MEETING NOTICE
AND AGENDA

REGIONAL ENERGY WORKING GROUP

The Regional Energy Working Group may take action on any item appearing on this agenda.

Thursday, May 28, 2015

11:30 a.m. to 1 p.m.

SANDAG, 7th Floor Conference Room
401 B Street, Suite 800
San Diego, CA 92101

Staff Contact: Susan Freedman
(619) 699-7387
susan.freedman@sandag.org

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AGENDA HIGHLIGHTS

- DRAFT SAN DIEGO FORWARD: THE REGIONAL PLAN
- REGIONAL GREENHOUSE GAS INVENTORY AND SCENARIOS
- LOCAL CLEAN ENERGY WORKFORCE DEVELOPMENT

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ITEM NO. | RECOMMENDATION
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1. | WELCOME AND INTRODUCTIONS
+2. | APPROVAL OF MEETING MINUTES APPROVE
The Regional Energy Working Group (EWG) is asked to review and approve the minutes from its April 23, 2015, meeting.
3. | PUBLIC COMMENTS/MEMBER COMMENTS
Members of the public shall have the opportunity to address the EWG on any issue within the jurisdiction of SANDAG that is not on this agenda. Anyone desiring to speak shall reserve time by completing a “Request to Speak” form and giving it to the meeting coordinator prior to speaking. Public speakers should notify the meeting coordinator if they have a handout for distribution to working group members. Public speakers are limited to three minutes or less per person. EWG members also may provide information and announcements under this agenda item.

REPORTS

+4. | DRAFT SAN DIEGO FORWARD: THE REGIONAL PLAN INFORMATION
The SANDAG Board of Directors released the Draft San Diego Forward: The Regional Plan (Draft Regional Plan) for public review on April 24, 2015. Laurie Gartrell (SANDAG) will present an overview of the Draft Regional Plan, which combines the Regional Transportation Plan and its Sustainable Communities Strategy with the Regional Comprehensive Plan into one planning document that provides a vision for the region’s future growth and development. The Draft Regional Plan proposes a strategy for a more sustainable future, which includes investing in a transportation network that will provide residents more travel choices, protecting the environment, creating healthy communities, and stimulating economic growth. SANDAG is currently soliciting comments on the Draft Regional Plan. The attached April 24 Board of Directors item discusses the release of the Draft Regional Plan and we invite your comments and feedback. A bilingual flyer on local workshops about the Draft Regional Plan also is included.

5. | REGIONAL GREENHOUSE GAS INVENTORY AND SCENARIOS INFORMATION
The Energy Policy Initiatives Center (EPIC), University of San Diego, developed a regional greenhouse gas (GHG) emissions inventory and potential scenarios to reduce regional GHG emissions through 2050. Scott Anders (EPIC) will provide an overview of the project and the results.
LOCAL CLEAN ENERGY WORKFORCE DEVELOPMENT

Greg Newhouse (Miramar College Advanced Transportation Technology and Energy Program) will present on the California Community Colleges Advanced Transportation and Renewable Energy Program and Jon Kropp (Cuyamaca Community College) will discuss the Proposition 39 Clean Energy Workforce Project which is focused on improving existing community college programs and creating a clean energy experts network to strengthen the regional approach to clean energy workforce development in the San Diego and desert regions. A Clean Energy Labor Market Analysis report for San Diego County is attached. This item was postponed last month.

UPCOMING MEETINGS

The next meeting of the EWG is scheduled from 11:30 a.m. to 1 p.m. on Thursday, June 25, 2015.

+ next to an agenda item indicates an attachment
May 28, 2015

San Diego Association of Governments
REGIONAL ENERGY WORKING GROUP

AGENDA ITEM NO.: 2

Action Requested: APPROVE

APRIL 23, 2015, MEETING MINUTES

1. WELCOME AND INTRODUCTIONS

Chair Chris Orlando (City of San Marcos), called the Regional Energy Working Group (EWG) to order at 11:35 a.m.

2. FEBRUARY 26, 2015, AND MARCH 26, 2015, MEETING MINUTES (APPROVE)

Action: Upon a motion by Supervisor Dave Roberts (County of San Diego) and a second by Dr. Don Mosier (City of Del Mar), the EWG approved the minutes from its February 26, 2015, and March 26, 2015, meetings.

Yes: Vice Chair Scott Anders (Energy Policy Initiatives Center [EPIC]), Pamela Bensoussan (City of Chula Vista), Amanda Rigby (City of Vista), Dr. Mosier, Mr. Roberts, Brett Caldwell (San Diego County Regional Airport Authority), Sophie Barnhorst (San Diego Regional Chamber of Commerce), Paul Webb (Sierra Club), Cameron Durckel (San Diego Gas and Electric [SDG&E]), and Michelle White (Unified Port District of San Diego); No: None; Abstain: None; Absent: Center for Sustainable Energy, City of San Diego, City of Santee, Cleantech San Diego, Environmental Health Coalition, Metropolitan Transit System, North County Economic Development Council, San Diego Regional Clean Cities Coalition, and UC San Diego.

3. PUBLIC COMMENTS/MEMBER COMMENTS

John Wotzka (Public Attendee) discussed energy-related news and provided written comments that are summarized here: Russia will finance and control a nuclear power plant for Hungary; a Dallas-based waste storage company is seeking approval to house spent nuclear fuel from reactor sites around the country; the need for dry cask storage facilities is on the rise around the world, with only Sweden and Finland expecting to have underground repositories completed by the 2020s; the Oak Ridge National Laboratory projects the United States will have 10,000 spent nuclear fuel canisters by 2050; the United States wind power could provide 33 percent of electricity by 2050 and reduce energy rates; a refinery owned by Exxon Mobil in Torrance, California exploded, possibly causing gas prices to rise; the United States is running out of space to house the excess production of crude oil, which could drive oil and gas prices even lower in the future; California is producing 1.6 million cubic feet per day of natural gas; low natural gas prices are projected to be the norm. with production in the United States at 70 billion cubic feet as recently as July 2014; exports of liquefied natural gas (LNG) will keep production at 2 trillion cubic feet per year; Shell is seeing a return on its $40 billion investment on LNG deliveries, an increase of 16 percent in sales.
Susan Freedman (SANDAG) spoke of energy related events that will be taking place:

- On May 18, 2015, an event on understanding community choice aggregation for local governments will be held at the Millennium Biltmore Hotel in Los Angeles. A flyer will be sent out with the information pertaining to this event.

- There will be a statewide symposium on Property Assessed Clean Energy (PACE) programs at the Millennium Biltmore Hotel in Los Angeles on May 28, 2015, for residential and May 29, 2015, for commercial PACE.

- On June 18, 2015, the Statewide Energy Efficiency Collaborative will hold a forum for local governments on energy efficiency best practices and programs in Sacramento. This workshop is free to local governments and limited scholarships are available.

**REPORTS**

4. **COMMUNITY WORKSHOPS FOR SAN DIEGO FORWARD: THE REGIONAL PLAN (INFORMATION)**

Ms. Freedman informed the EWG of several workshops being offered to deepen community awareness and receive input on the Draft San Diego Forward: The Regional Plan (Draft Regional Plan). These workshops will be held around the County over the next few weeks, with the Draft Regional Plan being released at the Board of Directors meeting on April 24, 2015. Those who would like to access the Draft Regional Plan are encouraged to visit sdforward.com to review the document and provide comments. If members are interested in more information, SANDAG staff can go to any organization to give a presentation on the Draft Regional Plan.

EWG members had the following questions and comments:

- Carrie Downey (City of Coronado) encouraged EWG members to review the Draft Regional Plan to make sure all transportation-related activities from their jurisdictions are being reflected accurately.

5. **LOCAL CLEAN ENERGY WORKFORCE DEVELOPMENT (DISCUSSION)**

This item has been postponed until further notice.

6. **PREPARING THE REGION FOR HYDROGEN FUEL CELL ELECTRIC VEHICLES (DISCUSSION)**

Chair Orlando shared information from a hydrogen fuel cell event hosted by the Governor’s Office of Business and Economic Development on April 2, 2015, at the Center for Sustainable Energy (CSE). The workshop gave information on hydrogen fuel cell electric vehicles and infrastructure work happening throughout the State of California. He stated that panels included auto manufacturers and hydrogen station developers to discuss the technology, vehicles, and fueling infrastructure in California. The California Energy Commission (Energy Commission) and other state agency representatives conveyed the state’s commitment to hydrogen as a transportation fuel for small passenger cars to large trucks. Included in the agenda packet is a list of resources on hydrogen.
Chair Orlando added that the state makes available $20 million a year in funding for industry to site, build, and operate fueling stations; and that another round of funding from the Energy Commission is expected within the year. He shared that Los Angeles has nine fueling sites, and San Diego has one under development and expected to open this year. He mentioned that the auto manufacturers at the workshop stated that they prefer two or three stations to operate in a region prior to offering hydrogen fuel cell electric vehicles for lease or purchase, so he stressed the importance for the region to begin considering potential fueling sites and participate in the next grant opportunity.

