobs program must take advantage of this expanding market and create structures, processes and resources that enhance career advancement opportunities. The skilled trades that will likely be affected by weatherization, including **carpenters, plumbers and HVAC**, are already among those areas that have seen shortages of skilled workers in the recent past. Also, as noted above, the demand for home **energy auditors** is expected to quadruple.

Key drivers of demand in the weatherization sub-sector include:

- Increased federal funding for weatherization requiring both additional weatherization technicians and energy auditors to assess eligibility for the program
- New recommendations from the Mayor’s Sustainable Building Task Force including increased energy efficiency standards and 2030 Carbon Neutrality goals for new construction, which can be applied to retrofits now and to new buildings as the residential housing market recovers.
- Formula and anticipated discretionary ARRA funding.

- **Water Conservation**

Given San Antonio’s aggressive goals for water conservation and management, another high-value set of opportunities for both job creation and workforce development lies in the area of water conservation. Skill Development programs are currently offered by SAWS, but will be strengthened by creating partnerships between SAWS, Alamo Colleges, Workforce Solutions Alamo and the K-12 system. Key jobs in this subsector include **landscape technicians, landscape architects, and plumbers**. One of our interviewees estimated that as many as 500 plumbers need training in this area.

Drivers of worker and skill demand in the water conservation category include:

- Impending requirements that will increase the need for Licensed Irrigators to be involved in planning and approval of annual irrigation system analysis.
- Incorporation of US EPA Water Sense standards into San Antonio City code.

- **Residential Solar Installation and Maintenance**

In solar photo-voltaic installation and maintenance, there are 23 contractors approved by CPS Energy, and we found an additional 13 contractors on the Texas Renewable Energies Association and Solar San Antonio websites. Reaching out to these companies, we

discovered that the size ranged from small one-man operations to 11 person teams. Many of these contractors are finding work in areas outside of San Antonio, as a result of the elimination of the rebate program at CPS Energy. According to demand projections performed by St. Philip's College, within the next two years it is estimated that San Antonio will need a minimum of 171 new employees in this area.

Although the need for services for the residential **solar installation and maintenance**, market and related worker skill requirements has not yet clearly emerged and it is more difficult to predict the demand for needed investments in education and skills training, a number of public policy changes may change this picture in the near term. Worker and skill needs in the residential solar installation category, for example, have not been growing because of CPS Energy's suspension of rebates for installation of solar panels, but it is likely that these rebates will soon be available again. When that happens, and when large-scale, publicly funded or subsidized solar installation projects receive funding from the state, there will be an increase in the demand for workers with these skills. And if CPS decides to make its solar investments within the San Antonio Labor shed, this, too, will cause a rapidly growing worker demand. *Note: that if San Antonio's solar employers are to be able to predict demand for workers and skills, there must be predictable investments in solar by CPS and a consistent and stable policy about rebates.*

A Closer Look at “Smart Grid” Jobs

The movement towards the “Smart Grid” which may take 3 to 5 years to completely achieve and CPS Energy's increasingly diverse portfolio of renewable energy sources (wind and solar) will be important drivers for the changing nature of jobs in the utility industry.

As new state and local regulations are formed to help catalyze the market for renewable and efficient energy, there will be a need for workers with different skills and knowledge, as well as retraining across disciplines. In particular, our research suggests that we expect to see new engineering specialties and staff dedicated to information and telecommunications technology. New skills will be required in information technology, digital communications, planning and modeling. Since many entry level professional jobs within utilities require engineering degrees, it will be important that these curricular changes happen ahead of the industry changes and that continuing education programs are available for current employees who will need new skills.

A Closer Look at Renewable Energy Jobs

Eventually investments in San Antonio made by the Multi-Tech Venture Fund are expected to create new firms and new jobs in clean and green technology companies. As this takes place, linkage of the Green Jobs Program to the Fund and its ventures will inform additional workforce development programming. While some discussion is underway on developing manufacturing facilities for solar and wind power components (perhaps in partnership with high-technology firms in the Austin – San Antonio corridor), not enough information is available about the opportunities, possibilities and timeframe to begin a meaningful skills-development

conversation. It is important to note, however, that companies make decisions about site location based on available resources, including a skilled workforce. Paying attention to worker skills and the skill level demanded by these new firms needs to be considered in the jobs initiative—perhaps through pathway programs to higher levels of skill as they come into demand.

Appendix B: Workforce Solutions Alamo Data

BEXAR COUNTY		BUILDING RETROFITTING																
SOC Code	Description	2007 Jobs	2008 Jobs	Change	% Change	2007 Median Hourly Earnings	2007 Avg Hourly Earnings	State 2007	State 2008	State % Change	2007 State Median Hourly Earnings	2007 State Avg Hourly Earnings	National 2007	National 2008	National % Change	2007 National Median Hourly Earnings	2007 National Avg Hourly Earnings	Education Level
47-2031	Carpenters	8,427	8,635	208	2%	\$14.6	\$16.16	102,480	103,523	1%	\$16.79	\$18.6	1,750,001	1,674,588	(4%)	\$17.14	\$19.08	Long-term on-the-job training
47-2051	Cement masons and concrete finishers	1,595	1,654	59	4%	\$12.65	\$12.91	20,314	20,847	3%	\$13.31	\$13.83	229,054	220,754	(4%)	\$16.16	\$17.92	Moderate-term on-the-job training
47-2061	Construction laborers	10,079	10,326	247	2%	\$11.32	\$12.34	156,810	161,049	3%	\$11.74	\$12.77	1,480,291	1,427,278	(4%)	\$13.78	\$15.83	Moderate-term on-the-job training
47-2111	Electricians	3,996	4,087	91	2%	\$16.21	\$16.65	57,627	57,895	0%	\$18.05	\$18.79	761,185	732,089	(4%)	\$20.37	\$22.09	Long-term on-the-job training
47-2131	Insulation workers, floor, ceiling, and wall	150	155	5	3%	\$12.09	\$13.19	3,335	3,423	3%	\$12.29	\$13.23	32,656	31,887	(2%)	\$14.93	\$16.41	Moderate-term on-the-job training
47-2152	Plumbers, pipefitters, and steamfitters	2,609	2,683	74	3%	\$17.21	\$18.18	35,430	35,951	1%	\$18.72	\$19.62	501,966	485,381	(3%)	\$20.35	\$22.05	Long-term on-the-job training
47-2211	Sheet metal workers	714	725	11	2%	\$16.68	\$17.5	11,360	11,511	1%	\$15.25	\$16.47	180,786	175,644	(3%)	\$18.46	\$20.16	Long-term on-the-job training
47-4041	Hazardous materials removal workers	329	386	57	17%	\$14.29	\$14.29	4,412	4,564	3%	\$13.83	\$14.63	40,239	40,731	1%	\$17.53	\$18.94	Moderate-term on-the-job training
49-9021	Heating, air conditioning, and refrigeration mechanics and installers	2,347	2,398	51	2%	\$14.54	\$15.83	29,219	29,404	1%	\$16.78	\$17.71	343,887	334,516	(3%)	\$17.49	\$18.78	Long-term on-the-job training
		30,245	31,047	802	3%	\$13.87	\$14.93	422,205	428,168	1%	\$14.96	\$16.30	5,320,065	5,123,866	-4%	\$16.99	\$18.84	
BEXAR COUNTY		MASS TRANSIT-FREIGHT RAIL																
SOC Code	Description	2007 Jobs	2008 Jobs	Change	% Change	2007 Median Hourly Earnings	2007 Avg Hourly Earnings	State 2007	State 2008	State % Change	2007 State Median Hourly Earnings	2007 State Avg Hourly Earnings	National 2007	National 2008	National % Change	2007 National Median Hourly Earnings	2007 National Avg Hourly Earnings	Education Level
17-2051	Civil engineers	1,266	1,260	(6)	0%	\$31.11	\$32.01	24,456	25,138	3%	\$36.68	\$39.04	246,283	251,508	2%	\$34.48	\$36.17	Bachelor's degree
43-5032	Dispatchers, except police, fire, and ambulance	941	943	2	0%	\$14.88	\$15.54	16,471	16,575	1%	\$15.82	\$17.29	188,910	186,635	(1%)	\$15.93	\$17.07	Moderate-term on-the-job training
47-2111	Electricians	3,075	3,146	71	2%	\$17	\$18.93	46,356	46,607	1%	\$18.36	\$18.64	628,620	605,285	(4%)	\$21.53	\$23.13	Long-term on-the-job training
47-4061	Rail-track laying and maintenance equipment operators	64	64	0	0%	\$14.69	\$15.99	1,562	1,582	1%	\$17.10	\$16.84	14,159	14,151	0%	\$20.25	\$20	Moderate-term on-the-job training
51-2031	Engine and other machine assemblers	378	382	4	1%	\$17.31	\$16.57	2,673	2,705	1%	\$14.78	\$14.46	41,534	41,124	(1%)	\$15.14	\$15.99	Short-term on-the-job training
51-2041	Structural metal fabricators and fitters	591	589	(2)	0%	\$13.9	\$13.97	16,926	17,253	2%	\$13.21	\$13.48	109,885	109,437	0%	\$14.92	\$15.52	Moderate-term on-the-job training
51-4121	Welders, cutters, solderers, and brazers	1,450	1,473	23	2%	\$12.78	\$13.02	50,719	52,303	3%	\$14.71	\$15.71	386,225	386,213	0%	\$15.51	\$16.33	Long-term on-the-job training
53-3022	Bus drivers, school	2,510	2,591	81	3%	\$9.85	\$10.4	33,363	33,787	1%	\$9.63	\$10.04	447,929	452,443	1%	\$12.43	\$12.59	Short-term on-the-job training
53-4019	Locomotive engineers and operators	103	104	1	1%	\$31.86	\$33.99	3,409	3,470	2%	\$39.21	\$37.73	48,927	49,439	1%	\$26.65	\$29.15	Moderate-term on-the-job training
53-4031	Railroad conductors and yardmasters	51	51	0	0%	\$39.04	\$38.48	3,235	3,235	2%	\$35	\$34.56	30,395	30,619	1%	\$28.2	\$29.56	Moderate-term on-the-job training
		10,428	10,602	174	2%	\$16.29	\$16.65	199,120	202,656	2%	\$18.13	\$18.52	2,144,866	2,127,053	-1%	\$19.29	\$20.36	
BEXAR COUNTY		SMART GRID																
SOC Code	Description	2007 Jobs	2008 Jobs	Change	% Change	2007 Median Hourly Earnings	2007 Avg Hourly Earnings	State 2007	State 2008	State % Change	2007 State Median Hourly Earnings	2007 State Avg Hourly Earnings	National 2007	National 2008	National % Change	2007 National Median Hourly Earnings	2007 National Avg Hourly Earnings	Education Level
15-1031	Computer software engineers, applications	2,830	2,860	30	1%	\$31.65	\$33.37	33,194	34,312	3%	\$40.97	\$41.45	497,137	513,498	3%	\$39.97	\$41.18	Bachelor's degree
17-2071	Electrical engineers	500	500	0	0%	\$36.4	\$38.55	14,625	14,850	2%	\$41.62	\$42.53	148,469	148,736	0%	\$38.1	\$39.47	Bachelor's degree
17-3023	Electrical and electronic engineering technicians	456	453	(3)	(1%)	\$26.52	\$26.33	15,813	15,946	1%	\$26	\$26.02	161,394	160,415	(1%)	\$25.07	\$25.23	Associate's degree
47-2061	Construction laborers	7,096	7,269	173	2%	\$10.07	\$10.42	121,497	124,265	2%	\$10	\$10.37	1,059,737	1,023,476	(3%)	\$13.13	\$14.88	Moderate-term on-the-job training
47-2073	Operating engineers and other construction equipment operators	2,182	2,239	57	3%	\$13.74	\$14.22	39,636	40,811	3%	\$14.05	\$14.64	407,874	401,339	(2%)	\$18.33	\$20.22	Moderate-term on-the-job training
49-9051	Electrical power-line installers and repairers	292	314	22	8%	\$19.09	\$18.87	9,041	9,378	4%	\$19.87	\$20.26	105,024	105,216	0%	\$25.27	\$24.85	Long-term on-the-job training
51-2022	Electrical and electronic equipment assemblers	1,612	1,541	(71)	(4%)	\$12.48	\$12.42	18,401	17,994	(2%)	\$12.19	\$13.34	213,700	205,593	(4%)	\$12.76	\$13.75	Short-term on-the-job training
51-2092	Team assemblers	5,084	5,005	(79)	(2%)	\$10.09	\$11.43	67,142	68,201	1%	\$9.88	\$10.62	1,162,194	1,141,511	(2%)	\$11.84	\$12.73	Moderate-term on-the-job training
51-4041	Machinists	965	952	(13)	(1%)	\$14.4	\$14.41	35,781	36,622	2%	\$14.96	\$15.7	405,658	402,687	(1%)	\$16.94	\$17.49	Long-term on-the-job training
		21,017	21,132	115	1%	\$14.85	\$15.62	355,701	362,420	2%	\$16.19	\$16.76	4,161,187	4,102,473	-1%	\$18.50	\$19.67	
BEXAR COUNTY		WIND POWER																
SOC Code	Description	2007 Jobs	2008 Jobs	Change	% Change	2007 Median Hourly Earnings	2007 Avg Hourly Earnings	State 2007	State 2008	State % Change	2007 State Median Hourly Earnings	2007 State Avg Hourly Earnings	National 2007	National 2008	National % Change	2007 National Median Hourly Earnings	2007 National Avg Hourly Earnings	Education Level
13-1051	Industrial production managers	457	452	(5)	(1%)	\$43.52	\$44.62	12,182	12,249	1%	\$44.06	\$48.19	154,437	152,352	(1%)	\$38.73	\$42.09	Work experience in a related field
17-2081	Environmental engineers	176	177	1	1%	\$40.73	\$38.97	3,316	3,516	4%	\$32.28	\$33.93	51,842	53,049	2%	\$34.78	\$35.97	Bachelor's degree
47-2211	Sheet metal workers	581	589	8	1%	\$17.37	\$17.88	9,789	9,907	1%	\$15	\$15.99	162,454	156,042	(4%)	\$18.85	\$20.5	Long-term on-the-job training
47-2221	Structural iron and steel workers	431	446	15	3%	\$13.16	\$13.41	5,962	6,063	2%	\$14.28	\$15.09	64,330	62,293	(3%)	\$20.25	\$21.99	Long-term on-the-job training
49-9044	Millwrights	126	131	5	4%	\$19.3	\$18.44	3,095	3,145	2%	\$20.67	\$19.97	48,395	47,122	(3%)	\$22.16	\$23.39	Long-term on-the-job training
51-1011	First-line supervisors/managers of production and operating workers	2,588	2,568	(20)	(1%)	\$20.27	\$21.97	54,523	54,778	0%	\$22.64	\$24.16	674,845	666,151	(1%)	\$23.4	\$24.88	Work experience in a related field
51-2022	Electrical and electronic equipment assemblers	1,612	1,541	(71)	(4%)	\$12.48	\$12.42	18,401	17,994	(2%)	\$12.19	\$13.34	213,700	205,593	(4%)	\$12.76	\$13.75	Short-term on-the-job training
51-4041	Machinists	965	952	(13)	(1%)	\$14.4	\$14.41	35,781	36,622	2%	\$14.96	\$15.7	405,658	402,687	(1%)	\$16.94	\$17.49	Long-term on-the-job training
53-7051	Industrial truck and tractor operators	2,682	2,616	(66)	(2%)	\$11.2	\$11.66	48,063	48,251	0%	\$11.48	\$11.98	635,645	622,743	(2%)	\$13.47	\$14.31	Short-term on-the-job training
		9,618	9,472	-147	-2%	\$16.82	\$17.44	191,192	192,566	1%	\$18.24	\$19.41	2,411,506	2,370,033	-2%	\$19.56	\$20.80	
BEXAR COUNTY		SOLAR POWER																
SOC Code	Description	2007 Jobs	2008 Jobs	Change	% Change	2007 Median Hourly Earnings	2007 Avg Hourly Earnings	State 2007	State 2008	State % Change	2007 State Median Hourly Earnings	2007 State Avg Hourly Earnings	National 2007	National 2008	National % Change	2007 National Median Hourly Earnings	2007 National Avg Hourly Earnings	Education Level
13-1021	Purchasing agents and buyers, farm products	20	20	0	0%	\$16.22	\$27.36	502	506	1%	\$24.25	\$27.46	15,626	15,465	(1%)	\$23.27	\$25.95	Work experience in a related field
17-2041	Chemical engineers	82	85	3	4%	\$45.57	\$42.55	4,466	4,560	2%	\$40.89	\$42.09	29,914	30,150	1%	\$39.18	\$40.5	Bachelor's degree
19-2031	Chemists	226	225	(1)	0%	\$30.07	\$30.94	4,494	4,545	1%	\$26.86	\$29.33	78,816	79,618	1%	\$30.52	\$32.94	Bachelor's degree
19-4031	Chemical technicians	287	289	2	1%	\$15.03	\$16.56	5,951	6,021	1%	\$22.18	\$22.32	63,529	63,688	0%	\$19.59	\$20.39	Associate's degree
45-1099	Supervisors, farming, fishing, and forestry workers	72	73	1	1%	\$16.09	\$16.46	1,367	1,364	0%	\$13.35	\$15.09	39,323	39,100	(1%)	\$18.25	\$19.5	Work experience in a related field
45-2011	Agricultural inspectors	50	50	0	0%	\$21.3	\$20.87	944	950	1%	\$21.17	\$20.27	15,630	15,794	1%	\$19.12	\$19.15	Work experience in a related field
51-9011	Chemical equipment operators and tenders	64	65	1	2%	\$28.47	\$28.42	7,149	7,130	0%	\$25.3	\$24.05	53,945	53,569	(1%)	\$21.18	\$21.27	Moderate-term on-the-job training
51-9023	Mining and blending machine setters, operators, and tenders	350	338	(12)	(3%)	\$11.43	\$11.77	13,860	13,823	0%	\$12.12	\$13.08	140,580	138,432	(2%)	\$14.59	\$15.25	Moderate-term on-the-job training
53-7051	Industrial truck and tractor operators	2,682	2,616	(66)	(2%)	\$11.2	\$11.66	48,063	48,251	0%	\$11.48	\$11.98	635,645	622,743	(2%)	\$13.47	\$14.31	Short-term on-the-job training
		3,834	3,760	-74	-2%	\$13.90	\$14.41	85,797	87,149	0%	\$15.97	\$16.53	1,073,208	1,058,568	-1%	\$16.73	\$17.67	
BEXAR COUNTY		ADVANCED BIOFUELS																
SOC Code	Description	2007 Jobs	2008 Jobs	Change	% Change	2007 Median Hourly Earnings	2007 Avg Hourly Earnings	State 2007	State 2008	State % Change	2007 State Median Hourly Earnings	2007 State Avg Hourly Earnings	National 2007	National 2008	National % Change	2007 National Median Hourly Earnings	2007 National Avg Hourly Earnings	Education Level
13-1021	Purchasing agents and buyers, farm products	20	20	0	0%	\$16.22	\$27.36	502	506	1%	\$24.25	\$27.46	15,626	15,465	(1%)	\$23.27	\$25.95	Work experience in a related field
17-2041	Chemical engineers	82	85	3	4%	\$45.57	\$42.55	4,466	4,560									

