California's Path to 12,000 Megawatts of Local Renewables

Governor's Local Renewable Power Working Conference

Segmenting the Governor's Localized Energy Goal Panel

Discussion Paper # 1

ISSUE OVERVIEW

The Governor's Clean Energy Jobs Plan sets a goal to develop 12,000 megawatts (MW) of localized electricity generation by 2020. Achieving that goal is a major undertaking, but like any large task, breaking it down into its component parts can provide a starting point for moving forward. Other panels at this conference will address the opportunities and barriers to distributed generation, and the issues typically vary throughout the state depending on local jurisdictional and infrastructure issues as well as resource potential. For the most part, these projects are interconnected to the local distribution grid which is not homogenous throughout the state, and locational characteristics affect project development costs. Also, identifying low-income communities and opportunities for job creation can inform the development of regional targets. Thus, regional targets that build up to the 12,000 MW goal is a good starting point to help advance meeting and measuring progress. In this paper, Energy Commission staff proposes a bottom-up approach based on market activity to date, with a policy emphasis on supporting low-income communities.

SUMMARY

This is an Energy Commission staff analysis for developing regional targets that build up to the Governor's statewide goal to develop 12,000 megawatts (MW) of localized generation. This analysis is a work in progress and staff welcomes comments. This analysis does not include an estimate of costs.

For the purpose of this analysis, staff defines localized generation as renewable distributed generation projects 20 MW and smaller that are interconnected to the distribution or transmission grid. The scope includes both behind the meter installations to serve on-site load and projects that produce excess energy for wholesale. The analysis is intended to be technology neutral and includes solar, biomass, geothermal, wind, fuel cells using renewable fuel, and small hydro. Staff's analysis includes data from the beginning of the California Solar Inititative in 2007 and extends projections to 2020.

Staff's analysis is organized into three components:

- Behind the Meter – Staff assumes that the state would meet the goal of SB 1 to develop 3,000 MW of rooftop solar and extends current market trends to estimate regional development toward that goal by 2020. Staff assumes that market trends in the past are a proxy for the resource availability, interconnection availability, and local policies going forward. By 2020, staff assumes development of 3,300 MW on existing residential, commercial buildings; 564 MW of localized generation in low-income communities;150 MW on new homes such that the SB 1 goal of building 50 percent of all new homes with solar power is achieved; and 700 MW in publicly owned utility service territories to meet their SB 1 goal. Staff also included estimates of the potential for wind and biomass development behind the meter, 200 MW and 255 MW, respectively. For the Self Generation Incentive Program and Emerging Renewables Program, staff assumes a combined total of about 24 MW will be developed. In total, staff estimates about 5,210 MW of behind the meter development.

- Wholesale Generation – Staff also estimates regional development of wholesale distributed generation. Staff assumes that proposed, wholesale distributed generation facilities 20 MW and smaller that are under contract or are going through the environmental review process would be developed. Staff recognizes that some portion of projects will fail, but assumes that projects under contract or in environmental review show a level of investment at specific sites that may be indicative of future market interest. Staff also assumes that 700 MW would be developed as a result of feed in tariff programs in Los Angeles (600 MW) and in the Sacramento Municipal Utility District (100 MW) service territory. Staff identifies about 3,420 MW of wholesale generation.

- Distribution Grid Interconnection Capacity –Staff estimated available capacity to install generation on the distribution system to verify the feasibility of further regional goals. Staff identifies roughly 11,000 MW of technical potential capacity to interconnect in the investor-owned utilities' (IOUs) service territories. This category is not defined as wholesale or behind the meter, but rather could be any mix of the two applications. Also, this category is not technology specific and could include solar, wind, biomass, fuel cells fueled by renewable resources, and perhaps small hydro. Staff combined the region-specific wholesale data and behind the meter data for a total of 8,630 MW. Staff assumed that the remaining 3,370 MW needed to meet the 12,000 MW goal would be developed to meet the Governor's policy goals, keeping in mind the constraint of available capacity on the distribution grid. Staff is assuming that the remaining 3,370 could be either behind the meter or wholesale and could be any number of technologies.