Ms. Freedman added that the EWG and Refuel San Diego (Refuel) work in conjunction with one another, and the discussions from last week’s workshop and this EWG meeting will be continued at Refuel and its hydrogen subcommittee. Refuel is the region’s alternative fuel readiness planning group, which SANDAG and CSE manage. Ms. Freedman also reiterated the commitment of the Governor’s Office and Energy Commission to hydrogen fuel cell electric vehicles and support for additional fueling stations in the San Diego region.

EWG members had the following questions and comments:

- Ms. Downey asked whom the one station will be owned by and where it was located. Chair Orlando responded that a private developer owns the station. He added that permitting is handled through the State Fire Code and that station developers are enthusiastic about the promise of this fuel type and want to own stations. The station under development is in the City of San Diego at the Shell gas station near Interstate 5 and Interstate 56.

- Ms. Downey also asked if SANDAG is going to assist cities to be the site for the next stations. Chair Orlando opened this topic for discussion. He inquired what can be done in terms of offering recommendations or technical assistance to cities. Ms. Freedman added that Refuel will be developing a toolkit for regional hydrogen readiness and that CSE may be able to provide technical assistance.

- Dr. Mosier inquired if manufacturers of hydrogen fuel cell electric vehicles will be putting hydrogen fueling stations at their dealerships. Chair Orlando shared that topic was not discussed at the workshop but the three auto manufacturers were supportive of additional stations available to all of them.

- It was asked what would be the source and methodology of delivering fuel to the fueling stations. Chair Orlando explained that at the workshop developers of both on-site generation (electrolysis), and those that truck in fuels, discussed individual processes. He mentioned that initially trucking-in of fuels would be more common due to less infrastructure needed, initially prices would be comparable to gasoline, and the sources from where the fuel would be trucked-in from were not discussed.

- Cesar Rios (energy consultant to the County of San Diego) asked if any manufactures discussed the range of their vehicles. Chair Orlando commented that the range and power of hydrogen fuel vehicles are comparable to gasoline vehicles. Hydrogen fuel cell technology is referred to as the only technology that is truly a replacement for gasoline vehicles.
7. OVERVIEW OF THE CITIES OF SAN DIEGO AND CHULA VISTA STREETLIGHT RETROFIT PROJECTS (DISCUSSION)

Brendan Reed (City of Chula Vista) and Lorie Cosio Azar (City of San Diego) gave an overview of the streetlight retrofit projects that took place in each city. Mr. Reed discussed the three components that made the project successful: mature energy efficiency technology, funding sources and incentives, and increased collaboration amongst jurisdictions. The City of Chula Vista has 9,000 streetlights that account for 37 percent of municipal energy consumption.

In 2009, Chula Vista participated in a pilot project to replace High Pressure Sodium lamps with light-emitting diode technology. The first phase was a $2 million project for residential streets financed through an energy commission loan and $215,000 in rebates, which provided annual savings of 860,000 kilowatt-hour (kWh). The second phase was a $2,650,000 project that dealt with arterial streets. It was financed through the Qualified Energy Conservation Bond and $475,000 in rebates, which provided annual savings of 1.7 million kWh. Mr. Reed mentioned that the City of Chula Vista selected a fixture that is adaptive control ready and that the City is partnering with the California Lighting Technology Center, the City of San Diego, and SDG&E on an adaptive streetlight controls demonstration.

Ms. Cosio Azar shared that the adaptive control streetlighting pilot for the City of San Diego was near the Central Library in Downtown. Data from the project showed that the lighting fixtures could be dimmed at least 50 percent and still meet lighting standards and the installation was for traditional style pedestrian lighting. The City of San Diego achieved 72 percent in energy savings from energy efficiency, equaling 2.5 million kWh per year. She stated that they saved $250,000 per year in monetary costs also.

Ms. Cosio Azar explained that this new lighting technology reduced up-light by 90 percent and was beneficial for the environment. She mentioned that the City of San Diego conducted stakeholder engagement through the process and the project was well received. Currently, the City of San Diego is trying to establish a metered rate for adaptive control streetlights. Ms. Cosio Azar explained that the City of San Diego has filed a letter with the California Public Utilities Commission and is hoping this rate will be addressed in the next SDG&E general rate case.

EWG members had the following questions and comments:

- Ms. Downey inquired if the cities are looking at moving this technology to stoplights as well. Mr. Reed mentioned that there is some discussion regarding traffic signals, and how this technology could be beneficial.

- Chair Orlando asked if for adaptive lighting, as conditions change, does the lighting change with it. Ms. Cosio Azar answered that sensors should be able to detect motion and adjust for that. The City of San Diego has not incorporated those elements yet due to expense but they will be looking into this for the future.

- Amanda Rigby (City of Vista) inquired in terms of dimming, why is it important to not go below a certain point, and when/why would one want timing capability. Mr. Reed responded that the City of Chula Vista has a set time for when dimming occurs. He added that as sensor technology
matures there can be more reactive sensors. Currently, there is no financial incentive to dim the lights.

- Ms. Downey inquired how this technology works with weather changes. Mr. Reed answered that there is a city that has addressed weather by tuning the light for environmental conditions.

- It was asked what the return would be if maintenance savings were included. Mr. Reed did not remember that number, but answered that the cost savings they presented did not include expected savings from lower maintenance needs.

8. LEGISLATIVE STATUS REPORT (DISCUSSION)

Allison Wood (SANDAG) provided the EWG with a legislative status update. Included in the agenda is the timeline for deadlines in the state legislature. Ms. Wood highlighted the annual report to the legislature on the investments of cap-and-trade auction proceeds. Included on page 36 of the agenda is a link to the full report and the final section for the FY 2014-2015 cap-and-trade solicitations is there for review. She added that SANDAG partnered with the City of San Diego on a grant submittal for a targeted car sharing and mobility options in disadvantaged communities pilot project. The Air Resources Board is still reviewing the submittals.

Attachment 1 in the agenda pertains to energy related state legislation, and Ms. Wood informed the EWG of key changes to highlight:

- Assembly Bill (AB) 946 (Ting, 2015) is now focusing on the Energy Commission’s Alternative and Renewable Fuel and Vehicle Technology Program, including electric vehicle charging stations in disadvantaged communities.

- AB 1453 (Rendon, 2015) deals more with worker safety now and will be removed from the list, due to lack of relevance.

- AB 1482 (Gordon, 2015) was edited to include Natural Resources Agency and Strategic Growth Council to collaborate on climate adaptation work.

- Senate Bill (SB) 246 (Wieckowski, 2015) was edited to have more specific direction for the Climate Action Team to update the state’s Climate Adaptation Strategy and Adaptation Guide every five years.

- SB 286 (Hertzberg, 2015) was added to the list as requested by Mr. Rios.

- SB 471 (Pavley, 2015) eliminated the specifics to water and energy for legislation.

8. UPCOMING MEETINGS (INFORMATION)

The next EWG meeting is scheduled from 11:30 a.m. to 1 p.m. on Thursday, May 28, 2015.

9. ADJOURNMENT

Chair Orlando adjourned the meeting at 12:30 p.m.
### REGIONAL ENERGY WORKING GROUP
#### MEETING ATTENDANCE FOR APRIL 23, 2015

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<td>Lorie Cosio Azar, City of San Diego</td>
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DRAFT SAN DIEGO FORWARD: THE REGIONAL PLAN

Introduction

The Draft San Diego Forward: The Regional Plan (Regional Plan) combines the big-picture vision for how our region will grow over the next 35 years with an implementation program to help make that vision a reality. The Regional Plan, including its Sustainable Communities Strategy (SCS), is built on an integrated set of public policies, strategies, and investments to maintain, manage, and improve the transportation system so that it meets the diverse needs of the San Diego region through 2050.

Discussion

The following sections present a brief overview of the Regional Plan, which is followed by a discussion of the public input process as well as the major milestones leading to the anticipated adoption of the Regional Plan in fall 2015.

A Vision of Healthy and Thriving Communities

The San Diego region’s changing patterns of land use – where we live, work, and play – give us an exciting opportunity to build a smarter transportation system that reflects these changes and serves people’s evolving needs and desires. The Regional Plan is designed to strike a balance among competing interests and champion a sustainable San Diego region for generations to come. Central to the Regional Plan is its vision:

“To provide innovative mobility choices and planning to support a sustainable and healthy region, a vibrant economy, and an outstanding quality of life for all.”

The path toward achieving these goals includes several objectives: Habitat and Open Space Preservation; Regional Economic Prosperity; Environmental Stewardship; Mobility Choices; Partnerships and Collaboration; and Healthy and Complete Communities.