Appendix C: Analysis of Green Skills

A clear focus throughout the Green Jobs Program needs to be on the necessary skills that make a traditional job “green.” This is not an easy exercise in an emerging area where agreement on job titles and required skills are still in flux. CAEL has examined each of the recommended subsectors for immediate focus and has identified where there is possible consensus on “green” skills along with degrees, certifications and certificates that indicate proficiency in the particular areas.

In the majority of cases, however, employers we interviewed in the construction and home rehabilitation sectors placed little emphasis on formal validation of skills (mentioned above). Instead, they rely predominantly on on-the-job training and informal learning. This informal approach to learning is especially prevalent at the lower levels of the career paths, but also characterizes many of the higher-level occupations with more specific green-skill demands. Even at the higher levels, most contractors and business owners cite “experience” and “self-study” as the method by which they have attained expertise. Of the formal learning that they do pursue, much of it is not accessed through the local education and training system but is purchased through commercial training vendors, many of whom are not based in San Antonio. As the green sector matures, it will be critical that emerging skills and certifications are available to the local workforce or that AC develop articulation with the commercial training vendors.

Skill Categories

In most instances, the Green jobs will be a more specific version of the non-green jobs. Very rarely will an entirely new occupation need to be considered. Of the employers who provide weatherization, retrofit and related services, virtually all exhibit or anticipate a need for skill development in a number of categories: Technician Skills, Design and Planning Skills, Communication Skills and Assessment Skills. In each application, contractors need to be able to evaluate homes’ current level of energy efficiency, design and plan a response, communicate the value of the proposed work to the homeowner/client, perform the recommended activity, and measure its effectiveness

	Technical Skills	Design and Planning Skills	Measuring Skills	Communication Skills
HVAC	Installation of HVAC equipment ducts. Use of computer controls.	Proper placement of air ducts, selection of heating and cooling units.	Use of diagnostic equipment (duct blast, blower door).	Sales and explanation of energy-efficiency improvements, including equipment and design factors.
Weatherization	Use of new equipment, computer controls, installation techniques, building science/air infiltration	Building Science (generally and particular to HVAC, Water, etc.), moving beyond the official manuals	Use of diagnostic equipment.	Communicating value of energy investment and retrofit, rebate/subsidy programs
Energy Auditing		Development of work orders	Use of ratings software and diagnostic equipment.	Communication of energy efficiency deficiencies, recommendations.
Solar Photo-Voltaic Installation	Installation and connection of solar panels	Panel placement		Sales and explanation of solar PV equipment, usage. Communication of permitting and regulatory issues
Water Conservation	Plumbing, installation of storm water systems	Landscape design, integration of irrigation planning with landscape and horticultural design	Smart Metering	User education

Skill Standards

Once these “green” roles, positions and associated skills are defined, it is necessary to recognize how those skills are validated and the skills standards for which education and training programs will prepare their participants. As previously mentioned, formal skill validation mechanisms (degrees and certifications) are rarely required by the contractor community. At this stage of development, the vast majority of the needed green skills are learned informally – on the job or through some self study process. The need for these skills is new and the community of contractors who do the work is not highly organized, so the market has demanded few formal training programs and degrees aimed directly at Green Skills. This informal method of training

will become more problematic as worker and skill shortages emerge or if the city and state demand skill certifications to ensure quality work.

Skills standards and certifying bodies do exist within each of the target subsectors, however under-recognized.

HVAC:	National Comfort Institute (NCI), Air Conditioning Contractors of America (ACCA)
Rating:	Residential Energy Services Network (RESNET)
Water:	Green Plumbers USA, Texas Commission on Environmental Quality, SAWS certification for Water Saver Landscaper
Solar PV:	North American Board of Certified Energy Professionals (NABCEP)
Home Building:	US Green Building Council: Leadership in Energy and Environmental Design Accredited Professional (LEED-AP), Building Performance Institute (BPI)

Incorporation of these bodies' skills standards into existing and new education and training programs will enable San Antonio to externally validate skills and abilities, and provide some structure to the training/employer relationship as well as ensure some level of quality.

Appendix D: Inventory of Green Jobs

The term “Green Jobs” has entered our lexicon quickly and forcefully. Its meaning, however, is not yet consistently defined and it is an emerging sector that crosses many established occupations. The City of San Antonio has committed to maximizing Green Jobs opportunities to be created by the Mission Verde initiative and has included Green Job development and associated education and training among its initial priorities. In order to develop a strategic approach to preparing workers for Green Jobs, those jobs with the most potential impact must be identified and green skills defined as they pertain to the economic activity and jobs within San Antonio.

In this appendix, CAEL provides an inventory of Green Jobs that are found outside of large private and municipal utility work settings. Specifically, the inventory covers jobs in the following five subsectors:

- Home energy auditing/energy rating
- Weatherization
- Heating, ventilation and air conditioning (HVAC)
- Water conservation
- Residential and commercial solar energy

Much of the near-term activity of Mission Verde as well as other public investment initiatives focuses on increasing the energy efficiency of residential dwelling units – specifically home energy assessment and rating and home weatherization and retrofit. Jobs in this area will increase, and how the jobs are done will be impacted. While many jobs now being classified as “Green Jobs” have long existed in non-green forms, we must now consider the impact on energy efficiency, and identify specific skills which enable workers in these occupations to address that challenge. For selected positions which we have grouped into job families, this document identifies specific green functions and the specific knowledge and skills those positions require which separate them from their non-green versions.

In the introduction to each section we have also summarized the underlying education and skills of the traditional job family or occupation as described in publications from the Bureau of Labor Statistics, U.S. Department of Labor. In general, many of these occupations are currently classified by the U.S. Department of Labor and the Bureau of Labor Statistics as Construction-related jobs. Many of the green jobs fall within the skilled trades in construction or utilities. As these occupations emerge over the next few years, classification and documentation of skills will emerge in the DOL classification scheme; however, today we need to try to work within the current scheme and supplement the information with emerging knowledge about these jobs from employers.

It is important to note that most firms involved in these activities are small businesses and will not employ someone in each position or role. In many cases a number of roles will be filled by one person – especially when the firm is small and operated by the owner.

Home Energy Auditing/Energy Rating

The energy efficiency of a dwelling unit is determined by heating and cooling systems, appliances, insulation and openings (doors, windows, seams). Improvements to these elements will result in increased energy efficiency. A home energy audit will aide in determining what improvements will be most beneficial. Many publicly-funded energy efficiency programs will require that some type of home energy audit or rating take place. Home Energy raters typically are employed by independent assessment firms, construction firms, HVAC installation and maintenance firms, and public agencies.

These are new and emerging jobs and will likely be filled by workers from many areas in the skilled and construction trades and possibly from real estate professionals. Prior classroom and on the job learning, training and certification in building management, engineering or engineering technology, HVAC, or as an electrician or plumber will be highly valued in these emerging occupations.