Staff compiled the data into targets for 13 geographic regions based on the following county groupings:

- Inland Empire: San Bernardino, Riverside
- Central Valley: Kern, Kings, Tulare, Fresno, Madera, Merced, Stanislaus
- Sacramento Region: San Joaquin, Solano, Sacramento, El Dorado, Placer, Nevada, Yuba, Sutter, Yolo
- East Bay: Contra Costa, Alameda
- Central Coast: Santa Cruz, San Benito, Monterey, San Luis Obispo, Santa Barbara, Ventura
- Los Angeles (both city and county)
- Orange County
- San Diego County
- Imperial
- SF Peninsula: San Francisco, San Mateo, Santa Clara
- North Bay: Sonoma, Napa, Marin
- Sierras: Amador, Calaveras, Alpine, Tuolumne, Mariposa, Mono, Inyo
- North Valley: Lake, Colusa, Glenn, Butte, Sierra, Plumas, Mendocino, Tehama, Lassen, Shasta, Trinity, Humboldt, Del Norte, Siskiyou, Modoc

The table below shows staff's estimates by region for development of behind the meter, wholesale, and an undefined mix of behind the meter and wholesale projects.

Table 1: Summary of Proposed Regional Targets by 2020

Region	Behind the Meter (all technologies)	Wholesale	Undefined Mix (mix of behind the meter and wholesale)	Total
Central Coast	280	90	0	370
Central Valley	830	1590	0	2420
East Bay	420	30	0	450
Imperial	50	90	0	140
Inland Empire	480	430	0	910
Los Angeles*	970	860	2170	4000
North Bay	220	0	0	220
North Valley	120	50	0	170
Sacramento Region	410	170	220	800
San Diego	500	50	630	1180
SF Peninsula	480	10	310	800
Sierras	30	40	0	70
Orange	420	10	40	470
Total	**5,210**	**3,420**	**3,370**	**12,000**

*city and county of Los Angeles
Source: Energy Commission Staff

For breakout discussions at the Governor's Conference, the regions have been aggregated into the following five groupings:

- **San Diego/Inland Empire:** Counties include San Diego, Riverside, San Bernardino, and Imperial
- **Greater Los Angeles/ Orange County:** Counties include LA and OC
- **Central Coast/ Greater Bay Area:** Counties include Santa Cruz, San Benito, Monterey, SLO, Santa Barbara, Ventura, Contra Costa, Alameda, Sonoma, Napa Marin, San Francisco, San Mateo, and Santa Clara.
- **Northern California:** Counties include San Joaquin, Solano, Sacramento, El Dorado, Placer, Nevada, Yuba, Sutter, Yolo, Lake, Colusa, Glenn, Butte, Sierra, Plumas, Mendocino, Tehama, Lassen, Shasta, Trinity, Humbolt, Del Norte, Siskiyou, and Modoc.
- **Central Valley/Central Sierras:** Kern, Kings, Tulare, Fresno, Madera, Merced, Stanislaus, Amador, Calaveras, Alpine, Tuolumne, Mariposa, Mono, Inyo.

BACKGROUND

Staff presented a previous iteration of these regional targets at the Energy Commission's May 9, 2011 Integrated Energy Policy Report (IEPR) Committee

Workshop titled "Distributed Generation – Getting to 12,000 MW by 2020." Staff anticipates that the 2011 IEPR will include a discussion of regional goals reflecting input from staff, the public, and policy makers. [1]

The analysis presented here is similar to what staff presented at the May 9 IEPR workshop; both use a bottom-up approach based on market activity. The current analysis has been modified to reflect public comments from the workshop and continued staff analysis.[2] Changes from the May, 2011 analysis includes the following:

1) more emphasis on development in low income areas

2) an estimate of the potential capacity to interconnect on local distribution lines

3) a broader mix of technologies

4) a category of "undefined mix" instead of allocating all capacity as either behind the meter or wholesale. In this sense, the current analysis is less prescriptive and more open to future market developments.

5) the targets are allocated by region instead of county

More information about the preliminary methodology that staff presented on May 9 is available at:
http://www.energy.ca.gov/2011_energypolicy/documents/index.html#05092011

METHODOLOGY

Behind the Meter

Staff assumed that the state's SB 1 goals will be met through the continuation of current market trends. Described below is the methodology for developing regional targets for the California Solar Initiative, Multifamily Affordable Solar Housing program, Single-family Affordable Solar Homes program, New Solar Homes Partnership, Self Generation Incentive Program and Emerging Renewables Program, and Publicly

---

[1] The Scoping Order for the 2011 IEPR is available at:
http://www.energy.ca.gov/2011_energypolicy/notices/2011-03-30_Revised_Scoping_Order.pdf

[2] Staff's presentation and public comments from the workshop are available at:
http://www.energy.ca.gov/2011_energypolicy/documents/index.html#05092011 A total of 31 parties representing utilities, environmental groups, developers, environmental justice advocates, and local government provided written comments to the Energy Commission.