Recommendation

The Board of Directors is asked to: (1) accept the Draft San Diego Forward: The Regional Plan (Regional Plan) for distribution; (2) authorize staff to distribute the Draft Environmental Impact Report (EIR) under development for the Regional Plan as soon as it is available in May 2015; (3) schedule various public hearings and workshops on the Draft Regional Plan, including its Sustainable Communities Strategy (SCS) and Draft EIR; and (4) set the closing date for public comments to 55-days after distribution of the Draft EIR for the Draft Regional Plan and its SCS and the Draft EIR.
The Sustainable Communities Strategy

The updated general plans for San Diego’s local jurisdictions call for a region that grows more strategically than in the past, concentrating new housing and jobs in existing urban areas while preserving open space. To accomplish this, the Regional Plan’s SCS demonstrates how the regional development pattern, transportation network, policies, and programs can work together to achieve greenhouse gas (GHG) emission targets for cars and light trucks. The California Air Resources Board has set a target for the San Diego region to lower GHG emissions by 7 percent per capita by 2020, and by 13 percent per capita by 2035, compared with a 2005 baseline. The Regional Plan’s SCS will result in lowered GHG emissions that will exceed the state’s targets, reaching per capita reductions of 18 percent by 2020 and 24 percent by 2035.

The SCS includes the following five building blocks:

1. A land use pattern that accommodates the San Diego region’s future employment and housing needs, and protects sensitive habitats and resource areas.

2. A transportation network of public transit, Express Lanes and highways, local streets, bikeways, and walkways built and maintained with reasonably expected funding.

3. Managing demands on our transportation system (also known as Transportation Demand Management) in ways that reduce or eliminate traffic congestion during peak periods of demand.

4. Managing our transportation system (also known as Transportation System Management) through measures that maximize the overall efficiency of the transportation network.

5. Innovative pricing policies and other measures designed to reduce the number of miles people travel in their vehicles as well as traffic congestion during peak periods of demand.

Investing in Mobility for a Changing Region

The Regional Plan outlines nearly $204 billion in transportation investments, paid for by local, state, and federal tax dollars. Projects will be phased in as funds become available, but the goal is to complete these projects as early as possible to provide more travel choices. The Regional Plan’s investment strategy focuses heavily on expanding public transit and active transportation (biking and walking), while also reconfiguring existing highways to promote carpooling, public transit, and other alternatives to driving alone.

The Regional Plan’s public transit improvements include: double-tracking of the Amtrak and COASTER corridor and improved stations; SPRINTER double-tracking, which will enable services every 10 minutes; new Trolley lines from San Ysidro to Carmel Valley, Pacific Beach to El Cajon, Downtown San Diego to San Diego State University via Mid-City, and University City to Sorrento Valley; expanded Rapid bus services; streetcars; and local bus enhancements. Additionally, the Regional Plan includes full implementation of the regional bike network, plus safety improvements near public transit projects, highway interchanges, and schools to promote walking and biking.

The Regional Plan also includes more Express Lanes to encourage carpooling and better accommodate expanded public transit services. Features will include dynamic pricing, multiple
access points to regular highway lanes, and direct access ramps for carpools and toll-paying customers. Net revenues generated on those lanes will be used to support public transit operations.

**Using the Latest Technology to Build a 21st Century Transportation System**

To make our transportation system as efficient and user-friendly as possible, the Regional Plan envisions a network of cost-effective, high-tech tools to help transportation managers keep the system running smoothly, and to help travelers make their trips faster, more efficient, and trouble-free. These enhancements are included as Transportation Demand Management and Transportation System Management solutions in the Regional Plan. Technology embedded into the transportation system will grow even more useful when it is linked to smart phones, tablets, and other devices. In addition, future vehicle automation technology will provide additional opportunities to optimize use of San Diego's corridors.

**A Regional Plan that Promotes Sustainability and Health**

All the transportation improvements outlined in the Regional Plan are designed to serve new patterns of land use – a future with increasingly compact communities that demand a mix of easy-to-use and efficient public transit, more opportunities to walk and bike, and more efficient roadways.

Meeting these demands will support healthier communities, while protecting the environment and preserving more open space. Air quality has improved significantly over the past four decades, and the transportation investments detailed in the Regional Plan, coupled with improvements in fuel and vehicle technologies, will continue to help improve air quality throughout the San Diego region while lowering GHG emissions.

**Financing Our Future**

The Regional Plan is based on current and reasonably available financial resources that are applied to the estimated capital, operating, maintenance, and rehabilitation costs of the region's transportation system phased through 2050.

Total revenues estimated to come into the region over the 35-year span of the Regional Plan are estimated at $204 billion. All revenues have been escalated to the year that the money will be spent. The investment plan is funded by a combination of local, state, and federal revenues. Local funds make up 48 percent of the projected revenue, state funds make up 34 percent, and federal funds amount to 18 percent, with revenues phased by decade.

**Economic Analysis**

The Regional Plan’s economic analysis shows that the benefits of the Regional Plan outweigh the costs by a factor of almost two-to-one, meaning that for every dollar invested in the Regional Plan, San Diegans will receive almost two dollars of benefit. Among the tangible economic benefits of implementing the Regional Plan over the next 35 years are an average of roughly 53,000 new jobs per year, an annual increase of $13 billion in gross regional product, and an annual increase of nearly $6 billion in income.
Public Input and the Adoption Process

SANDAG implemented a comprehensive public outreach and involvement program to support the development of the Regional Plan and its SCS. The Regional Plan Public Involvement Program is based on the SANDAG Public Participation Plan, which was adopted by the Board of Directors in 2012. Efforts to involve the public in the development of the Regional Plan have been tracked and recorded to chronicle the large number and wide range of activities organized and held by SANDAG beginning in 2012.

The next step will be to obtain public input on the Draft Regional Plan. To do this, a broad range of media and communication avenues are being utilized to provide information, solicit participation and input, and allow for ongoing feedback and updates. A major goal of this public involvement effort is to reach out to both nontraditional and traditional audiences to include them in the transportation planning process. To support this goal, Community Based Organizations working with SANDAG to engage lower-income and minority communities as well as seniors, disabled, and other stakeholder groups, have been conducting ongoing outreach throughout the development of the Draft Regional Plan and will continue these efforts through the public review period. The closing date for public comments on the Draft Regional Plan and its SCS is proposed for 55-days after distribution of the Draft EIR.

SANDAG will hold various subregional workshops and public hearings in May 2015 to allow for public comment on the Draft Regional Plan and its SCS and the Draft EIR. The schedule and format of the workshops will provide opportunities for questions and answers with technical staff, public comments to be submitted, and information to be shared. The public workshops have been scheduled at times and locations that will provide the best options for public participation.

Upon action by the Board of Directors, the Draft Regional Plan and its SCS will be distributed to local jurisdictions, the Metropolitan Transit System, the North County Transit District, Caltrans, and other interested parties, and will be available on the SANDAG website and on the San Diego Forward: The Regional Plan website. The Draft EIR will be released as soon as it is available in May 2015, and a deadline for public comment on the Draft EIR will be 55-days after distribution. Anticipated major milestones include:

- April 24, 2015: Release of the Draft Regional Plan and its SCS
- May 2015: Release of the Draft EIR
- May 12-28, 2015: Subregional Workshops on the Draft Regional Plan/SCS/EIR
- June 12, 2015: Public hearing at the Board of Directors Policy meeting (note that a second public hearing will be scheduled at another location before the close of the public comment period and will be widely publicized)
- July 2015: Close of public comment period for the Draft Regional Plan and its SCS and the Draft EIR (date to be determined based on release of Draft EIR)
• July 2015: Transportation Committee, Regional Planning Committee, and Board of Directors review of Draft Regional Plan/SCS/EIR public comments

• September 25, 2015: Board of Directors certifies Final EIR, approves air quality conformity finding, and adopts Final Regional Plan and its SCS

Note: The Draft Regional Plan, SCS and Appendices may be obtained from the SANDAG website at www.sandag.org or from the San Diego Forward: The Regional Plan website at www.sdforward.com. CDs of the entire document will be available upon acceptance of the release by the Board of Directors free of charge by contacting the SANDAG Public Information Office at (619) 699-1950. Copies of the Draft Regional Plan in printed format may be purchased for the cost of reproduction.

GARY L. GALLEGOS
Executive Director

Key Staff Contact: Phil Trom, (619) 699-7330, phil.trom@sandag.org
Provide Your Opinion on the Plan for our Region’s Future

San Diego Forward: The Regional Plan – Draft Released

For almost three years now, you — community members, stakeholders, and local agencies — have helped the San Diego Association of Governments (SANDAG) develop San Diego Forward: The Regional Plan.

Your input helped shape the Draft Plan’s vision, goals, and policy objectives as well as the transportation investments that will serve the region for many years to come.

The Draft Plan proposes a strategy for a more sustainable future which includes investing in transportation projects that will provide people more travel choices, protecting the environment, creating healthy communities, and stimulating the economy.

The SANDAG Board released the Draft Plan on April 24, 2015. Take part in a series of workshops that will be held throughout the region in May.

Come to a workshop or participate online. Learn about the Draft Plan and give us your feedback!