Home Energy Auditing Job Title	Description	Green Skills	Education and Training
Home Energy Surveyor	Observe home energy efficiency elements. Measurement and inspection	Ability to observe and document home energy deficiencies	Residential Energy Services Network (RESNET) Home Energy Surveyor Certification
Home Energy Rater	Observe home energy efficiency elements, apply performance testing to HVAC units	Utilize rating equipment – blower door, duct blaster, flow hood, infrared camera – to evaluate home energy efficiency levels	RESNET Home Energy Rater (HERS) Inspector Training.
Green Rater	A home energy rater who has undertaken additional training and completed certain tests and tasks to become qualified to work with the LEED for Homes program through the US Green Building Council.	Same as above, plus knowledge of US Green Building Council (USGBC) LEED factors.	RESNET Green Rater Certification
Green Verifier	Certifies that homes meet with the NAHB green building certification requirements	Complete understanding of National Association of Home Builders (NAHB) verification standards, ability to complete NAHB Verification Report	RESNET Green Verifier Certification
Comprehensive Home Energy Auditor	Observe home energy efficiency elements, apply performance testing to HVAC units, as well as combustion units (including liquid, gas and solid fuel burning appliances) Write scopes of work for contractors to	Understanding of liquid, gas and solid fuel burning appliances including water heaters, wood stoves, ranges, ovens or stove tops, furnaces, boilers, space heaters, fireplaces, fireplace inserts, and gas logs.	RESNET Home Energy Auditor Certification

Home Energy Auditing Job Title	Description	Green Skills	Education and Training
	remediate energy efficiency findings.		
AACOG (Alamo Area Council of Governments) Assessor	Conduct energy assessments of homes applying for weatherization credits from TDHCA	Utilize Texas Department of Housing and Community Affairs (TDHCA) assessment software (Texas EZ Rater)	TDHCA assessment software training
Rater Trainer	Provides training and supervision to rater trainees	Knowledge of home energy rating systems.	Must be HERS certified RESNET Rater Trainer certification?
Quality Assurance Designee	Reviews and evaluates plans for up to 10% or Energy Ratings and observes work of up to 1% of homes rated.	Same as above	RESNET QAD Certification

Weatherization

Building weatherization protects a building and its interior from sunlight, precipitation, and wind. Weatherization includes insulation, sealing openings (windows and doors), and of modifying a building to reduce energy consumption and optimize energy efficiency.

As described below, multiple occupations within the Construction Trades are utilized in Weatherization. Some of the most typical include: carpenters, roofers, construction laborers, drywall installers, ceiling installers, and tapers as well as insulation installers. In addition, HVAC and plumbing workers will be engaged. Most workers in construction are Construction Trades workers which will include master, journey and apprentice crafts workers. Persons can enter the construction trades through a variety of education and training programs. High school vocational programs provide some basic skills and those who enter the trades directly from high school usually start as laborers, helpers or apprentices. Skills are generally learned through a combination of on the job and classroom training. Many enter the construction trades through apprenticeship programs. Managerial personnel usually have a college degree or considerable experience in their specialty.

Job opportunities in this area are characterized as excellent, especially for experienced workers. Growth in this area is seen especially in the Western and Southwestern regions of the country.

Weatherization Job Title	Description	Green Skills	Education and Training
Weatherization technician, laborer, installer, crew member	Under direction, installs weatherization materials such as insulation, ceiling and wall repair, duct work, heating and cooling systems	Installs insulation, caulk, weather stripping and other measures called for on work orders; Measures, cuts, and installs glass. May require higher standards of installation than non-green counterparts	On-the-job training. No certification or education requirements. Prior training and experience preferred by many employers. The Association of Window and Door Installers (AWDI) offers standards and certification
Assessor	Measures home energy efficiency and identified efficiency enhancement options	Operates energy efficiency diagnostic tools	Knowledge of materials and installation standards
Operations Manager	Supervises field and warehouse staff performing in all aspects of field and warehouse operations for the Weatherization and CEAP programs. Creates work orders	Performs assessments and inspections for Weatherization and CEAP programs through knowledge of TDHCA material and installation standards for both Weatherization and Community Energy Assistance Program (CEAP).	Degree or training in Building Science High school graduation, or its equivalent, plus at least six years of experience in general carpentry, at least two of which is directly involved in Weatherization and CEAP
Warehouse manager	responsible for ensuring that all necessary materials and supplies are readily available.	Making and repairing windows and screens Negotiating and coordinating with sub-contractors Tracking inventory of materials and supplies; Ordering materials and supplies; must have thorough knowledge of material and installation standards for different agencies and funding sources	Experience in general carpentry or two years of direct experience in Weatherization.
Field Coordinator	Expedites the efficiency of the work crews and administrative processes. Organizes and oversees paperwork for both field operations and administrative process.	Maintain tool and supply inventory Schedule and conduct assessments with funding sources and clients	Experience in general carpentry or two years of direct experience in Weatherization. Thorough knowledge of material and installation standards for different agencies and funding sources.

Weatherization Job Title	Description	Green Skills	Education and Training
Field Supervisor, Foreman, Crew Chief, Crew Leader, Project Manager	<p>Follows work orders to install and supervise the installation of weatherization materials,</p> <p>Expedites the efficiency of the work crews and administrative processes</p> <p>Distribute work orders and necessary information to crew leaders</p> <p>Organize and oversee paperwork for both field operations and administrative process.</p>	<p>Operates diagnostic tools.</p> <p>Schedule and conduct assessments with funding sources and clients available to complete jobs</p> <p>Maintain tool and supply inventory</p> <p>Understands concepts of air infiltration, basic building science.</p> <p>Knowledge of TDHCA material and installation standards for both Weatherization and CEAP programs.</p>	<p>Experience in general carpentry or two years of direct experience in Weatherization.</p> <p>Thorough knowledge of material and installation standards for different agencies and funding sources</p> <p>Some experience in construction or related trades. Building Science, Construction Management, Project Management experience and training preferred.</p>
AACOG Assessor	Assesses private homes to determine eligibility for weatherization program	Utilizes TDHCA EZ3W Energy Audit System	TDHCA Training State administer EA3W audit test
Purchasing Agent	Researches, Selects, prices, negotiates the purchase of weatherization materials, including recycled content products, environmentally preferable products and services, biobased products, energy- and water-efficient products, products using renewable energy, and alternatives to hazardous or toxic chemicals	Understands renewable materials. Understands TDHCA materials standards.	<p>No certification or education requirements.</p> <p>Experience as a purchasing agent, purchasing manager preferred</p>
Sales	Promotes and sells weatherization services.	<p>Communicates the value and benefits of weatherized homes.</p> <p>Explains value and use of TDHCA and CEAP programs.</p>	<p>No certification or education requirements.</p> <p>Understands HHS, HUD, AACOG and TDHCA rules and regulations.</p> <p>Understand costs, materials, and labor needs related to weatherization</p>

Heating, Ventilation and Air Conditioning (HVAC)

HVAC systems and equipment impact indoor air quality and energy consumption. HVAC systems consist of many mechanical, electrical, and electronic components. Technicians often specialize in either installation or maintenance and repair, but are trained to do both. They may also specialize in doing heating or air conditioning or refrigeration work. Some specialize in one type of equipment, for example solar. “Green” HVAC systems include use of heating and cooling units that meet or exceed energy efficiency standards, and are designed to minimize air flow resistance. Overall efficiency of HVAC systems is also affected by how well the building is sealed and insulated.

Because of the increasing sophistication of HVAC systems, employers prefer to hire those who have completed training programs or formal apprenticeships. HVAC programs typically range from 6 months to 2 years and are offered in secondary vocational programs as well as postsecondary technical and trade schools and community college programs. After completing programs, technicians generally need an additional 6 months to two years of field experience before they are considered proficient. Many technicians train through formal apprenticeship programs. Applicants for an apprenticeship program must have a high school diploma and good math and reading skills. HVAC mechanics and installers are required to be licensed in some states and localities.

Job prospects for HVAC mechanics and installers are expected to be excellent and job prospects are best in growing areas of the country such as San Antonio. Those with green skills are also expected to be in high demand.

HVAC Job Title	Description	Green Skills	Education and Training
HVAC Installer, Maintenance	Installs, operates, repairs and maintains heating and cooling equipment	Measures efficiency of heating and cooling units through use of computer controls. Uses, tests, adjusts and repairs gauges and control instruments.	In addition to training described above, green skills obtained through: on-the-job training, experience with energy efficient HVAC units, product and manufacturer specific training
HVAC Project Manager	Manages the installation of heating and cooling equipment and materials, including HVAC units, ductwork, and insulation.	Integrates HVAC installation and purchases with insulation, building materials and other energy efficiency improvements.	Knowledge of building materials, building science, construction management
HVAC System Designer	Determines appropriate heating and cooling system products and design features	Understands principles of building science, air infiltration	Experience in HVAC system installation. National Comfort Institute (NCI), Association of Energy Engineers (AEE), Building Performance Institute (BPI) offer certifications
HVAC Sales	Promotes and sells HVAC systems, repair services	Promotes, explains the value of energy efficient HVAC units and systems	Knowledge of energy efficiency HVAC units, HVAC system design principles

HVAC Job Title	Description	Green Skills	Education and Training
Estimator	Estimates the cost of HVAC related energy efficiency improvements	Understanding of improvement costs	Construction Management, Building Science certificate preferred

Water Conservation

Water conservation refers to reducing the volume of water needed and water recapture and reuse through site design, use of native plants, and irrigation systems design.

Traditional occupations underlying this area include landscape technicians, landscape architecture, and plumbing. Basic knowledge and skills in these underlying occupations are diverse as are education and training programs. Entry level and technician skills can be obtained through pre collegiate K-12 vocational programs and 2 year technical and community college programs. Licensure and certificate programs include both on the job and classroom training. Apprenticeship programs provide higher level of skills certification. Professional positions require 2 and 4 year college degrees.

Job growth is predicted to be good and SAWS is already experiencing significant shortages in qualified workers in these areas.

Water Conservation Job Title	Description	Green Skills	Education and Training
Licensed Irrigator	Sells, designs, provides consultation services, installs, maintains, alters, repairs, or services an irrigation system and connects irrigation systems to water supplies.		Basic Irrigator Training Texas Commission on Environmental Quality (TCEQ) Licensed Irrigator Training
Irrigation Technician, Supervisor	Supervise irrigation projects on-site, interpret design specifications	Understanding of irrigation regulations and laws	SAWS Irrigation Technician Training
Green Plumber	Design, communicate and install water saving devices and techniques.	Conduct water usage audits and recommend appropriate water conservation strategies.	Green Plumber Certification

Water Conservation Job Title	Description	Green Skills	Education and Training
Landscape Architect	Design outdoor environments for residential, commercial or industrial sites	Understanding of native plants, rainwater recapture and reuse.	LEED AP Certification TX Landscape Architect License
Water Saver Landscape Contractor, Crews	Installs and maintains irrigation systems.	Conservation and reuse techniques in irrigation, planting and maintenance	SAWS Water Saver Landscape Contractor Training

Residential and Commercial Solar Energy

Use of fossil fuels for energy generation is widely recognized as a threat to energy independence and environmental quality. Solar power as a generator of electricity (Solar-Voltaic) can reduce reliance on fossil fuels. Installation and maintenance of solar power equipment requires special skills and safety considerations.

Prior to gaining solar skills, workers in this category must meet the underlying skills required for electricians. Most electricians learn their skills through apprenticeship programs which combine on the job training with classroom training. Local unions provide apprenticeship opportunities. Those wishing to enter these programs must have completed high school or have a GED and once accepted into programs, training generally lasts about 4 years. The apprenticeship and other training programs are highly technical and require good English language skills. Programs generally include at least 144 hours of classroom work and 2,000 hours of supervised on the job training per year. In addition to apprenticeship programs, postsecondary vocational programs are offered by technical education providers and community colleges. Additional job skills notes by the BLS include the ability to communicate in both English and Spanish, as Spanish speaking workers make up a large part of the construction industry.

Job growth is expected to be good, especially in areas experiencing high growth.

Solar Energy Job Title	Description	Green Skills	Education and Training
Photo-Voltaic Install Assistant	Assist with the installation of: roof penetrations, racking, panel attachment, grounding, homeruns, wire combiner box, and perform voltage testing Assist the Lead Installer with quality	Basic understanding of electricity and solar PV installation Basic understanding of home construction, ability to read schematics	NABCEP entry-level certification desirable but not required.

Solar Energy Job Title	Description	Green Skills	Education and Training
	installations of inverters and grid intertie based on system design specifications		
Photo-Voltaic Installer	Install, maintain, operate, and test photo-voltaic equipment.	Understanding of basic solar PV principles. Mechanical/structural mounting of racking, collectors and plumbing equipment	On-the-job training. Apprenticeship in electrical or construction trade preferred. NABCEP PV Installer Certification desirable, but not required. Electrical experience and/or licensure and know-how desirable, but not required. Contractor/carpenter skills desirable.
Photo-Voltaic Inspector	Inspects and ensures safety of Photo Voltaic equipment, interface with electrical grid	Understanding of PV equipment and standards	Licensed Electrician
PV System Designer	Designs and plans installation and retrofit of Solar power systems	Understanding of Solar equipment and standards, climatology, basics of electricity	NABCEP Entry Level Certificate Some knowledge of electrical engineering, architecture, climatology
Foreman	Oversees installation of solar equipment	Understanding of solar principles and regulations	NABCEP PV Installer Certification NABCEP Solar Thermal Installer Certification
Project Manager	Assist with and manages the implementation of various solar-electrification projects leading the assessment and installation phases of projects	Project assessment Visiting sites and potential partners prior to finalizing projects. May include both technical and socio-economic assessments) Supervising project installations and ensuring compliance with permitting process	NABCEP PV Installer Certification NABCEP Solar Thermal Installer Certification desirable Extensive experience in the design and installation of off-grid PV systems with both DC and AC loads. Project Management or construction management experience and certification desirable Education and training as an electrician, electrical engineer or