Owned Utility SB 1 programs. To include non-solar technologies behind the meter, staff also estimated potential wind and biomass development by region.

- California Solar Initiative (CSI):

  Data source for PV installation:
  http://www.californiasolarstatistics.org/current_data_files/

  The CSI program provides two data sets to the public, a working data set and a raw data set. Staff used the working data set because applications with data errors were removed from it. Staff included projects that were installed, received funding, or for which funding was reserved between January 1, 2007 and June 15, 2011[3].

  Staff categorized projects by year based on the "First Reservation Request Review Date". Staff used this filter because it was identified for all projects regardless. Staff made the following assumptions:

  - There were a few projects that had a "First Reservation Request Review Date" from the end of 2006. These projects were added to the 2007 category.
  - Due to budgetary constraints, the CSI program is not currently issuing reservations, but is still accepting applications. These applications are added to a waitlist and will be processed as funding becomes available. Staff assumed that additional funding for the CSI program would become available in 2012, and so all waitlisted projects were added to the 2012 category.

- Because the data points were kilowatts (kW) reserved annually, and the CSI program is not currently issuing reservations, staff assumed that the capacity reserved to date in 2011 would be the total capacity reserved for the entire year.[4] Staff then used project location information to categorize each project by the 13 regions used in this analysis.

---

[3] Staff included all projects that had a current status of "reservation" or a stage beyond that. Staff included projects that had a status of "Pending RFP-Reservation Reserved", "Pending Payment" and "System Removed". Staff did not include projects that had a current status of "Cancelled" or "Withdrawn".

[4] Using the reservations that had occurred so far for 2011 to represent the reservations for all of 2011 would have affected the trends for some regions more than others, especially those areas

Staff identified the number of MW reserved per region and assumed the same trends would continue until the goals of the California Solar Initiative were met. The data from 2007 to 2011 were plotted and the best fitting trend line was selected to come up with regional projections through 2020. The projection for the CSI program is 3,330 MW.

- Multifamily Affordable Solar Housing (MASH):

  The California Public Utilities Commission (CPUC) implements the MASH program to provide incentives for PV development on existing, low-income multifamily residences. The MASH program is one of the California Solar Initiative's two low-income programs. The MASH program is structured to offer incentives under two "tracks." Although Track 1 is now closed, it provided up-front incentives for eligible photovoltaic (PV) installations on low-income residential units or common areas. Track 2 is still open and provides incentives through a bid process. Staff used program data for Track 1 incentives for PG&E, Southern California Edison (SCE) and San Diego Gas and Electric (SDG&E). Staff chose not to use Track 2 data because there is an inconsistent correlation between project size and rebate level which made it problematic to extrapolate trends.

  To estimate how much solar could have been installed if MASH continued through 2020, staff first identified the duration of the Track 1 program for each utility. PG&E's, SCE's and SDG&E's programs lasted 9, 12, and 17 months, respectively.[5]

  Staff extrapolated program activity to the end of 2020 assuming that it would have remained constant over time. For each utility, staff divided the amount of time from the end of the program to 2020 by the program duration. This resulted in a factor of 15 for PG&E, 11.25 for SCE, and 8 for SDG&E 8. Staff multiplied these factors by the number of MW installed in each county at the close of Track 1. The result was 244 MW of potential PV installation in multifamily low-income housing.

- Single-family Affordable Solar Homes (SASH):

---

that had seen a high number of reservations in the previous year or two, and then showed a large drop in 2011 due to only having a half year of reservations.

[5] http://www.cpuc.ca.gov/NR/rdonlyres/C0EEF9DF-1EF4-4C9A-965D-683205D59293/0/MASHSemiAnnualProgressReport_July2010.pdf, page 14.