View and comment on the Draft Plan at SDForward.com

Seven Community Workshops

- Presentation followed by panel discussion
- Open house
- Interactive activities
- Offer your comments on the record
- Complimentary cookies and beverages
- Live-streaming of three workshops (*)

* To participate in the live-streaming sessions, visit SDForward.com at the time of the event.

Seven Community Workshops

North County Coastal
May 20, 6 to 8:30 p.m.
Oceanside City Hall Community Rooms
300 N. Coast Highway, Oceanside, 92054

South County
May 21, 6 to 8:30 p.m.
Casa Familiar Civic Center
212 W. Park Avenue, San Ysidro, 92173
Live-streaming on the Internet*

Mid-City/Southeast San Diego
May 27, 6 to 8:30 p.m.
Jacobs Center Community Room
404 Euclid Avenue, San Diego, 92114
Live-streaming on the Internet*

University Town Centre
May 28, 6 to 8:30 p.m.
UTC Forum Hall Community Room
4545 La Jolla Village Drive, Suite E-25
San Diego, 92122

Spanish-speaking staff members and translators will be available at all seven workshops. The workshop at Casa Familiar will be conducted in Spanish with English translation available.

Please RSVP to Rose Farris at rose.farris@sandag.org or (619) 595-5337, or via the SANDAG Region Facebook page. Families welcome.

All locations are transit accessible. Call 511 or visit 511sd.com/transit for route information.

If you require assistance in order to participate, please contact SANDAG at (619) 699-1900 at least 72 hours in advance of the meeting. TTY: (619) 699-1904

Attachment 1
Durante casi tres años, usted — miembros de la comunidad, partes interesadas y agencias locales — ayudó a la Asociación de Gobiernos de San Diego (SANDAG) a desarrollar San Diego Forward: El Plan Regional

Sus comentarios ayudaron a darle forma a la visión, las metas y los objetivos de las políticas del borrador del Plan, así como a las inversiones en transporte que ayudarán a la región por muchos años venideros.

El borrador del Plan propone una estrategia para un futuro más sustentable, que incluye inversiones en proyectos de transporte que le brindarán a la gente más opciones de viaje y, al mismo tiempo, protegerán el medio ambiente, crearán comunidades saludables y estimularán la economía.

La Mesa Directiva de SANDAG publicó el borrador del Plan el 24 de abril de 2015. Participe de una serie de talleres que se realizarán en mayo en toda la región.

Asista a un taller o participe en línea. Conozca el borrador del Plan y proporcione sus comentarios.

Consulte el borrador del Plan y proporcione su comentarios en SDForward.com

Siete talleres comunitarios

- Presentación seguida por panel de discusión
- Evento abierto
- Actividades interactivas
- Brinde sus comentarios oficialmente
- Bebidas y galletas
- Transmisión en vivo de tres talleres (**)

* Para participar en las sesiones transmitidas en vivo, visite SDForward.com a la hora del evento.

Talleres

- Norte del condado – Interior
  12 de mayo, de 6 a 8:30 p. m.
  Escondido City Hall, Mitchell Room
  201 North Broadway, Escondido, 92025

- Este del condado
  13 de mayo, de 6 a 8:30 p. m.
  La Mesa Community Center, Arbor View Room
  4975 Memorial Drive, La Mesa, 91942

- Central
  14 de mayo, de 1 a 3:30 p. m
  Caltrans, District 11, Garcia Room
  4050 Taylor Street, San Diego, 92110
  Transmisión en vivo por internet*

- Norte del condado – Costero
  20 de mayo, de 6 a 8:30 p. m.
  Oceanside City Hall Community Rooms 300 N. Coast Highway, Oceanside, 92054

- Sur del condado
  21 de mayo, de 6 a 8:30 p. m.
  Casa Familiar Civic Center
  212 W. Park Avenue, San Ysidro, 92173
  Transmisión en vivo por internet*

- Mid-City
  27 de mayo, de 6 a 8:30 p. m.
  Jacobs Center Community Room
  404 Euclid Avenue, San Diego, 92114
  Transmisión en vivo por internet*

- University Town Centre
  28 de mayo, de 6 a 8:30 p. m.
  UTC Forum Hall Community Room
  4545 La Jolla Village Drive, Suite E-25
  San Diego, 92122

Personal que habla español y traductores estarán disponibles en todos los talleres. El taller en Casa Familiar se llevará a cabo en español con traducción en inglés disponible.

Todos los lugares son accesibles por transporte público. Llame al 511 o visite 511sd.com/transit para obtener información sobre las rutas.

Si necesita ayuda para participar, comuníquese con SANDAG al (619) 699-1900 por lo menos 72 horas antes de la reunión. Teletipo: (619) 699-1904
Clean Energy

LABOR MARKET ANALYSIS
SAN DIEGO COUNTY

October 2014
**Foreword: Vision for San Diego**

I am pleased to share with you the Clean Energy: Labor Market Analysis report. The report is one in a series of five published this year. We identified five regional high-priority sectors for an in-depth assessment of employer needs: Advanced Manufacturing, Life Sciences, Information and Communication Technologies, Clean Energy and Health Care.

The Clean Energy sector has been the topic of considerable excitement for a number of years. Two subsectors in Clean Energy have seen particular growth in San Diego—Renewable Energy and Energy Efficiency—which are the focus of this report. San Diego boasts more than 3,100 companies in these two subsectors, employing more than 28,000 individuals. One-third of these employers expect to add workers over the next 12 months. Its projected rapid employment growth and opportunities for on-the-job training, combined with reported current and future skills shortage, placed this sector on our list of San Diego’s top five priority sectors.

Our findings are a result of a collaboration with the San Diego and Imperial Counties Community Colleges Association (SDICCCA). These reports represent the first step in cooperative, sector-based strategies for workforce development in our region. Together, the San Diego Workforce Partnership (SDWP) and SDICCCA conducted online surveys, in-person interviews and focus groups of regional employers from the Renewable Energy and Energy Efficiency subsectors. We delved deep, asking questions that would give us insight into the jobs that can be filled with an associate degree or short-term training. Our findings and recommendations paint a picture of where we are and where we should be headed in our workforce planning.

With nearly 1.6 million people in the regional workforce, it is important for us to continuously review the state of our industries and identify job potential for our burgeoning workforce. We need to inform the unemployed, the underemployed and the yet-to-be-employed of which careers will provide an upward trajectory and meet the needs of our regional employers. SDWP is committed to funding research and job training programs that will ensure every business in our region has access to a skilled workforce and every job seeker has access to meaningful employment.

Together we will build our region’s skilled and prosperous workforce.

Peter Callstrom, President and CEO
San Diego Workforce Partnership
EXECUTIVE SUMMARY

The Clean Energy sector in San Diego County indicates that mature industries, such as construction, have been transformed by technology and innovation, providing new employment opportunities in the region. Building upon available labor market data, survey responses from 290 Clean Energy firms and executive interviews with employers, this report analyzes Clean Energy occupational growth, employer expectations of workers regarding education and work experience, employer difficulties in finding qualified workers, the supply of and demand for workers and the resulting training gaps in the region.

This report explores the opportunities in Clean Energy and recommends specific actions for the workforce development system. Nine occupations were selected for detailed analyses of job gaps, in-demand skills and training priorities:

- Construction or project managers
- Energy auditors
- Photovoltaic designers
- Sales representatives
- Electricians
- Plumbers
- Solar photovoltaic installers
- Weatherization specialists
- Heating, ventilating, and air conditioning (HVAC) technicians

The study confirms that Clean Energy is a robust and continually growing sector in San Diego County. This sector is estimated to have over 28,000 workers in 2013 and is expected to grow at a rate of 11.5 percent to over 32,000 jobs over the next 12 months. Despite the media attention directed toward the Renewable Energy subsector (promoting the installation of solar panels and alternative electrical sources in the county), more than two-thirds of companies surveyed focus in the Energy Efficiency products and services. Therefore, workers with the knowledge of the materials and technologies available to reduce energy consumption are in demand.

Occupational growth is also significant in the county. On average, employers surveyed projected all 11 occupations of study to grow from 2014 to 2015 with the exception of electricians. The most openings were expected for construction or project managers, sales representatives, HVAC technicians and solar photovoltaic installers. Clean Energy employers in general do not have difficulty finding qualified workers, while they did report difficulty in hiring for specific occupations, specifically solar water heater installers, solar photovoltaic installers and photovoltaic designers.

The study also explores the skills and work experience requirements employers have across 11 occupations. The Clean Energy sector-specific skills employers were looking for in job applicants were centered on awareness of industry-specific policies and programs and ability to discuss them with clients. As a result, sales occupations are increasingly in demand and often difficult to fill. Employers also reported difficulty in finding applicants with soft skills, particularly problem-solving skills and critical thinking. The employer preferences of previous work experience vary by occupation; however, most employers of traditionally trade occupations such as electricians and plumbers expect them to have prior work experience.