Solar Energy Job Title	Description	Green Skills	Education and Training
			certified solar installer. Experience as a trainer in PV (or other vocational or technical disciplines)
PV Sales	<p>Drive large-scale system designs from conception to installation.</p> <p>Evaluate and recommend system designs providing optimum aesthetic, performance and price in accordance with customer goals and expectations</p> <p>Liaise and co-ordinate with the Manager of Design, for project planning and integration</p>	<p>Knowledge of PV and Solar Systems, and associated material and labor costs.</p> <p>Ability to evaluate customer needs and viability of the project.</p>	<p>Bachelor's degree in electrical engineering, architectural design, or computer science preferred</p> <p>Equivalent work experience as a CAD operator, drafter, or technician</p> <p>PV system design experience</p> <p>Strong knowledge of the National and local Electric Codes</p> <p>NABCEP certification is preferred.</p>
Project Estimator	<p>Plans and estimates the cost of Solar installation</p> <p>Candidate must be familiar with blueprints, the NEC, and commercial job-sites. The ability to design solar systems is required.</p>	<p>Knowledge of product and labor costs, planning Ability to communicate with engineers, architects, GC's, owners, electrical inspectors and utility engineers in a professional manner.</p> <p>Review and specify necessary equipment and components for the specific job. Qualified applicant should be able to write proposals, use and modify spreadsheets for estimating costs and calculating long term economics, and design systems to the basic one line electrical and schematic structural level.</p>	<p>Capabilities should include CAD, Visio and/or Auto CAD.</p> <p>Experience with estimating and computer estimating programs such as Vision Infosoft EBM 3000. Experience with site surveys preferred.</p>
Master Solar Electrician	Supervises the design and installation of solar photo-voltaic equipment	Extensive knowledge of output, performance and reliability factors of various commercially	<p>Electrical contractors license</p> <p>Commercial and Residential</p>

Solar Energy Job Title	Description	Green Skills	Education and Training
	<p>Ensures compliance with local permitting procedures</p> <p>Ensures safe integration of PV equipment with the home and local electric grid.</p>	<p>available PV modules and inverters</p> <p>Knowledge of PV Module Support Structure design, module array layout</p> <p>Experience with interconnection design and review with utility companies</p> <p>Familiarity with review/design of instrumentation for data acquisition systems</p>	<p>electric experience and service experience in a variety of conditions</p> <p>Comprehensive knowledge of the NEC and IBC</p> <p>NABCEP certification preferred</p> <p>Solar experience preferred</p> <p>Management and Crew Lead experience</p>

Appendix E: San Antonio Green Jobs Education Scan

The following is table of the various certificate and degree programs related to the areas covered in this report. Specific information on select San Antonio colleges and universities is also provided in this appendix.

Degree and Certificate Programs by Type

Certificate & Degree Programs	Provider
AAS Advanced Water Treatment	AC, Northwest Vista College
AS, Engineering	AC, Northwest Vista College
Certificate, Advanced Water Treatment	AC, Northwest Vista College
AS, Civil & Construction Engineering Technology	AC, Palo Alto College
AS, Civil Engineering	AC, Palo Alto College
AS, Electrical & Electronics Engineering	AC, Palo Alto College
AS, Electrical & Electronics Engineering Technology	AC, Palo Alto College
AS, Engineering	AC, Palo Alto College
AS, Engineering Technology	AC, Palo Alto College
AS, Manufacturing & Mechanical Engineering Technology	AC, Palo Alto College
AS, Mechanical Engineering	AC, Palo Alto College
Certificate, Industrial Maintenance Technology	AC, Palo Alto College
Certificate, Industrial Troubleshooting	AC, Palo Alto College
AA, Architecture	AC, San Antonio College
AAS Engineering	AC, San Antonio College
AAS Engineering Technology	AC, San Antonio College
AAS, Computer Aided Drafting & Design	AC, San Antonio College
AAS, Computer Aided Drafting & Design Engin. Tech. Option	AC, San Antonio College
Certificate, Construction Assistant I	AC, San Antonio College
Certificate, Construction Assistant II	AC, San Antonio College
Certificate, Construction Technician	AC, San Antonio College
Certificate, Engineering Drafting Technician I	AC, San Antonio College
Certificate, Engineering Technician I	AC, San Antonio College
AAS, Air Conditioning & Heating	AC, St. Phillips College
AAS, Allied Construction	AC, St. Phillips College
AAS, Electrical Trades	AC, St. Phillips College
AAS, Home Building Technology	AC, St. Phillips College
AAS, Refrigeration Technology	AC, St. Phillips College
Certificate Building Trades	AC, St. Phillips College
Certificate, Air Conditioning & Heating	AC, St. Phillips College
Certificate, Allied Construction	AC, St. Phillips College
Certificate, Electrical Trades	AC, St. Phillips College
Certificate, Home Building	AC, St. Phillips College
Certificate, Plumbers Helper	AC, St. Phillips College
Certificate, Plumbing Trades	AC, St. Phillips College
Certificate, Refrigeration	AC, St. Phillips College
BS, Engineering	Trinity College
BS, Architecture	University of Texas, San Antonio
BS, Civil Engineering	University of Texas, San Antonio

BS, Construction Management	University of Texas, San Antonio
BS, Electrical Engineering	University of Texas, San Antonio
BS, Environmental Sciences	University of Texas, San Antonio
BS, Mechanical Engineering	University of Texas, San Antonio
MA, Architecture	University of Texas, San Antonio
MS Environmental Science	University of Texas, San Antonio
MS, Architecture	University of Texas, San Antonio
MS, Biomedical Engineering	University of Texas, San Antonio
MS, Civil Engineering	University of Texas, San Antonio
MS, Computer Engineering	University of Texas, San Antonio
MS, Electrical Engineering	University of Texas, San Antonio
MS, Manufacturing Engineering	University of Texas, San Antonio
MS, Mechanical Engineering	University of Texas, San Antonio
Ph.D. Biomedical Engineering	University of Texas, San Antonio
Ph.D. Electrical Engineering	University of Texas, San Antonio
Ph.D. Environmental Science and Engineering	University of Texas, San Antonio
BS, Engineering Management	University of the Incarnate Word
BS, Environmental Science	University of the Incarnate Word

Alamo Colleges (AC)

The AC campuses have degree and certificate programs as well as continuing education opportunities in many areas that provide education and training for jobs in the sectors that will be in demand as a result of the Mission Verde initiatives. Programs in Engineering (electrical, civil and construction, manufacturing and mechanical), Engineering Technology, Construction and Home Building Technology, Electrical Trades, Air Conditioning and Heating (refrigeration, HVAC), Advanced Water Treatment, and Architecture are among the areas of focus. In particular, two AC colleges, St. Phillip's and San Antonio, have taken a lead in integrating and incorporating green skills and programs.

St. Philips College is part of the Texas Renewable Energy Education Consortium (TREEC). Member colleges include Houston Community College, Lamar Institute of Technology, Texas State Technical College campuses, Austin Community College, Cedar Valley College, and St. Phillips College. The mission of TREEC is to investigate, develop, and teach curricula dedicated to postsecondary education in emerging energy technologies to meet the demand in the Texas Workforce. The participation of St. Philips College in this consortium is a major resource for San Antonio. Specific Green initiatives or courses already developed through TREEC include:

- Fuel cell technology with Texas Skill Standard Endorsement
- Large Wind Technology
- Energy Education Programs
- Renewable Energy Curricula (Austin Community College)

Solar programs are currently under development by the Consortium.

St. Phillip's College is focusing on developing an alternative energy center within the college. It has partnered with CPS Energy to document the need and demand for all levels of programs in alternative energy. It will begin a new 2 year AAS in alternative energy in the fall and they have

proposed to the Texas Coordinating Board a new 4-year program to be delivered at the college—a BAS in alternative energy. It is also planning a new solar energy curricula/program and is in discussions with Texas State Technical College about partnering or articulating with the existing program at TSTC.

St. Phillip's also has a cluster of construction programs that can address skill needs in the weatherization/retro-fit initiatives. It will be partnering with Northside High School in its proposed construction/trades academy which will accept its first students in the fall. It also currently partners with three existing career academy schools—Aerospace, Manufacturing (repair and maintenance are a focus) and IT (security focus). St. Phillips believes that two of these partnerships provide opportunities for connection to green jobs with a focus on both the IT area (in the “smart wiring” of homes or with jobs that will be generated with the “smart grid,” for example) and perhaps in the manufacturing sector if solar manufacturing emerges. The college's traditional engineering programs (mechanical engineering), which provide opportunities to connect with UTSA Engineering programs, provide a pathway into the Engineering profession and is a prerequisite for many jobs in the water and power utilities industry. The alternative energy focus discussed above will provide programs and courses in green knowledge and skills.

In addition to these programs, St. Phillip's also has begun to develop a robust continuing education program to address supplementing traditional occupational skills in the building and electrical trades with green skills.

San Antonio College is not as far along in the for credit program sector as St. Philips. They do have both AS and AA degrees in Engineering and Architecture that articulate with UTSA degrees. They are currently adding “green components” to the curricula in both programs—their advisory boards provide input on need and demand. San Antonio offers short-term training programs through their Continuing Education Training Network and in February of this year launched a Green Training Program as part of their Service, Trade, and Industry Center. The mission statement of this initiative states that the college and the district are “committed to providing skills and knowledge which residents of the district need in order to be employed or promoted in ‘green’ jobs.” The initiative draws on pre-established alliances with business and industry, Workforce Solutions Alamo, the City, and organizations such as MERCED Housing, Solar San Antonio, and Build San Antonio Green. Programs listed that are particularly relevant to the jobs/skills identified in this report include: Certified Energy Rater (64 class hours) and Solar Photovoltaic Installer (48 class hours). Both programs are aligned with the relevant industry certifications. Additional ‘green programs’ such Green Consumer Education, Green Interior Design, Electric Vehicle Conversion, Arborist Certification are also offered.

University of Texas, San Antonio (UTSA)

UTSA has both undergraduate and graduate programs in Architecture and Engineering Both have the potential to address green jobs and green skills in San Antonio. In an interview with the Dean of the College of Engineering he expressed his belief that Mission Verde will have an impact on jobs and the San Antonio workforce in two time frames. In the short-term, he believes, green jobs/skills will be created in the “blue collar” sector, fueled by the retro-fit initiative. He believes that AC is the more appropriate educational and training provider for these jobs and skills. Longer-term, he thinks, the clean and renewable energy jobs that on which San Antonio is focused will be fueled by new technology and new manufacturing in the region. UTSA has a large role to play in this area as these jobs will require higher degrees and new companies will need the research engine of UTSA. He believes that a focus on the clean energy sector in San Antonio can do for San Antonio what the semi-tech industry did for Austin a few years ago.

The College of Engineering currently offers undergraduate and graduate degrees in Civil and Environmental Engineering and provides opportunities for a study emphasis in both environmental and water resources engineering—both directly applicable to jobs and skills addressed in this report. The College also houses Centers for Advanced Manufacturing and Lean Systems and a Center for Innovation and Technology Entrepreneurship. The College is also in the process of establishing a new center, the Institute for Conventional, Alternative and Renewable Energy (ICARE). It is intended to focus broadly across the energy sector and will have multidisciplinary input from the Schools/Colleges of Public Policy, Business, and Architecture along with Engineering.

There is also an emphasis to strengthen the focus on renewable energy across the current Engineering Programs and to create a new graduate level program in Energy. There is initial discussion about adding a Department of Energy Systems in the future.

UTSA has current articulation agreements with AC for engineering programs but acknowledges that they probably need to think differently about ways to do this in the future in order to attract more students into programs that could eventually lead to higher level green jobs. Consideration might be given to a joint degree of some kind and perhaps starting with a new energy degree would make sense given the focus of Mission Verde.

Texas A & M University

Texas A & M University, which runs a university center in San Antonio, has recently announced plans to expand the campus and programs in San Antonio. It appears that the campus may have an “energy” focus based on the decision to move a solar demonstration facility—the Solar Decathlon House—to San Antonio. The **Texas Engineering Experiment Station (TEES)**, also affiliated with A & M, also has a physical presence in San Antonio. The TEES is an engineering research agency with a statewide mission in Texas. They partner with industries, communities, and academic institutions to “solve problems to help improve the quality of life, promote economic development and enhance the educational systems of Texas.” The facility and researchers in San Antonio have a focus on energy research and the new Solar Demonstration House is seen as a “nexus” for research and development as well as a learning center for sustainability. It is being considered as a candidate for incorporation within Mayor Phil Hardberger’s new Mission Verde Initiative - An Economic Approach to Sustainability, focused

on energy. In addition, Dr. Jorge Vanegas, interim dean of the College of Architecture stated, “The emerging partnership between the College of Architecture and TEES, combined with the Solar D move, offers an exciting and unparalleled opportunity to create an exemplar of integrated research, teaching/learning/training, and engagement scholarship, in a domain of critical importance for the City of San Antonio, the State of Texas, our Nation, and the World: the sustainability of the built and natural environments. We are very proud to be a partner in this initiative.”

In addition to TEES research, training programs are also being provided at the site for “Trade jobs,” with a focus on energy related jobs. The training programs—which can be articulated with area community colleges and can lead to certificates—are delivered by the **Texas Engineering Extension Service (TEEX)**, also with a statewide mission. Staff within TEEX are currently engaged in a study of the variety of green initiatives in the state of Texas and the various training opportunities that exist within the state. The San Antonio TEES site is equipped with large classrooms and equipment and has capacity to deliver additional training programs in conjunction with industry or other educational institutions—they are currently focused on solar installation (Electrician and Electrician Helper training) and solar manufacturing areas.

Both TEEC and TEEX receive State appropriations for their work and could become important players in the San Antonio Green Jobs Program.

Private Institutions

Finally, there are two major private colleges in San Antonio that could have a relation to education and training in ‘green’ areas.

- The **University of the Incarnate Word** has a BA degree in Environmental Science—the only 4 year degree in this area currently operating in the city.
- **Trinity University** offers a BS degree in Engineering and a design sequence within that program has focused on green areas in the past. The University is currently thinking about adding specific green coursework to its curricula.