The CPUC also oversees the SASH program which provides incentives for PV installations on eligible, existing, low-income homes. The SASH and MASH programs are the two low-income programs of the CSI. The SASH PV-solar incentive is available to qualifying low-income homeowners in the PG&E, SCE, and SDG&E service territories.[6]

The CPUC contracted with Navigant to do a market assessment of the SASH program. Navigant concluded that there are 128,000 SASH eligible households in Enterprise Zones (EZs) in the IOU service territories.[7] With an average system size of 2.5 kW in the SASH program,[8] single-family low income homes represent a market potential of 320 MW.

Staff used current SASH data to estimate the regional distribution of installations, assuming that the all 128,000 eligible households identified by Navigant installed PV. Staff first identified the county and then EZ for systems installed in a county with an EZ. Although there are 42 EZs in the state, the SASH data only covers the IOU service territories. Also, not all EZs have participated in SASH. Consequently, staff calculated the percent of installations in each EZ relative to all installations in EZs and then multiplied this percentage by the 128,000 household potential. Staff then multiplied the number of homes in each county by the average 2.5 kW project size to estimate SASH development per region.

- New Solar Homes Partnership (NSHP)

  The NSHP is administered by the Energy Commission and provide rebates for PV installations at newly constructed homes. Staff accounted for projects approved for reservation from January 1, 2007 – July 7, 2011 by county. This totals about 31.5 MW. Staff assumed that the 400 MW NSHP program target would not be met due to the following reasons:

  - The depressed housing market.

---

[66] California Public Utilities Commission, "Single-family Affordable Solar Homes (SASH) Program Q1 2011 Program Status Report," April 2011, www.cpuc.ca.gov/NR/rdonlyres/BE2A2B11-A16A-4687-A556-39E337E9F1E4/0/2011Q1SASHREPORT.pdf

[7] Page 27: http://www.cpuc.ca.gov/NR/rdonlyres/EB601615-61B3-43B2-B034-EEC95AF46708/0/CSISASHandMASHMarketAssessmentReport.pdf

[8] Page 8, http://www.cpuc.ca.gov/NR/rdonlyres/BE2A2B11-A16A-4687-A556-39E337E9F1E4/0/2011Q1SASHREPORT.pdf

- The NSHP program is for new residential construction. Projects reserved for this program may not be realized for one to three years and the PV installation is dependent upon the builder obtaining and maintaining financing for the construction of the new home(s).
- The incentive for the PV system is tied to the new home achieving specified energy efficiency levels. Even with decreasing equipment costs, builders may not be able to afford the costs associated with achieving the required energy efficiency levels.

Staff assumed a slower growth trajectory for the new homes market, returning to the 150,000 new unit level of the early 2000s, but not the highs of 2004 to 2006.[9] Staff assumes that the program will be successful in achieving its goal of placing PV systems on 50 percent of new homes by the end of the program. Staff's analysis of the NSHP installations shows that the average size for all installed or reserved systems is 2.63 kW. Excluding installations and reservations for common areas, the system size decreases to 2.38 kW. Staff assumed an average system size of 2 kW in part to reflect a market trend toward smaller systems[10]. Also, the assumption that system sizes will continue to get smaller reflects the NSHP program emphasis on properly sized systems. As the energy efficiency requirements increase, the systems should be smaller. Based on the assumed level of housing starts and applying an estimated average system size of 2 kW, staff estimated that 150 MW would be installed through NSHP.

Staff categorized systems by year of their payment approval date. In the NSHP program, developers apply for funds and then make a payment claim after the project is complete. Staff assumed that all NSHP applications would result in completed projects within the timeframes required by the program as follows:

- Staff assumed that systems reserved in 2007 that have not yet received an incentive payment would be completed in 2011, systems reserved in 2008

[9] http://www.cbia.org/go/cbia/?LinkServID=FE5ED931-F09E-44C7-96836630388F21F7&showMeta=0

[10] http://www.cbia.org/go/cbia/government-affairs/cbia-reports1/june-18-2010/square-footage-shrinking-in-new-american-homes/?keywords=new
http://www.nahb.org/news_details.aspx?newsID=11485&fromGSA=1

would be completed in 2012, and systems reserved in 2009 would be completed in 2013. These completion dates correspond to the latest possible date before the project application expires.