The analysis of demand for versus supply of trained workforce revealed that there might be an under-supply of construction and project managers, solar photovoltaic installers, sales representatives and energy auditors. Therefore, there is an opportunity for expanded program offerings at two-year and four-year institutions to train for these occupations. The study recommends that education and training providers include adaptable skills in curriculums and invest in technology to train the workforce, and that the workforce development stakeholders encourage apprenticeships to gain the requisite job experience.
INTRODUCTION

Employment in the Clean Energy sector has grown dramatically in the recent decade, fueled by exponential growth in the installation of renewable energy technologies and energy efficiency retrofits. California leads the nation with proactive legislation that supports the Clean Energy sector: Firms must meet new energy building codes, conduct energy efficiency retrofits and have 33 percent of renewable energy resources by 2020. These policy initiatives helped fledgling companies become major job generators in regions throughout California, particularly in San Diego County. In the solar industry alone, there were 47,223 jobs in California in 2013, with 3,566 of them in San Diego County. Solar employers expect to add 10,500 jobs in California by the end of 2014. Similar growth in San Diego County suggests that 550 new solar workers will be hired by the end of the year, representing a 15 percent growth in a one-year period. The City of San Diego alone is home to 107 megawatts (MW) of solar photovoltaic (PV) power (as of the end of 2013), second in the nation behind Los Angeles. At the same time, utility ratepayer programs and federal and state tax incentives have spurred a building efficiency movement, requiring firms to meet new energy efficiency standards and producing jobs to complete those requirements.

In order to better understand the labor market landscape and workforce needs of San Diego’s Clean Energy employers, the San Diego Workforce Partnership (SDWP) collaborated with the California Community Colleges Center of Excellence for Labor Market Research, San Diego-Imperial Region (COE) and the San Diego & Imperial Counties Community Colleges Association (SDICCCA) to conduct this study. Clean Energy was chosen for in-depth research as one of the five priority sectors that SDWP and SDICCCA share. The research will be used for sector-based workforce development strategies and allocation of resources.

This report was commissioned by SDWP, and BW Research Partnership, Inc. collected data from surveys and interviews with 290 employers.

The Hype Cycle

As the Clean Energy market picked up steam in the past decade, policymakers, politicians and economic developers looked to the sector as a source of significant job growth, expecting Clean Energy to create millions of jobs in the nation and to save the economy from the Great Recession (2007–2009). This optimism is reflected across all levels of government, with large federal investments for “green” workforce training in the American Recovery and Reinvestment Act (ARRA), as well as state- and local-level policies to create jobs and train the next generation of green workers.

Gartner’s “Technology Hype Cycle,” provides a helpful illustration for how green jobs rose to a “peak of inflated expectations,” followed by the ultimate “trough of disillusionment,” as the public and legislators began to realize that green jobs could not single-handedly fill the employment gap.

While green jobs did not produce the millions of jobs expected, it is clear that the sector has grown rapidly in the past several years and remains an important vehicle for continued economic and employment growth.

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2 Respondents were surveyed in November of 2013 and asked about expected 12-month growth.
3 Photovoltaic power refers to the production of electric current or voltage through electromagnetic radiation, usually visible light.
4 Environment California, “Shining Cities.” Available at www.environmentcaliforniacenter.org/reports/cae/shining-cities: The national average for number of homes that can be powered by 1 MW of solar energy is 164. Because of state by state variance, taking California’s average system performance and dividing this by the state’s average annual electricity consumption per household, the number comes out slightly higher to about 216 homes powered with just 1 MW of solar power. In fact, this is the highest compared to any other state.
Study Scope and Methodology

The Clean Energy sector represents a broad set of activities from electricity generation to greenhouse gas emissions accounting. These activities include research and development, sales, manufacturing, installation and maintenance. Despite the incredible growth and potential for Clean Energy in the nation, there is no single standard definition for the "green industries" that make up the Clean Energy sector. In recent years, however, Clean Energy has come to represent four major subsectors: 1) renewable energy, which includes solar energy, wind power, geothermal, biofuels and hydroelectric power; 2) energy efficiency, which includes lighting, retrofitting, weatherization and heating, ventilation and air condition (HVAC); 3) alternative transportation, which includes electric vehicles and hydrogen buses; and 4) greenhouse gas emissions accounting and management, which includes auditing and carbon sequestration.\(^5\)

The majority of the 290 employers surveyed for this study are involved in the Energy Efficiency and Renewable Energy subsectors; consequently, these two subsectors with the most Clean Energy employment in San Diego County are the main focus of this report. Additionally, 11 occupations with the greatest employment growth potential were selected for further study:

- Construction or project managers
- Energy auditors
- Photovoltaic designers
- Sales representatives
- Electricians
- Plumbers
- Solar photovoltaic installers
- Weatherization specialists
- Heating, ventilating, and air conditioning (HVAC) technicians

Further details and profiles for each occupation can be found in Appendix A. The Standard Occupational Classification (SOC) codes that most closely correspond to these 11 occupations and the North American Industry Classification Industry System (NAICS) codes used in this study to define the Clean Energy sector are listed in Appendix B. (NAICS is a coding standard used by federal agencies to collect and disseminate data related to a region’s economy and employment.) Four additional occupations (battery installation specialists, wind turbine technicians, wind blade installers, and construction equipment operators) were originally selected for this study, but were found to have no significant employment in San Diego County based on employer survey responses and were thus omitted.

A survey was administered online and by telephone to a list of businesses known to do work in the Clean Energy sector, as well as to a random sampling of construction-related businesses. From February to May 2014, 290 employers provided survey responses. (The survey instrument can be found in Appendix F.) Additionally, a facilitated employer discussion was conducted, as were follow-up interviews with employers, to collect details of employer experiences with San Diego’s Clean Energy job applicants. Training providers in San Diego County were also surveyed to identify the workforce programs available to meet Clean Energy employer needs. The following report is a summary of the findings from this research. For more information in the methodology of the report, please see Appendix E.\(^5\)

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\(^5\) Many existing Clean Energy studies as well as several state legislatures use iterations of these four categories as their definitions of Clean Energy.

\(^6\) EM's "Inverse Staffing Pattern" tool determined the industries that employed the greatest number of the workers listed above. This provided a list of industry codes from the North American Industry Classification System (NAICS) to be used in this study, which was supplemented by the Green Goods and Services Initiative definition from the U.S. Bureau of Labor Statistics. These strategies allowed for a robust definition of the Clean Energy sector, and informed the sampling plan for the survey.
INDUSTRY OVERVIEW

Employment growth in the Clean Energy sector is robust and continually growing. The Clean Energy sector includes 3,181 establishments and employs 28,597 workers. Nearly half of the employers in this sector have less than five employees. (A breakdown of establishments and jobs by industry can be found in Appendix C.) These Clean Energy firms expect to add 3,285 jobs (or 11.5 percent) over the next 12 months (Figure 1), and just over one-third of them expect to add workers over the next 12 months (Figure 2).

Figure 1: Employer-Expected Employment Growth, 2014–2015

<table>
<thead>
<tr>
<th>2014 Jobs</th>
<th>2015 Jobs</th>
<th>Projected Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>28,597</td>
<td>31,882</td>
<td>11.5%</td>
</tr>
</tbody>
</table>

Figure 2: Percentage of Employers Expecting to Grow in Employment

- Same number of employees: 56.9%
- More employees: 34.5%
- Fewer employees: 0.7%
- No response: 7.9%

In addition to new jobs, a significant number of replacement jobs will be open between 2014 and 2015, generating a total of more than 6,000 jobs in the San Diego region (Figure 3).

Figure 3: 2014–2015 Projected Job Openings Due to New and Replacement Jobs

<table>
<thead>
<tr>
<th>New Jobs</th>
<th>Replacement Jobs</th>
<th>Total Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,285</td>
<td>2,897</td>
<td>6,182</td>
</tr>
</tbody>
</table>

Despite the media attention directed toward the Renewable Energy subsector (promoting the installation of solar panels and alternative electrical sources throughout San Diego County), more than 66 percent of companies surveyed focus in the Energy Efficiency subsector (Figure 4). As a result, there are significantly more employment opportunities for individuals in this subsector than in the Renewable Energy sector.

Figure 4: Subsector Makeup of Clean Energy Firms in San Diego

- Energy efficiency & energy efficient building: 66.2%
- Renewable energy and storage: 16.9%
- Other: 14.8%

*“Other” work includes alternative transportation, greenhouse gas emissions accounting and more.

While San Diego has a growing wind energy subsector, there are very few positions for wind turbine or blade repair technicians. Of the 290 employers surveyed, only two reported employing wind turbine or blade technicians. More than four-fifths (85.7 percent) of employers reported using solar or concentrating solar power (CSP) as the primary Clean Technology of their firm (Figure 5).

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7 Replacement jobs are due to worker retirements or other employee turnovers.
8 Defined as the generation of energy by concentrating a large area of sunlight onto a small area, typically for steam generation.
Figure 5: Renewable Energy Technologies that Firms were Most Closely Connected to

<table>
<thead>
<tr>
<th>Technology</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar, including photovoltaic, thermal or</td>
<td>85.7%</td>
</tr>
<tr>
<td>concentrating solar power</td>
<td></td>
</tr>
<tr>
<td>Wind power</td>
<td>16.3%</td>
</tr>
<tr>
<td>Other</td>
<td>18.4%</td>
</tr>
</tbody>
</table>

Note: Survey respondents were allowed to indicate more than one primary activity; hence the percentages add up to more than 100.