Other Programs

We also investigated the following programs, which are located outside the San Antonio area, but offer green courses or related coursework.

- Texas State Technical College System
- Texas State University at San Marcos
- Panola College
- Kilgore College

Appendix F: Green Job Initiatives in Other Cities

Profiles of Green Job Initiatives

California's Green Workforce Coalition

Program Overview	<p>California's Green Workforce Coalition is a public-private alliance of institutions, agencies, organizations, businesses and individuals devoted to developing a green workforce for a green future.</p> <p>The Coalition was formed in February 2008, in a spirit of cooperation and inclusiveness and was originally conceived as a funding-oriented group. It soon evolved into a larger learning community, based on the belief that shared information and insights, cross-fertilization of ideas, and the power of networking would provide a lasting foundation on which to build a sustainable future.</p> <p>Goal: To prepare a workforce that responds to green industry demands and supports economic development and growth in our communities, in our region and in our state.</p>
Geographic Area	California
Coalition/Cooperative Membership	Together, the Coalition's participating K-12, community college and workforce investment agencies, in collaboration with community-based organizations, labor, and industry, represent one of the most powerful local workforce and economic development support systems in the nation.
Current Activities	<p>The Coalition has developed the following Green Jobs concepts:</p> <ol style="list-style-type: none"> 1) Green Root Occupations 2) Green Derivative Occupations 3) Green Root Skill Sets 4) Guiding Principles for Green Jobs 5) Applied Definition of a Green Job 6) Outcomes-Based Criteria for Green Jobs 7) Green Evaluation Criteria for Service Occupations 8) Green Jobs Advisory Panels 9) Green Employer Certification <p>See article "What's Old is New" at http://www.southbayresource.net/articles/whatsoldisnew.pdf</p>
Training and certification available to validate green skills	The <i>East Los Angeles Skills Center</i> (one of the coalition members) currently offers accredited instruction in solar panel installation and will soon be developing a course in wind energy. In addition to this green training program, several of the Coalition's participating community colleges have identified a number of areas of educational focus in green technologies that students may take advantage of now and in the near future.
Assessment of job opportunity, job growth	There were not enough local level data and literature on green jobs beyond solar panel installers. In 2008, the Coalition investigated – what makes a job green? They looked at seven different reports put together by various groups and identified 120 unique occupational titles. Then they worked with the California Workforce Division and determined that 25-30 of those titles were duplicates, and whittled

	<p>the list down to 90. They determined that 52 of the 90 occupations had projected growth rates, and these were validated by 2 or more reports. These 52 occupations became known as the “green root occupations.”</p> <p>The “green derivatives” combine skill sets from more than one title to create a hybrid occupation.</p>
Prioritizing particular sectors, employers, jobs and job categories	<p>The top demand occupations in Los Angeles County green technology sectors are electricians, plumbers and pipe-fitters, carpenters, construction laborers and general and operations managers. The largest middle-skill occupations in these green sectors requiring an average of 1.5 years or less of training and education include:</p> <ul style="list-style-type: none"> • Electricians • Architectural Drafters • Plumbers and Pipefitters • Sheet Metal Workers • Carpenters • Bookkeepers and Auditors • Secretaries, General • Helpers-Electricians • Construction Laborers • Office Clerks, General • Refuse and Recyclable Collectors
Engaging employers, “Green” and traditional employers with green initiatives	Has had tremendous success engaging employers – many green employers are part of the coalition.
Engaging education and training providers, “Green” certificates, and credentials.	Post-secondary education institutions as well as K-12 schools are members of the coalition.
Standards (if any) used	They use the Texas Workforce Commission (TWC) suggested six distinct approaches to assessing the merits of green jobs training programs under the Green Jobs Act of 2007
Funding mechanisms	The Coalition is an eclectic voluntary partnership – in a large part administered through the SBWIB. They did get a seed grant of \$20,000, which helps pay for local travel, memberships, etc. Beyond that, they are a social networking group and do not go after funds as a group, but encourage members to go after funds separately.
Which national funders have emerged as supporters of Green Jobs development	
Where in the stakeholder groups is the talent development initiative housed (Workforce System, Community College, K-12, Chamber of Commerce, etc)	The Coalition’s members represent many of California’s key workforce preparation and development systems including the California Employment Development Department (EDD), the California Community Colleges, the K-12 public education system, the local Workforce Investment Act (WIA) system, and the California State University system.
Other information	
Contact Information	Robert T. Mejia, Coalition Manager at the South Bay Workforce Investment Board 310/970-7700

Source: Robert Mejia, SWIB, <http://www.sbwib.org/>

Oakland Green Jobs Corps

<p>Program Overview</p>	<p>The Oakland Green Jobs Corps is a job training program that provides a pathway into green careers for Oakland residents with barriers to employment. It provides young adults with job training, support, and hands-on work experience so they can independently pursue opportunities in the new energy economy.</p> <p>The program was officially launched October 2008 and has become a national model. The program is administered through a partnership, which includes:</p> <p>Laney College: one of the region's premier community colleges, providing green vocational education</p> <p>Cypress Mandela Construction Training Program: a renowned pre-apprenticeship program that serves young adults with barriers to employment, and that has strong connections to the building trades unions</p> <p>Growth Sector -- a workforce intermediary that connects employers, government and community agencies</p>
<p>Geographic Area</p>	<p>The East Bay Green Corridor Group: Oakland, Richmond, Emeryville, and Berkeley.</p>
<p>Coalition/Cooperative Membership</p>	<p>The Oakland Green Jobs Corps is a central achievement of the Oakland Apollo Alliance, co-convened by the Ella Baker Center for Human Rights and the International Brotherhood of Electrical Workers Local 595.</p> <p>Local firms have joined an Oakland Green Employer Council and are playing a critical role by shedding light on their workforce needs and providing internship placement opportunities for Corps trainees.</p>
<p>Current Activities</p>	<p>The Green Jobs Corps:</p> <ul style="list-style-type: none"> • Recruits participants and provides them with ongoing support; • Teaches participants “soft” skills: general life skills necessary to be successful in any work environment; • Teaches participants "hard" skills: specific required to work on new energy projects as a member of the Oakland Green Corps; • Provides participants with employment experience for a limited time on City-funded renewable energy and efficiency projects; • Supports participants in transitioning from the Oakland Green Jobs Corps into independent employment. <p>This initiative provides youth with green career pathways leading to jobs in solar, green construction, and energy efficiency. The program includes a paid internship from employers.</p>
<p>Training and certification available to validate green skills</p>	<p>The coursework has been developed by Laney College, and the hands-on training is conducted at Cypress Mandella.</p> <p>The Growth Sector provides students with pre-construction training, basic skills, and soft skills. Then the students go on to coursework at Laney College and Cypress Mandella. This coursework includes solar installation, weatherization, HVACR, Energy Auditing. Laney College has developed the curriculum for an Environmental Control Tech.</p>
<p>Assessment of job opportunity, job</p>	<p>N/A</p>

growth	
Prioritizing particular sectors, employers, jobs and job categories	The Corps works mainly in weatherization, energy auditing, solar installation, and HVAC.
Engaging employers, "Green" and traditional employers with green initiatives	Growth Sector works directly with the employers, and has developed the Employer Green Council, which includes both green employers, and non-green employers (such as big hotels, for instance). Growth Sector acquired commitments from employers to offer paid internships for the students, and helps to secure job placement after graduation.
Engaging education and training providers, "Green" certificates, and credentials. Standards (if any) used	Laney College and Cypress Mandella provide the education and training for this initiative.
Funding mechanisms Which national funders have emerged as supporters of Green Jobs development	The City of Oakland recently awarded Laney College, Growth Sector, and Cypress Mandella \$250,000 to administer the program. The program has expanded regionally, with the help of a Federal \$1.9 million grant and a California State grant of \$500,000.
Where in the stakeholder groups is the talent development initiative housed (Workforce System, Community College, K-12, Chamber of Commerce, etc)	Oakland Green Job Corps training programs are targeted to low income youth and adults. The pre-construction curriculum requires an 8 th grade reading and math level. The Bridge-to-Solar program is geared toward a 10 th grade reading level. The Corps is currently developing training and pathways for high school students.
Contact Information	Caz Pereira 415-902-6951 Growth Sector

Source: Caz Pereira, <http://www.ellabakercenter.org/gcjc>

Chicago Green Jobs Strategy

Program Overview	<p>The Chicago Green Jobs Strategy is a means to implement the actions outlined in the Chicago Climate Action Plan (CCAP), a comprehensive strategy for greenhouse gas (GHG) mitigation and adaptation, which was released in September 2008.</p> <p>The Chicago Green Jobs Strategy will:</p> <ul style="list-style-type: none"> • Ensure that an appropriately-skilled workforce exists in Chicago to carry out the work of CCAP and ensure that its GHG reduction goals are achieved; • Connect green-collar job opportunities from CCAP to populations and communities in need, and ensure that entry-level jobs are linked to career paths to self-sufficiency; and • Support the growth of green businesses developing and producing goods and services that further CCAP goals, and add to Chicago's economic base.
Geographic Area	City of Chicago
Coalition/Cooperative Membership	Representatives from the Department of Community Development's economic development (ED) and workforce development (WD) divisions will be part of the strategy, as well as representatives from relevant non-governmental WD and ED organizations, including Chicago Jobs Council (CJC), World Business Chicago, Delta Institute or the Chicago Manufacturing Center.

<p>Current Activities</p>	<p>The Chicago green jobs strategy includes multiple steps:</p> <ul style="list-style-type: none"> • The completion of a broad assessment of the potential job impacts of the CCAP based upon input output analysis. • Hiring a Coordinator for the City of Chicago to implement the economic and workforce development strategy and developing a coordination infrastructure. • Implementing, funding, and evaluating pilot programs related to the economic and workforce development strategy. • Developing additional strategies as implementation plans are undertaken. <p>The strategy also includes an alignment of existing initiatives, such as:</p> <ul style="list-style-type: none"> • Brownfields Redevelopment • Green Procurement • Sustainable Business Development • Green Industrial Modernization • Green Industrial Ecology • Green Supply Chain Development • Sustainable Household Expense Reduction • Sustainable Transit Oriented Development (TOD) • Green Job Training <p>The City of Chicago will focus on many areas, including:</p> <ul style="list-style-type: none"> • Investment in construction training programs to prepare energy efficiency measure-installers for positions retrofitting Chicago's homes and businesses. Promotion of training programs for energy efficiency auditors as well as standardization of this work. • Supporting transitional jobs programs that provide work experience to those with little employment history and to the hardest to employ through waste reduction projects. • Working with the Environmental Law and Policy Center to determine the best plan for achieving the goals of the CCAP in the area of renewable energy while creating family-supporting jobs and entry-level opportunities for new workers.
<p>Training and certification available to validate green skills</p>	<p>Green Job Training: A number of organizations have existing green job training programs in the following areas:</p> <ul style="list-style-type: none"> • Reuse • Landscaping • Carpentry • Urban Agriculture • Renewable Energy • Green Pathways to Success <p>A key to the strategy will be coordinating and investing in these existing efforts.</p>
<p>Assessment of job opportunity, job growth</p>	<p>The Strategy was developed by the Center for Urban Economic Development at the University of Illinois (CUED) using key informant interviews, available models and existing studies and reports to identify the follow scope of opportunities:</p> <ul style="list-style-type: none"> • New Job Creation: Industries and occupations where CCAP is likely to result in new, direct job creation; • “Critical jobs”: Industries and occupations that are instrumental to achieving CCAP's goals, and/or are likely to face changing skill

	<p>requirements as a result of CCAP;</p> <ul style="list-style-type: none"> • Opportunity areas: Product and technology areas where, with the right economic development response, CCAP could generate new business and job creation opportunities.
Prioritizing particular sectors, employers, jobs and job categories	<p>The strategy focuses on three sectors:</p> <ul style="list-style-type: none"> • Energy Efficiency • Landscape, Horticulture, and Urban Forestry • Recycling and Reuse
Engaging employers, “Green” and traditional employers with green initiatives	N/A
Engaging education and training providers, “Green” certificates, and credentials.	N/A
Standards (if any) used	
Funding mechanisms	To fund new training programs, the City of Chicago and the Chicago Jobs Council (CJC) will pursue a variety of funding opportunities:
Which national funders have emerged as supporters of Green Jobs development	<ul style="list-style-type: none"> • The federal Green Jobs Act (GJA): • The Workforce Investment Act: • Local and national foundations interested in supporting green job training initiatives.
Where in the stakeholder groups is the talent development initiative housed?	N/A
Other information	
Contact Information	<p>City of Chicago, Department of the Environment http://egov.cityofchicago.org/ Chicago Climate Action Plan http://www.chicagoclimataction.org/</p>

Source: “A Workforce and Economic Development Strategy for the Chicago Climate Action Plan,” UIC Center for Urban Economic Development Center on Wisconsin Strategy Green For All, December 2008.

Chicagoland Green Collar Jobs Initiative

Program Overview	<p>The mission of Chicagoland Green Collar Jobs Initiative is to develop a skilled workforce that is ready to meet employer demands in the new “green” market and to capture new employment opportunities for Chicagoland low-skilled individuals.</p> <p>The Chicagoland Green Collar Jobs Initiative was founded in September 2007 with the intent of organizing stakeholders around the opportunities and resources around green collar jobs.</p>
Geographic Area	The Chicagoland Region, which includes Milwaukee, Northern Indiana, and Cook, Lake, and DuPage Counties in Chicago.
Coalition/Cooperative Membership	The Initiative is a collaboration of partners from labor groups, community organizations, businesses, community colleges, sustainability organizations, and environmental and workforce development non-profits.
Current Activities	Currently working on a research project, to be completed and distributed in May, that identifies the most promising green collar jobs in the Chicagoland Region, matches those with existing

	<p>workforce development programs, and makes recommendations on additional training programs needed and policies to help create a green collar economy.</p> <p>In the coming year, the Initiative will work to distribute that work, continue ongoing partner meetings, and build the capacity of the Initiative.</p>
Training and certification available to validate green skills	The Initiative does not train/certify.
Assessment of job opportunity, job growth	<p>Based on initial research conducted by the Chicagoland Green Collar Jobs Initiative, some of the prevalent green collar jobs include:</p> <ul style="list-style-type: none"> • energy raters for homes and commercial buildings • green cleaning and building maintenance staff; alternative energy service providers (solar, wind, geo-thermal) • installer/ maintenance of stormwater management systems (green roof, permeable pavement, rain water collection) • urban agriculture (landscaping, farming, apiculture) and green-related services (recycling, retail, manufacturing) <p>The Initiative has done primarily direct outreach to employers, job placement agencies, etc to determine what is happening now.</p>
Prioritizing particular sectors, employers, jobs and job categories	<p>The Chicagoland Green Collar Jobs Initiative focuses on four green collar job sectors:</p> <ul style="list-style-type: none"> • Urban Agriculture and Horticulture • Building Construction, Operations & Maintenance • Green Products and Services • Energy Efficiency & Alternative Energy <p>Future work will focus on selecting two promising job types and drafting a program development plan for these jobs that will serve as a program model for additional job and career selections. The model will identify program components to be developed including job readiness, participant support services, career counseling, training classes that link existing programs as well as new classes to be developed on a career path, curriculum development needs, employment, retention and advancement training. Strong emphasis will be on mapping a career path and gaining the training, credentials and work experience necessary to advance.</p>
Engaging employers, “Green” and traditional employers with green initiatives	<p>Through the Initiative’s Partner and Steering Committee member, the Chicago Sustainable Business Alliance, and other contacts. Businesses are struggling right now and see the green wave coming and have been willing to participate. The Initiative’s next struggle will be to engage the larger businesses. Another struggle is duplication of effort.</p>
Engaging education and training providers, “Green” certificates, and credentials.	Education and training providers have been coming to the Initiative.
Standards (if any) used	
Funding mechanisms	Current funding includes the following:
Which national funders have emerged as supporters of Green Jobs development	<p>Grand Victoria Foundation Field Foundation The LEED Council The Initiative is currently pursuing many other sources of funding.</p>

	LEED Council is the 'home' of the Initiative and serves as the fiduciary agent.
Contact Information	Chicagoland Green Collar Jobs Initiative c/o LEED Council 1866 North Marcey Avenue Chicago, Illinois 60614 P 773.929.5552 x 226 www.greencollarchicago.org

Source: Paige Finnegan, Director

American YouthWorks: Casa Verde YouthBuild

Program Overview	Casa Verde Builders (CVB) is an award-winning, project-based education program, at American YouthWorks (AYW), providing participants with hands-on construction skills and applied academics by building single-family, energy-efficient, affordable housing in East Austin communities. CVB members work to improve their own neighborhoods while pursuing their high school diploma or GED.
Geographic Area	Austin, Texas
Coalition/Cooperative Membership	
Green Training Program	<p>The Casa Verde YouthBuild program helps youth and young adults (ages 17-24) learn construction skills by building environmentally friendly houses in Austin. In addition to earning industry certificates in construction, students earn college scholarship money. Casa Verde uses 60 percent recyclable material as well as solar screens and other technologies to make homes more energy-efficient.</p> <p>As part of the AmeriCorps National Volunteer Service Program, CVB members earn a living allowance and are provided health care. Those who successfully complete their 12-month service will also earn a \$4,725 award for higher education or trade school.</p> <p>American YouthWorks is focused on training for a variety of occupations in solar and wind power, building energy management, water harvesting, healthy food and commercial kitchens</p>
Number of Participants to Date	<p>Currently, the Casa Verde YouthBuild program serves 22 students, however enrollment ranges from 22 – 35 students at any given time. At least 30 percent of graduates have gone into the skilled trades industry. Five recent graduates are currently in a stone cutting artisan apprentice program in the Austin area.</p> <p>Since the Casa Verde Builders program's inception in 1994, more than 100 homes have been built and over 1,000 young people have gained job and life skills as they construct these homes from the ground up. Nearly \$900,000 in property taxes have been generated for the City of Austin from Casa Verde Builder homes.</p>
Program Funding	<p>The Casa Verde program is partially funded through the Department of Labor's (DOL) YouthBuild program and has received other investments from industry, foundations and other state, local and Federal entities.</p> <p>In September 2008, the U.S. Economic Development Administration issued a grant to redevelop one of American YouthWorks high school campuses into a Green Jobs Training Center (EDA also</p>

	issued a grant in 1999 to YouthWorks to build the first green-built school and commercial building in Austin). The training center, set to break ground this month, will serve as an energy magnet high school. The Green Training Center, which will be complete in August 2009, has also received a Workforce Training Grant from DOL's Employment and Training Administration and continues to seek investment to ensure success.
Contact Information	Richard Halpin, Chief Executive Officer/Founder, 236-6155

Source: EDA, Volume 2, Issue 3, <http://www.eda.gov/PDF/edavol2issue3.pdf>, and American YouthWorks, <http://www.americanyouthworks.org/index.htm>

Richmond BUILD

Program Overview	<p>The Richmond BUILD Pre-apprenticeship Construction Skills & Solar Installation Training program was first developed to create employment and career opportunities for Richmond residents and also to implement a strategy for reducing violence in the community.</p> <p>Richmond BUILD was established in May 2007 and has quickly become a model of effective and broad public/private partnership that is focused on developing talent and skills in the high growth and high wage construction and renewable energy fields.</p>
Geographic Area	Richmond, California
Coalition/Cooperative Membership	RichmondBUILD's innovative job training program is made possible by a robust partnership created by the City of Richmond's Employment & Training Department, and includes various public and private partners. These partners include the City of Richmond's Redevelopment Agency, Housing Authority, Housing Department, and Department of Public Works; along with community based organizations Solar Richmond, the Solar Living Institute, and Rising Sun Energy Center; West Contra Costa Adult Education, Carpenters Local 152, and a number of employers.
Green Training Program	RichmondBUILD provides a comprehensive ten week training program that includes instruction in power tools, framing, electrical, plumbing, welding, and a strong green component that incorporates eco literacy, energy efficiency, and solar installation. As part of the training, students participate in two live solar installations for low income Richmond homeowners. This unique training opportunity delivers a triple benefit: participants experience an effective hands-on training in solar installation, homeowners receive a no-cost solar system that allows them to immediately save money on their energy bill, and our planet benefits from the reduction in carbon emissions.
Number of Participants to Date	<p>Since its inception in April 2007, a total of 150 participants have graduated from RichmondBUILD.</p> <p>Richmond BUILD has 90% placement rate at an average starting wage of \$18.33 an hour for program graduates. Eighteen (25) graduates have obtained employment in the Green-Collar industry.</p>
Program Funding	The total cost for the solar training component, the solar system, and installation is covered by the Housing Department of the City of Richmond.
Other Information	See attached career ladder

	http://www.ci.richmond.ca.us/DocumentView.asp?DID=3701
Contact Information	Sal Vaca, Director RichmondWORKS 330 25th Street Richmond, CA 94804 510-307-8014

Source: <http://www.ci.richmond.ca.us/index.asp?NID=275>

Gainesville's Solar Feed-in Tariff Program (FIT)

Program Overview	<p>Gainesville Regional Utilities (GRU) offers GRU electric customers a chance to invest in solar photovoltaic (PV) systems and sell all the electricity that they produce directly to GRU with a newly adopted Solar Feed-in Tariff Program.</p> <p>Florida will be the first state in the nation to offer this type of program. The City of Gainesville looked to Germany, a country that has seen the fastest rates of solar PV adoption. In Germany, a system called Feed-in Tariff was developed in the 90's and became a national law in 2000, and doubles (or more) the price that is paid by the utility to the homeowner for their solar energy.</p>
Geographic Area	GRU customers in Gainesville, FL
Coalition/Cooperative Membership	Gainesville Regional Utilities (GRU) is a multi-service utility owned by the City of Gainesville and is the 5th largest municipal electric utility in Florida.
Green Program	<p>The Feed-in Tariff (FiT) justifies a tariff that is levied not on the consumer directly but on the utility that is fed the energy (hence "feed-in") since it serves to mitigate the cost of carbon dioxide emissions and helps stimulate the fledgling solar industry. It requires two meters -- one that measures the home's direct energy use (which they homeowner uses free of charge), and a second meter which measures the output that is fed to the grid.</p> <p>Participants signing up during the first two years of the program will be guaranteed a fixed rate of US \$0.32 per kilowatt-hour of electricity produced for 20 years.</p> <p>GRU's previous program offered rebates to encourage the installation of PV systems and then bought back the excess power that was not used in the home or business. The advantage of the FIT is that the participant's income is much more predictable, because all of the power generated will be sold directly to GRU. This factor is expected to increase participation.</p> <p>GRU estimates that investors will see a five percent return on investment for large-scale projects. The order from the Gainesville City Commission does however set a total installation cap of 4 megawatts (MW) per year. The entire state currently has approximately 2 MW of capacity installed.</p>
Current Data	Gainesville Regional Utilities sends word it has already received completed applications for the maximum power capacity allotted for in the program for this year. As of March 1 applications may still be submitted for participation in 2010.
Program Funding	The costs of running the program would be passed on to ratepayers.

	The GRU said its customers could expect an average increase of 42 cents per bill in 2009, provided that there isn't a dramatic increase in the amount of solar power generation.
Other information	<p>Currently there is not a uniform approach to the training of solar installers. The traditional week long courses at FSEC and SEI are booked for months and there is a shortage of skilled trainers.</p> <p>The local community college is interested in offering a 45 day crash course and the local chapter of the IBEW union has a training program as part of the apprenticeship for electricians. But the latter is a four-year program.</p> <p>Feed-in tariff legislation is in the works in the states of Hawaii, California, Oregon, and Washington</p>
Contact Information	<p>Program developed by Harry Kegelmann, from Advanced Solar Technologies (AST) http://ast-solar.com/</p> <p>The program is administered by GRU. http://www.gru.com/</p>

Source: <http://www.gru.com/Pdf/AboutGRU/News/FIT/Gainesville%20FIT%20Synopsis.pdf>

Other Noteworthy Programs

The Center on Wisconsin Strategy (COWS)

The Center on Wisconsin Strategy (COWS) has deep roots in the state of Wisconsin, but its work has now grown to address issues, organizations, and leaders across the nation. COWS is a national policy center and field laboratory for high-road economic development — a competitive market economy of shared prosperity, environmental sustainability, and capable democratic government.

COWS’ work is collaborative, experimental, and evidence-driven. Working with business, government, labor, and communities, we try out new ideas, test their effectiveness, and disseminate those with promise. We believe that the best way to predict the future is to start making it, particularly in our states and metro regions.

COWS collaborates with other groups and institutions to conduct research and policy projects, address key public policy issues, and educate the general public about their work. Collaborations and projects include:

- **Apollo Alliance** - A national campaign of labor, environmental, and civil rights organizations to create jobs through energy efficiency in communities across the country.
- **Emerald Cities Initiative** - The Emerald Cities Initiative is a small group of business, labor, and community leaders fulfilling the promise of “high-road efficiency cities” (aka “equity efficiency cities” or “emerald cities”) — that is, cities that organize themselves to

become more energy efficient and less CO₂e-emitting, with equitable local capture of the benefits of doing so.

- **Governor's Consortium on Biobased Industry** - COWS served as a consultant to the Governor's Consortium on Biobased Industry. The Consortium was formed in May 2005 to recommend state goals and policies for the development of a Wisconsin bioeconomy, based on turning feedstocks such as crops, animal waste, and forest products into energy, fuel, and other marketable products.
- **Green For All** - Green For All is a national organization dedicated to building an inclusive green economy strong enough to lift people out of poverty.
- **Milwaukee Energy Efficiency (Me2)** – Profiled on the following page.