This small percentage of firms associated with wind power technology is largely reflective of the relatively low installed capacity and estimated wind resource potential for San Diego County. Based on these data, it is unlikely that wind technician jobs will be a major source of employment in San Diego.

Of the companies involved in renewable energy and storage (or the Renewable Energy subsector), installation firms make up the largest segment of respondents (37.6 percent), followed closely by construction companies (33.8 percent) and sales firms (14.5 percent) (Figure 6).

Figure 6: Business Focus that Renewable Energy Firms Most Identified With

<table>
<thead>
<tr>
<th>Business Focus</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm that installs and maintains clean energy systems or provides clean energy</td>
<td>37.6%</td>
</tr>
<tr>
<td>product installation services</td>
<td></td>
</tr>
<tr>
<td>Firm that works on the construction or remodeling of buildings</td>
<td>33.8%</td>
</tr>
<tr>
<td>Firm that sells clean energy products and services</td>
<td>14.5%</td>
</tr>
<tr>
<td>Firm that conducts energy audits</td>
<td>2.8%</td>
</tr>
<tr>
<td>Other</td>
<td>11.3%</td>
</tr>
</tbody>
</table>

Determining the business focus of firms has important implications for San Diego workers seeking a Clean Energy career. Generally speaking, Renewable Energy firms that install and maintain clean energy products have jobs that are traditionally trade-related—such as construction workers, plumbers and electricians—and have been repurposed to learn the Clean Energy market or technologies. For example, electricians can install traditional incandescent lights as well as energy efficient, recessed light emitting diode (LED) lights. Similarly, installing high-efficiency ductless mini-split air conditioners requires approximately the same skill set as installing conventional central air systems. On average, one-third of electricians and one-third of plumbers work on renewable energy or energy efficiency projects. These are the types of adaptable skill sets that employers demand from the workforce.

In addition to understanding the activities that are prominent in the Renewable Energy firms, workers must also be familiar with the types of materials and technologies that they are working with. For firms in the Energy Efficiency subsector, knowledge of the materials and technologies available to reduce energy consumption is highly valued in workers (Figure 7).
Figure 7: Materials and Technologies that Firms in the Energy Efficiency Subsector Most Identified With

<table>
<thead>
<tr>
<th>Technology</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy efficient building materials</td>
<td>44.8%</td>
</tr>
<tr>
<td>Lighting, including solar tubes</td>
<td>43.8%</td>
</tr>
<tr>
<td>Energy efficient appliances and machinery</td>
<td>40.1%</td>
</tr>
<tr>
<td>HVAC and building controls</td>
<td>39.1%</td>
</tr>
<tr>
<td>Window, insulation and other weatherization products</td>
<td>37.5%</td>
</tr>
<tr>
<td>Other</td>
<td>12.5%</td>
</tr>
</tbody>
</table>

Note: Survey respondents were allowed to indicate more than one primary activity; hence the percentages add up to more than 100.

In addition to these activities, materials and technologies, employers noted that the Clean Energy sector-specific skills they were looking for in job applicants were more connected to awareness and knowledge of industry-specific policies and programs. Workers that can explain rebate programs, discuss and calculate potential energy savings, and generally describe why the technology is not risky for consumers are highly valued because they can often generate more business for the employer. As a result, sales occupations are increasingly in demand and often difficult to fill, which places them on this report as an occupation to study.

**OCCUPATIONAL OVERVIEW**

Based on survey and interview responses, employers expected all 11 occupations in this study to grow from 2014 to 2015 with the exception of electricians (Figure 8). This may be due to seasonal changes or—as part of the construction trade—this position is still recovering from the Great Recession. However, based on historical data and industry trends, all 11 occupations are projected to grow in the long-term.

Figure 8: Employer Expectations of 12-Month Employment Growth, 2014–2015
Employers will have a similar demand for the number of entry-level and non-entry-level jobs, but the most job openings\(^9\) by the end of 2015 will come from positions that require less than an associate degree (Figure 9).

**Figure 9: Overall 2014–2015 Projected Job Openings by Educational Attainment and Experience**

![Figure 9: Overall 2014–2015 Projected Job Openings by Educational Attainment and Experience](image)

More specifically for the 11 occupations, the most openings in the short-term (2014–2015) are construction or project managers, sales representatives, HVAC technicians and solar photovoltaic installers (Table 1).

**Table 1: Projected New and Replacement Jobs, 2014–2015**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Total New &amp; Replacement Jobs(^10)</th>
<th>New &amp; Replacement Jobs Requiring Bachelor's Degree or Higher</th>
<th>New &amp; Replacement Jobs Requiring AA or College Certificate or Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Entry-Level</td>
<td>Experienced</td>
<td>Total</td>
</tr>
<tr>
<td>Construction or project managers</td>
<td>889</td>
<td>1,178</td>
<td>2,067</td>
</tr>
<tr>
<td>Sales representatives</td>
<td>913</td>
<td>981</td>
<td>1,894</td>
</tr>
<tr>
<td>HVAC technicians</td>
<td>235</td>
<td>207</td>
<td>442</td>
</tr>
<tr>
<td>Photovoltaic installers</td>
<td>275</td>
<td>113</td>
<td>388</td>
</tr>
<tr>
<td>Plumbers</td>
<td>125</td>
<td>232</td>
<td>357</td>
</tr>
<tr>
<td>Energy auditors</td>
<td>144</td>
<td>101</td>
<td>245</td>
</tr>
<tr>
<td>Weatherization specialists</td>
<td>164</td>
<td>73</td>
<td>237</td>
</tr>
<tr>
<td>Photovoltaic designers</td>
<td>27</td>
<td>40</td>
<td>67</td>
</tr>
<tr>
<td>Documentation specialists</td>
<td>32</td>
<td>11</td>
<td>43</td>
</tr>
<tr>
<td>Electricians</td>
<td>10</td>
<td>24</td>
<td>34</td>
</tr>
<tr>
<td>Solar water heater installers</td>
<td>15</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>3,137</td>
<td>3,045</td>
<td>6,182</td>
</tr>
</tbody>
</table>

\(^9\) As mentioned in Figure 3, San Diego County will have 6,182 job openings between 2014 and 2015, which include both new and replacement jobs. This chart only displays the number of job openings based on educational attainment (a total of 6,101) and omits the 81 jobs that do not have these specific educational requirements.

\(^10\) New and replacement jobs were generated using average estimates from the Employment Development Department and Economic Modeling Specialists for the selected occupations, with the exception of solar installers (PV installers and solar water heater installers), which were generated from interviews with employers.
While employers expect strong employment growth from 2014 to 2015, employers face little difficulty in finding qualified workers to fill job openings (Figure 10), creating an employers’ market and allowing employers to be particular with their employee selection. Sixty-five percent of San Diego Clean Energy firms report no difficulty in hiring qualified job candidates—a far larger percent compared with 30 to 40 percent of firms in other industries that typically report difficulty in finding qualified applicants. This suggests that presently there is an ample-supply of well-trained workers in San Diego County to fulfill the growing employer demand.

Because a significant portion of Clean Energy jobs are traditionally trade-related professions, the severe decline in construction employment as a result of the Great Recession (2007–2009) helps explain the high percentage of employers with no difficulty in hiring qualified candidates. The construction industry in San Diego lost nearly 35,000 jobs between 2007 and 2011. Despite rebounding over the past several years, construction employment is still down approximately 24,500 jobs or 22.3 percent since before the recession (Figure 11).

This suggests that there are still tens of thousands of unemployed individuals already trained for and experienced with similar skills needed in the Clean Energy sector, which attributes to the employers’ market and selectivity of new employees. This raises the issue that newly trained workers in the construction trades will often be competing with experienced workers who lost their jobs during the recession. Given the competition in the marketplace, training providers need to train beyond the minimum requirements of these occupations and ensure that their trainees have sufficient “differentiators” in their skill sets to increase their chances of securing a job when training is complete. Employers reported that demonstrated technical ability was a key differentiator in job applicants. To demonstrate their technical abilities, job seekers need some prior work experience directly in the field. Approximately 53 percent of employers require previous job experience for the 11 occupations studied in this report and nearly 39.8 percent prefer it (Figure 12).

11 Economic Modeling Specialists, International. Name of dataset: Class of Worker 2014.2. 2014 numbers are projected based on historical industry trends.
For each of the 11 occupations in this study, the percent of employers that require previous experience vary by occupation; however, most employers expect job applicants for traditionally trade occupations such as electricians and plumbers to have prior work experience (Figure 13).

Another way to demonstrate technical proficiency is by obtaining a professional license or certification. While the type of licensure or certification is specific to each occupation, 32.2 percent of employers reported, overall, that they were a requirement for the 11 occupations and 33.1 percent of employers reported that they were preferred (Figure 14).