For more information: <http://www.cows.org/>

Milwaukee Energy Efficient (Me2) Program

Program Overview	COWS and the City of Milwaukee are working with local political, labor, community, and business leaders to retrofit much of the city's building stock. The project, called Milwaukee Energy Efficiency (Me2), allows property owners and renters to implement energy efficiency measures with immediate savings and no upfront costs. It saves customers money, helps reduce greenhouse gas emissions, and generates local employment.
Geographic Area	Milwaukee, Wisconsin
Coalition/Cooperative Membership	COWS and the City of Milwaukee
Green Program	Me2 will create jobs — ranging from entry level to highly skilled — and fill them locally. Preliminary estimates suggest that the project will generate thousands of person-years of employment for installation work. These will be good jobs with real opportunities for advancement. Me2 is working with local labor and community leaders and training providers to make sure the program is open to those who are often excluded from the workforce.
Current Data	COWS is currently working with state and local partners toward a pilot of the Me2 model.
Program Funding	Me2 will use both public monies and private capital for the work involved in the project. Costs will be fully repaid by program participants via charges on their utility or municipal services bills, but on a schedule that allows them immediate savings. If a participating tenant leaves the property before repayment is complete, the remaining obligation goes to the next tenant. If a participating owner sells the property, the obligation goes to the new owner or is wrapped into the sales price. This design minimizes risk to both participants and creditors.
Other information: Billing Model	Me2 employs an innovative financing program that would allow building owners to pay for energy efficiency improvements out of the energy savings. Several states have started similar programs: <ul style="list-style-type: none"> • Michigan Public Service Commission order • New Hampshire PUC order • New Hampshire program evaluation • New Hampshire Electric Co-op tariff • Public Service of New Hampshire tariff • Hawaii SB 2957

	<ul style="list-style-type: none"> • Hawaiian Electric Co. tariff • Kansas Corporation Commission order Midwest Energy news release
Contact Information	Elissa Berger Me2 Coordinator eberger@cows.org

Source: <http://www.cows.org/pdf/me2summary.pdf>

Sustainable South Bronx (SSBx)

Sustainable South Bronx (SSBx) - a long-standing local environmental justice group. Since 2003, the environmental group has trained 70 former drug addicts, welfare recipients and convicts for jobs in landscaping, ecological restoration, green roof installation and hazardous waste cleanup. The Bronx group is at the forefront of a movement to put low-income and low-skilled workers in "green collar" jobs: manual work in fields that help the environment. For more information: <http://www.ssbx.org/>

Projects at SSBx include:

- **Greenway:** The South Bronx Greenway Project (SBG) is a community led plan for a bicycle/pedestrian greenway along the South Bronx waterfront, which will provide much needed open space, waterfront access and opportunities for mixed used economic development.
- **SmartRoofs Project:** SSBx and SmartRoofs, LLC is demonstrating the positive connection between living wage jobs and a cleaner environment.
- **BEST:** the Bronx Environmental Stewardship Training (BEST) program is one of the nation's first and most successful green-collar job training & placement systems. Students graduate with several certifications, job readiness preparation, and a powerful environmental justice perspective on all of the important work they are qualified to do. Nearly all of the students were on some form of public assistance, and about half have prison records. This 14-16-week program is free to qualified applicants.

Urban Agenda, New York

Urban Agenda, New York - is working to connect labor unions, environmentalists and environmental justice advocates, businesses, educators, and community organizations together around the need to respond to climate change, while simultaneously seizing opportunities to improve the socio-economic situation for New Yorkers in the transition to a clean energy economy. The major program at Urban Agenda, New York is the following:

Growing Green Collar Jobs: Urban Agenda, as convener of the NYC Apollo Alliance, has built a working coalition with business, labor, advocacy, workforce development, and environmental justice organizations. In addition, Urban Agenda benefits from its close working relationship with the NYC Central Labor Council (CLC) and the knowledge and reach of the CLC's 400 affiliated unions representing 1.3 million workers.

To address the lack of a coordinated workforce development plan Urban Agenda is spearheading the Green Collar Jobs Roundtable: a multi-stakeholder campaign initiated in 2008 to mobilize the City to prepare New Yorkers for green collar jobs. The Roundtable will chart a green jobs workforce development roadmap and make recommendations on practical implementation areas such as:

- Connecting with employers.
- Training curricula.
- Job certification.
- Leveraging existing workforce development resources.

Additionally, in 2007, Urban Agenda published a report that looks at job opportunities and challenges in improving energy efficiency in existing buildings, one of New York City's largest, fastest growing and most promising sectors.

Growing Green Collar Jobs: Energy Efficiency analyzes the jobs necessary to upgrade, maintain and manage energy efficiency in the built environment, as well as offers an advocacy agenda of specific, practical, policy and program recommendations to make the City more sustainable.

For more information: <http://www.urbanagenda.org/index.htm>

Solar Cities

Solar America Cities is a partnership between the U.S. Department of Energy (DOE) and a select group of cities across the country that have committed to accelerating the adoption of solar energy technologies at the local level. Twenty-five cities were selected in 2007 and 2008, and received a combined \$5 million in DOE funding in addition to substantial hands-on technical assistance over two years. San Antonio, TX was one of these cities, selected in 2008. For detailed information on the selected Solar Cities, see <http://www.solaramericacities.energy.gov/About.aspx>

A few of these cities include:

Austin, TX

Austin is pursuing a comprehensive strategy to transform the market for solar energy technologies, both locally and regionally. Austin plans to establish benchmarks for distributed and central (relatively large, power-plant scale) installations of solar energy to be integrated into the generation plan for the local utility, Austin Energy. The Austin Solar America City partnership will reduce information barriers that prevent participation in the city's renewable energy and energy conservation programs. Austin will also increase public knowledge about solar energy by educating the city's teachers and youth about the benefits of solar energy and by installing highly-visible solar systems.

For more information: Leslie Libby, Manager - Solar Programs, Austin Energy (512) 482-5390

Houston, TX

The City of Houston is committed to achieving a sustainable solar infrastructure through strategic partnerships that address market barriers for solar energy. The “Houston Solar Initiative” (the name of Houston’s Solar America Cities project) is dedicated to this long-term goal while focusing on near- and mid-term results that go beyond experimental solar projects.

For more information: Cris Eugster, Chief Officer for Sustainable Growth, City of Houston (832) 393-0976

Knoxville, TN

The Knoxville Solar Cities program builds on the city’s Energy & Sustainability Initiative, a set of existing partnerships between the city and local institutions aimed at reducing energy consumption and enhancing Knoxville’s overall sustainability.

For more information: Madeleine Weil, Deputy Director of Policy and Communications, City of Knoxville (865) 215-2680

San Diego, CA

San Diego is California’s second largest city and the eighth largest in the nation. The city has experienced rapid growth, which has led to a significant increase in the city’s energy demand. San Diego’s Solar America Cities project aims to improve the sustainability of the region by building an energy infrastructure that is diversified, reliable, and as self-contained as possible. Solar energy offers these attributes, and San Diego’s climate makes it well suited for extensive solar power development. The City of San Diego plans to launch a pilot financing program in fall 2009 that will allow residents to pay for the cost of solar installations through a monthly assessment on their property taxes.

For more information: Linda Giannelli Pratt, Program Chief, Energy, Sustainability and Environmental Protection Division, City of San Diego Environmental Services Department (858) 492-5088

Appendix G: Green Jobs Funding Opportunities

Local San Antonio Funding Prospects

Grantmaker Name	Contact
Anheuser-Busch Foundation	Judy Vonder Haar, Asst. Mgr., Charitable Contribs. Anheuser-Busch Foundation c/o Anheuser-Busch Cos., Inc. 1 Busch Pl. St. Louis, MO 63118-1849 http://www.anheuser-busch.com/CharitableGivingIndex.html
San Antonio Area Foundation	Clarence R. "Reggie" Williams, C.E.O. For grant applications: Lydia Rodriguez, Prog. Off., Discretionary Funds San Antonio Area Foundation 110 Broadway, Ste. 230 San Antonio, TX 78205-1974 Telephone: (210) 225-2243 Fax: (210) 225-1980 E-mail: info@saafdn.org URL: www.saafdn.org
George B. Storer Foundation, Inc.,	Peter Storer, Pres. George B. Storer Foundation, Inc. c/o Thomas R. McDonald P.O. Box 1040 Tavernier, FL 33070-1040
Heb Tournament of Champions Charitable Trust	Dir. of Public Affairs Heb Tournament of Champions Charitable Trust 646 S. Main Ave. San Antonio, TX 78204-1210
Halliburton Foundation, Inc.	Brinda Maxwell Halliburton Foundation, Inc. P.O. Box 42806 Houston, TX 77242-2806 Telephone: (281) 575-3558 http://www.halliburton.com/Default.aspx?navid=367&pageid=1003 .
Dickson-Allen Foundation	Dickson-Allen Foundation (formerly The Raymond Dickson Foundation) P.O. Box 406 Hallettsville, TX 77964-0406 Telephone: (361) 798-2531

William and Salome Scanlan Foundation	William Scanlan, Jr., Tr. William and Salome Scanlan Foundation 112 E. Pecan St., 30th Fl. San Antonio, TX 78205-1512
Joan and Herb Kelleher Charitable Foundation	Ruth K. Agather, Tr. Joan and Herb Kelleher Charitable Foundation P.O. Box 829 San Antonio, TX 78293-0829 Fax: (210) 223-3512 E-mail: tina.pawelek@paisanocattle.com
McNutt Charitable Trust, Amy Shelton	Trust Secy. Amy Shelton McNutt Charitable Trust 153 Treeline Park, Ste. 300 San Antonio, TX 78209-1880
United Way of Comal County	United Way of Comal County 468 S. Seguin Ave., Ste. 403 P.O. Box 310614 New Braunfels, TX 78130-7671 Telephone: (830) 620-5639 E-mail: unitedway@uwcomal.org URL: www.uwcomal.org
G. A. C. Halff Foundation	Thomas F. Bibb, Tr. G. A. C. Halff Foundation 745 E. Mulberry Ave., Ste. 400 San Antonio, TX 78212-3166 Telephone: (210) 735-3300
Watson Charitable Foundation, The	Mark E. Watson, Jr., Pres. The Watson Charitable Foundation (formerly The Mark and Kathleen Watson Charitable Foundation) P.O. Box 6886 San Antonio, TX 78209-0886
Frill Foundation	Charlene Slack Balderas, Admin. The Frill Foundation c/o Greater Houston Community Foundation 4550 Post Oak Pl., Ste. 100 Houston, TX 77027-3165
H-E-B	Susan Ghertner, Environmental Affairs Manager 5105 Rittiman Rd. San Antonio, TX 78218 210-938-8075
Potts and Sibley Foundation	Robert W. Bechtel, Mgr. Potts and Sibley Foundation P.O. Box 8907 Midland, TX 79708-8907 Telephone: (432) 686-7051

Skiles Foundation	The Skiles Foundation c/o Comerica Bank P.O. Box 75000, MC 3302 Detroit, MI 48275-3302
Guadalupe County United Way	Guadalupe County United Way P.O. Box 805 Seguin, TX 78156-0805
Anne Duncan & C. W. Duncan, Jr. Foundation	Robert J. Faust, Secy.-Treas. Anne Duncan & C. W. Duncan, Jr. Foundation 600 Travis St., Ste. 6100 Houston, TX 77002-3013 Telephone: (713) 226-5030
Mirza Trust of San Antonio	Mirza Trust of San Antonio P.O. Box 130630 Houston, TX 77219-0630 Telephone: (713) 696-8899
Steves Foundation	The Steves Foundation (formerly Marshall T. Steves Foundation) P.O. Box 1866 San Antonio, TX 78297-1866
Herrmann Family Charitable Foundation, The	The Herrmann Family Charitable Foundation 5005 West Ave., Ste. 100 San Antonio, TX 78213-2711 Telephone: (210) 344-9211
Zachary Construction	General Inquiries Zachry Construction Corporation 527 Logwood San Antonio, Texas 78221 210-475-8000 210-475-8060 fax
NuStar Energy, LP	General Inquiries and Information: NuStar Energy L.P. Corporate Headquarters 2330 North Loop 1604 W San Antonio, TX 78248 Phone: (800) 866-9060 or (210) 918-2000 webmaster@nustarenergy.com
USAA Foundation, Inc.	Barbara B. Gentry, Vice-Chair. and Pres The USAA Foundation, Inc. 9800 Fredericksburg Rd., D-03-E San Antonio, TX 78288-3500 Telephone: (210) 498-1225 http://www.usaaedfoundation.org/

Valero Energy Foundation	Sylvia Rodriguez, Exec. Dir. Valero Energy Foundation (formerly Ultramar Diamond Shamrock Foundation) 1 Valero Way P.O. Box 696000 San Antonio, TX 78269-6000 Telephone: (210) 345-2615 E-mail: Sylvia.Rodriguez@valero.com URL: http://www.valero.com/Community/ValeroEnergyFoundation.htm
CPS Energy	Milton B. Lee, Chief Executive Officer CPS Energy 145 Navarro San Antonio, TX 78205 http://www.cpsenergy.com/About_CPS_Energy/Who_We_Are/Citizen_Advisory_Board/index.asp

National Funding Prospects

CAEL also recommends that the following list of national philanthropic funders be pursued. This list includes 34 who are members of Living Cities, which has released Green Jobs RFPs; Partners in the Enterprise Foundation’s Green Communities Grant Program; or who are part of the Funders’ Network for Smart Growth and Livable Communities.

FUNDER	CONTACTS
AARP Foundation	Robin Talbert, Exec. Dir. (formerly American Association of Retired Persons (AARP) Andrus Foundation) AARP Foundation 601 E St., N.W., Tax Dept. Washington, DC 20049-0001 Telephone: (202) 434-2018 Fax: (202) 434-6593 E-mail: plannedgiving@aarp.org URL: www.aarp.org/foundation
Annie E. Casey Foundation	John Kim, Grants Mgr. Annie E. Casey Foundation 701 St. Paul St. Baltimore, MD 21202-2311 Telephone: (410) 547-6600 Fax: (410) 547-6624 E-mail: webmail@aecf.org URL: www.aecf.org

AXA Community Investment Program	Faith Frank, C.E.O. and Pres. AXA Community Investment Program (formerly The Equitable Foundation, Inc.) 1290 Ave. of the Americas, 7th Fl. New York, NY 10104-0101 Telephone: (212) 314-3662 Fax: (212) 314-4480 URL: www.axaonline.com/axafoundation
Bank of America (Bank of America Charitable Foundation, Inc.)	Need to check w/Charlotte to find contact in San Antonio for local grants. 101 S. Tryon St., NC1-021-02-20 Charlotte, NC 28202 Telephone: (800) 218-9946 URL: www.bankofamerica.com/foundation
Bill & Melinda Gates Foundation	Grant Inquiry Coordinator Bill & Melinda Gates Foundation P.O. Box 23350 Seattle, WA 98102-0650 Telephone: (206) 709-3100 Fax: (206) 709-3180 E-mail: info@gatesfoundation.org URL: www.gatesfoundation.org
Blue Moon Fund	Diane Edgerton Miller President and CEO Blue Moon Fund (formerly W. Alton Jones Foundation, Inc.) 222 W. South St. Charlottesville, VA 22902 Telephone: (434) 295-5160 Fax: (434) 295-6894 E-mail: info@bluemoonfund.org URL: www.bluemoonfund.org
BP America (BP Foundation, Inc.)	NO SPECIFIC CONTACT NAME AVAILABLE BP Foundation (formerly BP Amoco Foundation, Inc.) 3333 Warrenville Rd., 8th FL Lisle, IL 60532-1498 Telephone: (630)-836 5000 URL: http://www.bp.com/subsection.do?categoryId=6940&contentId=7050749 Houston Office Address 501 Westlake Park Boulevard Houston, TX 77079 Phone: 281 366 2000

Citi Foundation	Irena Budimova Citi Foundation (formerly Citigroup Foundation) 425 Park Ave., 2nd. Fl. New York, NY 10022-6211 Telephone: (212) 559-9163 Fax: (212) 793-5944 E-mail: citigroupfoundation@citigroup.com URL: www.citifoundation.com
Deutsche Bank	Deutsche Bank (formerly BT Foundation) 60 Wall St., NYC60-2112 New York, NY 10005-2858 Telephone: (212) 250-0555 Contact: Gary S. Hattem, Pres. URL: www.community.db.com/htm/db_americas_foundation.html
Ford Foundation	Secretary Ford Foundation 320 E. 43rd St. New York, NY 10017-4801 Telephone: (212) 573-5000 Fax: (212) 351-3677 E-mail: office-secretary@fordfound.org URL: www.fordfound.org
George Gund Foundation	David T. Abbott, Executive Director George Gund Foundation 1845 Guildhall Bldg. 45 Prospect Ave. W. Cleveland, OH 44115-1018 Telephone: (216) 241-3114 Fax: (216) 241-6560 E-mail: info@gundfdn.org URL: www.gundfoundation.org
Global Green USA	CALL FOR CONTACT INFO 2218 Main St., 2nd Fl. Santa Monica, CA 90405-2273 Telephone: (310) 581-2700 Fax: (310) 581-2702 E-mail: ggusa@globalgreen.org URL: www.globalgreen.org
Home Depot Foundation	Kelly Caffarelli, President Home Depot Foundation, Inc. 2455 Paces Ferry Rd. N.W. Atlanta, GA 30339-1834 Telephone: (770) 384-3889 Fax: (770) 384-3908 E-mail: hd_foundation@homedepot.com URL: www.homedepotfoundation.org

J.P. Morgan Chase & Company (The JPMorgan Chase Foundation)	Kimberly Davis, President JP Morgan Chase Foundation (formerly The Chase Manhattan Foundation) 270 Park Ave., 33rd Fl New York, NY 10017-2014 Telephone: (212) 270-6000 E-mail: jpmorgan.chase.grant@jpmchase.com URL: www.jpmorganchase.com/grants
John D. and Catherine T. MacArthur Foundation	Richard J. Kaplan, Assoc. V.P Institutional Research and Grants Mgmt. John D. and Catherine T. MacArthur Foundation 140 S. Dearborn St., Ste. 1200 Chicago, IL 60603-5285 Telephone: (312) 726-8000 Fax: (312) 920-6258 E-mail: 4answers@macfound.org URL: www.macfound.org
John S. and James L. Knight Foundation	Contact: Attn: Grant Administrator John S. and James L. Knight Foundation (formerly Knight Foundation) Wachovia Financial Ctr., Ste. 3300 200 S. Biscayne Blvd. Miami, FL 33131-2349 Telephone: (305) 908-2600 Fax: (305) 908-2698 URL: www.knightfoundation.org
Kendeda Fund	NO CONTACT INFO Kendeda Fund c/o Foundation Source 501 Silverside Rd., Ste. 123 Wilmington, DE 19809-1377
Kresge Foundation	Richard "Rip" Rapson, C.E.O. and President Kresge Foundation 3215 W. Big Beaver Rd. Troy, MI 48084-2818 Telephone: (248) 643-9630 Fax: (248) 643-0588 E-mail: info@kresge.org URL: www.kresge.org
M&T Bank The M&T Charitable Foundation	Debbie Pringle The M&T Charitable Foundation (formerly Manufacturers and Traders Trust Company Contributions Program) 1 M&T Plz., 11th Fl. Buffalo, NY 14240 Telephone: (716) 848-3804 Fax: (716) 842-4453 URL: www.mandtbank.com/community

McKnight Foundation	Kathryn Wolford, President McKnight Foundation 710 S. 2nd St., Ste. 400 Minneapolis, MN 55401-2290 Telephone: (612) 333-4220. Fax: (612) 332-3833 E-mail: info@mcknight.org URL: www.mcknight.org
Merrill Lynch Community	Eddy Bayardelle, President Merrill Lynch Community 2 World Financial Ctr., 5th Fl. New York, NY 10281-1008 Telephone: (212) 236-4319 Fax: (212) 236-3821 E-mail: philant7@exchange.ml.com URL: http://community.ml.com/index.asp?id=66319_67036
Met Life Foundation	Sibyl C. Jacobson, C.E.O. and President MetLife Foundation 1095 Ave. of the Americas, 40th FL New York, NY 10036-6797 Telephone: (212) 578-6272 URL: www.metlife.org
Mizuho Corporate Bank Mizuho US Foundation	Lesley Palmer, Exec. Director Mizuho USA Foundation (formerly The IJB Foundation, Inc.) 1251 Ave. of the Americas, 31st Fl. New York, NY 10020-1104 Telephone: (212) 282-4192 Fax: (212) 282-4250 E-mail: mizuho.usa.foundation@mihuzocbus.com URL: http://www.mizuhocbk.co.jp/english/global_branch/americas/pdf/mizuho_usafoundation.pdf
New York Community Trust	Judith Lopez, Exec. Assistant, Grants and Special Projects New York Community Trust 909 3rd Ave., 22nd Fl. New York, NY 10022-4752 Telephone: (212) 686-0010 Fax: (212) 532-8528 E-mail: info@nycommunitytrust.org URL: www.nycommunitytrust.org
Paul G. Allen Family Foundation	Lisa Arnold, Grants Manager Paul G. Allen Family Foundation 505 5th Ave. S, Ste. 900 Seattle, WA 98104-3821 Telephone: (206) 342-2030 Fax: (206) 342-3030 E-mail: info@pgafamilyfoundation.org URL: www.pgafamilyfoundation.org

Prudential Financial Prudential Foundation	Lata N. Reddy, V.P. and Secretary Prudential Foundation Prudential Plaza 751 Broad St., 15th Fl. Newark, NJ 07102-3777 Telephone: (973) 802-4791 E-mail: community.resources@prudential.com URL: www.prudential.com/view/page/public/12182
Robert Wood Johnson Foundation	Richard J. Toth, Dir., Office of Proposal Mgmt Robert Wood Johnson Foundation College Rd. E. and Rte. 1 P.O. Box 2316 Princeton, NJ 08543-2316 Telephone: (877) 843-7953 Contact: E-mail: mail@rwjf.org URL: www.rwjf.org
Rockefeller Brothers Fund	Benjamin R. Shute, Jr., Secretary Rockefeller Brothers Fund 437 Madison Ave., 37th Fl. New York, NY 10022-7001 Telephone: (212) 812-4200 Fax: (212) 812-4299 E-mail: info@rbf.org URL: www.rbf.org
Rockefeller Foundation	Peter Costiglio, Director, Communications Rockefeller Foundation 420 5th Ave. New York, NY 10018-2702 Telephone: (212) 869-8500 URL: www.rockfound.org
Surdna Foundation	Phillip Henderson, President Surdna Foundation 330 Madison Ave., 30th Fl. New York, NY 10017-5001 Telephone: (212) 557-0010 Fax: (212) 557-0003 E-mail: questions@surdna.org URL: www.surdna.org
U.S. Trust Corporation	NO CONTACT – Tied to Bank of America U.S. Trust 114 West 47 th Street New York, New York 10036-1532 URL: www.ustrust.com or https://www.bankofamerica.com/philanthropic/grantmaking.action

W.K. Kellogg Foundation	Debbie Rey, Supvr., Proposal Processing W.K. Kellogg Foundation 1 Michigan Ave. E. Battle Creek, MI 49017-4058 Telephone: (269) 968-1611 Fax: (269) 968-0413 URL: www.wkkf.org
Washington Mutual	Bettye Wilkes Washington Mutual (formerly Washington Mutual Savings Bank Foundation) 1301 2nd Ave, 42nd Fl. WMC4201 Seattle, WA 98101 Telephone: (206) 500-2191 Fax: (206) 377-2442 URL: www.wamu.com/foundation
William Randolph Hearst Foundations	Paul I. Dinovitz, Executive Director (west of the Mississippi River) William Randolph Hearst Foundations Hearst Towers 300 W. 57th St., 26th Fl. New York, NY 10019-3741 Telephone: (212) 586-5404 Fax: (212) 586-1917 URL: www.hearstfdn.org
Enterprise Foundation	Doris W. Koo, President & Chief Executive Officer Enterprise Community Partners, Inc. 10227 Wincopin Circle American City Building Columbia, MD 21044 Telephone: (410)964-1230 URL: http://www.greencommunitiesonline.org/

Appendix H: Individuals Interviewed for This Report

Alamo Area Council of Governments	Peter Bella
Alamo Area Council of Governments	Rose Jackson
Alamo Area Council of Governments	Joe Ramos
Alamo Colleges	Bruce Leslie, Chancellor
Alamo Colleges	Federico Zaragoza, Vice Chancellor of Economic & Workforce Development
AT&T	Howard Peak, External Affairs
Build San Antonio Green (formerly MPE)	Anita Ledbetter, Executive Director
Builders Energy Rater	Ross Bacon
Builders Energy Rater	Randy Erwin
Builders Energy Rater	Brent Dillon
Cinco Solar	William H. Fitch
City Council	Justin Rodriguez, City Councilman
City of San Antonio	Philip Gates
City of San Antonio - Electrical Inspections	Ray Martinez
Clean Energy Forum	Mike Burke, Director
Cody Enterprises	David Cody
Comfort Design Heating and Cooling	Tom Damiani
Contects – Consultants and Architects	Chip Henderson
CPS Energy	Bruce Evans, Director, Customer Solutions Delivery
CPS Energy	James Boston
CPS Solar Permitting	Matthew Haecker
CPS Energy	Karma Nilsson
CPS Energy	Jim McAden
CPS Energy	Kathe Doran
CPS Energy	Ana Nelson
Fisk Electronics	Orvil M Anthony, Jr. VP South Texas Division
Gary Trainer	Solarplex of Texas
Good Company	Bob King
Greater San Antonio Builders Association	Becky Oliver, Executive Director
Greater San Antonio Builders Association	Kim Shrum, Government Affairs Director
IBS Advisors	Brett Dillon
Imagine Homes	Stephan Colley, Architect & Coordinator of Green Building Program
KB Homes	Cathy Teague
Key Insulation Company	Ross Bacon
Lockheed Martin	Erin Zayko
Lone Star Alternative Energy	Charles E. Kirk
LP Building Products	Robert Earl
LP Building Products	Michael Murphy
LP Building Products	Karen Kaiser
Lucifer Lighting Company	Patrick Ward
M & M Weatherization	Mac Rattan, Owner
Mayor's Office	A. J. Rodriguez, Deputy City Manager
Mayor's Office	Phil Hardberger, Mayor
Mayor's Office	Larry Zinn
Mayor's Office	Laurence Doxey, Director, Office of Environmental Policy

Mayor's Office	Jeanne Russell
National Electrical Contractors Association	Les Moynahan, Executive Manager
Neighborhood Housing Services	Robert Jodon, Executive Director
Northside Independent School District	Linda Mora, Deputy Superintendent
Novastar	Dustin Aubrey
San Antonio Alternative Housing	Betsy Spencer, COO
San Antonio College	Bob Ziegler, President
San Antonio College	Verna Walker
SAWS	Karen Guz
Silver Venture (Pearl Institute)	Robert Sohn, Executive Director
Smart World Energy Inc	Gustavo Mendoza
Solar San Antonio	Bill Barker, Director
St. Philip's College	Adena Loston, President
St. Philip's College	B. Dennis McDonough, Chair
St. Philip's College	Maureen Carledge
Standard Renewable Energy	Sharron Brown
Superior Insulation Systems	Donald Fetzer
Texas Energy Raters	Matthew Villarreal
Texas Engineering Experiment Station	William Skip Mills, Director San Antonio Operations, TEES
Texas Engineering Experiment Station	Michael Martin, Manager, Energy & Automation Lab, TEES
Texas Engineering Extension Service	Joan Quintana, Program Manager, TEEX
Texas Engineering Extension Service	Sue Ann Palmore, Economic Development Coordinator, TEEX
Texas State Representative	Mike Villarreal, Representative
Texas Renewable Energy Industries Association	Russell Smith
Texas Workforce Commission	Doug Ridge, Director of Employer Initiatives
University of Texas, San Antonio	Robert McKinley, Assoc. VP Institute for Economic Development
University of Texas, San Antonio	C. Mauli Agrawal, Dean, College of Engineering
Workforce Solutions, Alamo	Chakib Chehadi, Director
Zachary Construction	Bartell Zachary