For specific occupations, the largest percent of respondents that require or prefer licensure were those who employed plumbers. However, most employers do require a license for electricians (Figure 15).
In short, 70 percent of employers require electricians to have previous job experience and 71 percent require licensure, but employers have very little difficulty in filling that position. In other words, a job seeker vying for these positions should be aware of not only the rigorous requirements that employers have in filling these positions, but also that the labor market is very competitive with employers.

In addition to required experience, technical skills and licensures, candidates for Clean Energy jobs can differentiate themselves in the competitive labor market by portraying the non-technical or soft skills that employers find valuable. While most employers did not have difficulty in finding technically skilled job applicants, they did report difficulty in finding applicants with soft skills, particularly problem-solving skills and critical thinking (Figure 16).

The importance of soft or non-technical skills must be emphasized for job seekers in the Clean Energy sector. In executive interviews, employers reported less need for skills specific to the position but greater importance for flexibility across job types, ability to transfer skills to different jobs and aptitude to learn new skills quickly.
TRAINING, EDUCATION AND GAP ANALYSIS

In addition to reviewing employer demand, this study provides an analysis of the region's training programs and their supply of trainees to fill Clean Energy job openings. Analyzing employer demand and trained worker supply identifies potential job gaps within the sector. A gap is created when the number of trained workers produced by the region's educational institutions does not match the number of available job openings. These are potential gaps that can be filled with workforce development programs.

In order to determine Clean Energy worker supply in San Diego, this report includes data from IPEDS, California Community College Chancellor’s Office Data Mart, local course catalogs, online searches and a training provider survey. Table 2 demonstrates the number of programs, institutions and program completions based on these data sets. The supply of qualified workers per occupation is based on the number of people who successfully complete programs related to the occupation. Analyzing training program data helps determine the number of potential qualified workers; however, these programs are not developed specifically to the 11 occupations. For instance, some electrical programs include solar photovoltaic installation modules while others do not. As a result, the supply data may be overestimated and should be used as a guide in determining supply gaps, not as the final determination of supply gaps in the San Diego region. For more details on the list of training providers and research methodology, please see Appendix D and Appendix E, respectively.

Table 2: Number of Educational and Training Programs by Institutions, Program Completions and Occupations

<table>
<thead>
<tr>
<th>Occupation</th>
<th># of Programs</th>
<th># of Institutions</th>
<th># of Program Completions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction or project managers</td>
<td>15</td>
<td>9</td>
<td>42</td>
</tr>
<tr>
<td>HVAC technicians</td>
<td>13</td>
<td>6</td>
<td>381</td>
</tr>
<tr>
<td>Electricians</td>
<td>13</td>
<td>3</td>
<td>456</td>
</tr>
<tr>
<td>Photovoltaic installers</td>
<td>9</td>
<td>5</td>
<td>63</td>
</tr>
<tr>
<td>Sales representatives</td>
<td>9</td>
<td>5</td>
<td>53</td>
</tr>
<tr>
<td>Plumbers</td>
<td>9</td>
<td>3</td>
<td>360</td>
</tr>
<tr>
<td>Energy auditors</td>
<td>5</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Photovoltaic designers</td>
<td>4</td>
<td>2</td>
<td>63</td>
</tr>
<tr>
<td>Solar water heater installers</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Documentation specialists</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Weatherization specialists</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

In comparing the number of job openings for jobs that require a bachelor’s degree or higher with the number of completions, there is a significant number of occupations that do not have enough worker supply to meet employer demand (Table 3). Job gaps are indicated in red in the table. This implies that there is a shortage of workers for jobs that employers typically require a bachelor’s degree. This stresses the importance of continuing education for job seekers to obtain new and replacement jobs.
Table 3: Demand, Supply and Gaps for Occupations Requiring Bachelor’s Degrees

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Demand(^{12})</th>
<th>Supply(^{13})</th>
<th>Oversupply/Undersupply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales representatives</td>
<td>583</td>
<td>0</td>
<td>-583</td>
</tr>
<tr>
<td>Construction or project managers</td>
<td>759</td>
<td>42</td>
<td>-717</td>
</tr>
<tr>
<td>Energy auditors</td>
<td>43</td>
<td>20</td>
<td>-23</td>
</tr>
<tr>
<td>Photovoltaic installers</td>
<td>39</td>
<td>0</td>
<td>-39</td>
</tr>
<tr>
<td>Photovoltaic designers</td>
<td>24</td>
<td>0</td>
<td>-24</td>
</tr>
<tr>
<td>HVAC technicians</td>
<td>14</td>
<td>0</td>
<td>-14</td>
</tr>
<tr>
<td>Plumbers</td>
<td>9</td>
<td>0</td>
<td>-9</td>
</tr>
<tr>
<td>Documentation specialists</td>
<td>6</td>
<td>0</td>
<td>-6</td>
</tr>
<tr>
<td>Electricians</td>
<td>2</td>
<td>0</td>
<td>-2</td>
</tr>
<tr>
<td>Solar water heater installers</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Weatherization specialists</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total Demand, Supply and Gaps</strong></td>
<td><strong>1479</strong></td>
<td><strong>62</strong></td>
<td><strong>-1417</strong></td>
</tr>
</tbody>
</table>

For employers that require a minimum of an associate degree for these positions, all occupations except photovoltaic designers, HVAC technicians, plumbers and electricians have a supply gap (Table 4). Despite this, employer demand for workers with at least an associate degree is greater across all occupations than demand for bachelor’s degree or higher. This indicates that there are significant work opportunities in all occupations for trainees that obtain certificates or two-year degrees.

Table 4: Demand, Supply and Gaps for Occupations Requiring Associate Degrees or Less

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Demand(^{14})</th>
<th>Supply(^{15})</th>
<th>Oversupply/Undersupply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction or project managers</td>
<td>379</td>
<td>0</td>
<td>-379</td>
</tr>
<tr>
<td>Sales representatives</td>
<td>411</td>
<td>53</td>
<td>-358</td>
</tr>
<tr>
<td>Photovoltaic installers</td>
<td>273</td>
<td>63</td>
<td>-210</td>
</tr>
<tr>
<td>Energy auditors</td>
<td>115</td>
<td>20</td>
<td>-95</td>
</tr>
<tr>
<td>Weatherization specialists</td>
<td>19</td>
<td>0</td>
<td>-19</td>
</tr>
<tr>
<td>Documentation specialists</td>
<td>11</td>
<td>0</td>
<td>-11</td>
</tr>
<tr>
<td>Solar water heater installers</td>
<td>8</td>
<td>0</td>
<td>-8</td>
</tr>
<tr>
<td>Photovoltaic designers</td>
<td>29</td>
<td>63</td>
<td>34</td>
</tr>
<tr>
<td>HVAC technicians</td>
<td>193</td>
<td>381</td>
<td>188</td>
</tr>
<tr>
<td>Plumbers</td>
<td>90</td>
<td>360</td>
<td>270</td>
</tr>
<tr>
<td>Electricians</td>
<td>8</td>
<td>456</td>
<td>448</td>
</tr>
<tr>
<td><strong>Total Demand, Supply and Gaps</strong></td>
<td><strong>1536</strong></td>
<td><strong>1396</strong></td>
<td><strong>-140</strong></td>
</tr>
</tbody>
</table>

Given that there are supply gaps for construction and project managers, solar photovoltaic installers, sales representatives and energy auditors, there is opportunity for expanded program offerings at two-year and four-year institutions.

\(^{12}\) Demand is based on the number of job openings (new and replacement) that employers that require at least a bachelor’s degree expect to be available between 2014 and 2015.

\(^{13}\) Supply is based on the number of people who successfully complete bachelor degree programs related to the occupation.

\(^{14}\) Demand is based on the number of job openings (new and replacement) that employers that require an associate degree or less expect to be available between 2014 and 2015.

\(^{15}\) Supply is based on the number of people who successfully complete associate degree programs related to the occupation.
In addition to identifying job gaps, analyzing employer difficulty in hiring for specific occupations helps determine potential skills gaps that need to be addressed by workforce training programs. If the region produces a surplus of candidates for a certain occupation, but employers are still having difficulty filling those positions, then there is a potential skills gap that in the programs. This issue needs to be addressed by updating educational and training programs’ curriculum to meet employers’ technical needs.

As previously reported, Clean Energy employers in general do not have difficulty finding qualified workers; however, employers did report difficulty in hiring for specific occupations (Figure 17). Employers have the most difficulty finding qualified applicants for occupations that are most related to the Renewable Energy subsector: solar water heater installers, solar photovoltaic installers and photovoltaic designers. These are occupations that have been developed due to the high demand of Clean Energy services and products.

**Figure 17: Percent of Employers with Difficulty in Finding Qualified Applicants by Occupation**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Great difficulty</th>
<th>Some difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar water heater installers</td>
<td>20%</td>
<td>40%</td>
</tr>
<tr>
<td>Solar photovoltaic installers</td>
<td>10%</td>
<td>40%</td>
</tr>
<tr>
<td>Photovoltaic designers</td>
<td>7%</td>
<td>33%</td>
</tr>
<tr>
<td>Sales representatives</td>
<td>9%</td>
<td>30%</td>
</tr>
<tr>
<td>HVAC technicians</td>
<td>6%</td>
<td>31%</td>
</tr>
<tr>
<td>Plumbers</td>
<td>15%</td>
<td>20%</td>
</tr>
<tr>
<td>Electricians</td>
<td>5%</td>
<td>27%</td>
</tr>
<tr>
<td>Weatherization specialists</td>
<td></td>
<td>31%</td>
</tr>
<tr>
<td>Construction or project managers</td>
<td>6%</td>
<td>22%</td>
</tr>
<tr>
<td>Energy auditors</td>
<td>6%</td>
<td>19%</td>
</tr>
<tr>
<td>Documentation specialists</td>
<td>13%</td>
<td></td>
</tr>
</tbody>
</table>

Based on supply gaps and difficulty hiring, solar photovoltaic installers appear to be the occupation that the workforce development system could focus training on. Not only is this occupation one of the top five occupations with supply gaps, 50 percent of employers reported having difficulty in filling this position. Another occupation to note is solar water heater installers. Although the demand for solar water heater installers appears low, this occupation has the highest percentage of employers (60 percent) reporting at least some difficulty in filling this position. This implies that solar water heater installers are highly specialized and require skill sets that employers find difficult to obtain.

**CONCLUSIONS AND RECOMMENDATIONS**

The Clean Energy sector is a unique and emerging sector in San Diego County. To ensure that the needs of employers are met, educators, trainers and the workforce development systems must work together to ensure a strong future workforce. Job seekers can also take matters into their own hands by seeking skill sets and certifications that will make them competitive in the job market.
Job Seekers

There are significant work opportunities for workers in the Clean Energy sector, job seekers should take advantage of the high demand, but need to stand out from the crowd by differentiating themselves with skills and certifications.

Soft Skills
Employers across all sectors look for job candidates who possess strong soft skills. Specifically for the Clean Energy sector, employers are having difficulties finding workers with problem-solving skills, written and oral communication, applied mathematics, teamwork and collaboration, and basic computer literacy. Job seekers should focus on obtaining and improving these skills in order to be competitive in the workforce.

Experience
For Clean Energy trainees or job seekers, training should include experiential learning, apprenticeship, internship or other on-the-job training. Employers reported that they require electricians to have experience, licensure and the appropriate related training. It is one of the most difficulty occupations for job seekers to be qualified for yet employers do not appear to have significant difficulty in finding qualified applicants. For occupations such as electricians that are very competitive, job seekers could differentiate themselves with extensive hands-on experience.

Professional Licensure
For job seekers to become more competitive in the Clean Energy sector they should obtain professional licensure to show employers the skills that the job seeker possesses. There are a variety of resources available to jobseekers for obtaining professional licensure.

- Energy auditors may obtain professional certifications in areas such as building performance (building analysis, envelope professional, as well as heating, ventilation, and air conditioning installation, operation, and maintenance) and advanced home energy (energy auditing, retrofit installation, quality control inspection) through Building Performance Institute, Inc. 16 (BPI).
- Solar employees can obtain professional licensure in photovoltaic and solar water heating sales or installation through the North American Board of Certified Energy Practitioners 17 (NABCEP). NABCEP also offers certifications for small wind installation.
- California’s Department of Industrial Relations provides professional certification programs for electricians, which is required by the state for any employee working as an electrician.
- While plumbing licensure is less important to employers than electrical licensure, the California Apprenticeship Coordinators Association offers a five-year apprenticeship program, providing 9,000 hours of on-the-job training and 1,080 hours of classes. Additionally, the Contractors State License Board offers a licensing program for anyone in the construction industry, including plumbing.

Education Providers and Workforce Development

Due to the size and expected growth in the Clean Energy sector in San Diego County and limited resources and time, the workforce development system should focus on the Energy Efficiency subsector, specifically on installation positions in San Diego County. While the sector as a whole is not having much difficulty finding qualified workers, specific occupations are struggling to find acceptable job candidates.

Differentiation
With many construction workers still unemployed since the Great Recession, the labor market for Clean Energy occupations, particularly those that are trade-related, is very competitive. Training providers need to train beyond the minimum requirements of these occupations and ensure that their trainees have

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16 BPI develops energy efficiency standards as well as professional certifications for individuals and companies
17 NABCEP is a North American certification organization for individuals seeking professional certification in a variety of solar industry professions.
sufficient “differentiators” in their skill sets to increase their chances of securing a job when training is complete. While employers may state that they prefer rather than require a particular skill set or certification, a job applicant will be more marketable to employers with those preferred skills than a job applicant without them.

Adaptable/Transferable Skills
Educators should focus instruction on skills that are easily transferable between Clean Energy occupations. Being adaptable in the work environment makes job candidates more appealing to employers. This can include knowledge of materials used in Clean Energy installation and construction, as well as knowledge of policies and regulations in the sector. The latter is especially important for sales representatives who should be well versed in tax credits and governmental regulations on energy resources. Employers are looking for candidates who have strong occupation-specific skills, but can also transfer that knowledge to other projects.

Long-term unemployed workers have the requisite work experience, but may be lacking in new Clean Energy-specific skills and employer expectations. Upgrading the skills that these workers will help them to have an increased chance of being hired.

Soft Skills
While technical skills may be paramount to employers, non-technical skills, such as communication and problem-solving, can be important to distinguish candidates in a competitive environment. Focusing on these skills earlier in the education pathway (starting in the K-12 system) could help to mitigate the lack of non-technical or soft skills in job applicants.

Non-technical skills are important to employers and can be developed through training. One method for improving communication and problem solving skills in the classroom is role-play. Scenarios can help students hone their job skills and make them more effective employees, in addition to giving them important talking points during job interviews.

Given the very low levels of reported hiring difficulty, these programs must ensure they offer trainees demonstrably superior skills to increase their chances for employment. Therefore, while program expansion at this point may not be warranted, there is a clear need for programs to follow continual improvement in training that reflects changing technologies and associated skill sets. Due to the limited need for programmatic expansion, educators should consider this a prime time to collaborate with institutions across the region to provide clear and consistent career pathways for students in order to effectively enter the workforce.

“Good Fit” Component
Nearly half of the employers in this sector have fewer than five employees. For job seekers, this means that “fit” will matter a great deal to employers. Because they make up a large portion of the overall workforce at a small business, each new worker can change the work environment and culture dramatically. As a result, decision-makers will want to ensure that personalities mix well. Poor hiring decisions may severely impact a small company as it becomes impossible to overlook inadequate or unsatisfactory employees in smaller firms.

Employers also noted the importance of workers who demonstrate hard work, good communication, and excellent teamwork skills. These microbusinesses need to be able to react to markets quickly to stay alive, and expect that their workers will try new tasks and be willing to learn new things.

Apprenticeships
On-the-job training and apprenticeship programs are important vehicles for providing the necessary work experience required by employers. While apprenticeships are expensive, employers emphasize the importance of exposure to a work environment as an important precursor to attaining a job.
Knowing the importance of apprenticeships in today’s job market, President Obama has designated particular attention and legislative action to the creation of apprenticeships and training programs. The President’s American Apprenticeship Initiative amounts to a $600 million investment in partnerships dedicated to developing relevant training programs for current industry needs. Jobs for the Future, a nonprofit organization, is currently working on their GreenWays Initiative, which trains adults in sectors of the green economy such as manufacturing, construction of energy efficient buildings, urban forestry, renewable technologies, and transportation. However, many firms and employers are unaware of such funding programs, making it imperative that the workforce development system highlights these prospects.

Job Placement
Placement is a significant challenge. Many training programs operate under the assumption that large firms will hire cohorts of workers and that connecting to a few local businesses is all that is required to successfully place candidates. In today’s economy, small firms are less likely to hire such large cohorts of similarly trained workers. These firms often want someone with a specific technical skill set to round out their teams. At the same time, they may only hire once every several years, which suggests that job developers and business service representatives should reach out to small businesses to build relationships in time for the next hiring phase.

The growth of small businesses in the subsector and the very specialized needs of employers, together with an abundant supply of experienced workers all contribute to placement challenges within training programs. Throughout the country, the most successful training programs, in terms of placement, are those that develop strong, ongoing relationships with employers in their region. This type of relationship management cannot be an afterthought and is not a part time job, which means that training providers and placement agencies need to allocate more time and resources to business development in order to improve the chances of their trainees obtaining jobs.

Investment in Technology
Rather than expanding existing programs, Clean Energy training programs should invest in technology to maintain the changing skill sets within this sector. With 65 percent of employers having no difficulty in hiring quality workers, the workforce development system will have to focus on technology to generate the technical skills that differentiate their trainees from the rest of the competition.