  - Staff assumed that systems reserved in 2010 that have not yet received an incentive payment would be completed in 2012, and unpaid systems reserved in 2011 would be completed in 2013. Staff assumed these systems would be completed and would receive payment in 2 years instead of 3 years because changes to the NSHP program which allow housing developments to be split up into multiple applications. This allows applicants to apply for funds in timeframes that better match their build-out schedules.
  - Since available 2011 payment data only accounts for half of the year, staff assumed an equal capacity of systems would be paid in the second half of the year.

  Staff then calculated the installed capacity from 2007 to 2011 per region and the percentage of capacity per region. The percent for each region was then multiplied by 150 MW to estimate the MW per region in 2020.

- Publicly Owned Utilities (POUs)

  Staff assumes that the POUs will meet their SB 1 targets. Collectively, the target for all POUs is 700 MW.

  City of Lompoc and Plumas-Sierra Electric Cooperative did not provide the Energy Commission with their SB1 MW goals. To determine their MW projections, staff developed a trend line with the existing data from 2007 to 2010 and the projections for 2011 through 2016 are based on the extension of the trend line.

- Self Generation Incentive Program and Emerging Renewables Program

  Staff identified DG installations under the CPUC's Self Generation Incentive Program (from 2007 to present) and all non-PV installations under the Energy Commission's Emerging Renewables Program from 2007 to April 28, 2011.

  The data for the Self Generation Incentive Program is available at: https://energycenter.org/index.php/incentive-programs/self-generation-incentive-program/sgip-documents/sgip-documents

  Staff first categorized the projects by year based on their payment date. They were further categorized by county and then region. The statewide total is 22 MW.

The data for the Emerging Renewables Program is available on line at: http://www.energy.ca.gov/renewables/emerging_renewables/index.html

Staff first categorized the projects by year based on their payment date, then by county and region. The regional totals added up to 1.92 MW.

- Estimate of Biomass and Wind Potential

Staff made a rough estimation of biomass potential from dairy cattle populations. Preliminary work from Central Valley Dairies[11] indicates that every 6,000 cattle can produce 1 MW of electricity production from manure. Staff selected counties with dairy cattle populations greater than 6,000 and concluded that the potential from manure is about 255 MW.

To estimate wind potential, staff used an estimate from Foundation Windpower[12] which identified about 100 MW of projects in various stages of construction, permitting, development, negotiation, or proposal. Foundation Windpower also stated that they believe there is at least an additional 100 MW of potential projects in California. The table below shows the estimates of wind potential by region.[13]

Table 2: Allocation of Small Wind Potential by Region

Region	MW
Central Valley	30
North Bay	10
Los Angeles	10
East Bay	20
Central Coast	50
Inland Empire	50
Imperial	10
Orange County	10

[11] Personal correspondence with Paul Fukumoto of Flex Energy on July 6, 2011.

[12] Personal correspondence with John Pimentel of Foundation Windpower on July 13, 2011.

[13] Foundation Windpower suggested 20 MW wind in Orange and San Diego Counties combined. For the purpose of this regional analysis, staff assumed 10 MW in each county.

San Diego County	10
TOTAL	**200**

Wholesale Distributed Generation

Energy Commission staff is maintaining a list of renewable energy projects sized 20 MW and smaller that are under environmental review at the state or local level in California in 2010, 2011, and 2012.[14] The Energy Commission also maintains databases for renewable facilities under contract to the investor-owned utilities (IOUs) and the publicly owned utilities (POUs).[15]

The IOU contract database is available at:
http://www.energy.ca.gov/portfolio/IOU_Contract_Database.xlsx

The POU contract database is available at:
http://www.energy.ca.gov/2008publications/CEC-300-2008-005/CEC-300-2008-005_rev.xls

Staff carefully reviewed the Energy Commission's IOU and POU contracts databases and the environmental review project database to remove projects that were online before 2007, located out of state, were behind the meter, or exceed 20 MW, including project expansions that increased the overall project size to a capacity of more than 20 MW. Staff also removed projects that were determined likely to fail, such as a tidal generation project. However, staff does not have detailed information on all the projects to make these determinations, and as a result there may be minimal double counting or inclusion of projects that serve on-site load. Staff identified 645 MW under contract and 2,320 MW going through environmental review at the local level, and about 197 MW both under contract and environmental review.

Staff intended to identify projects under contract or in environmental review that were also in the distribution and transmission interconnection queues, but were only able to obtain the necessary data to identify the projects located in the California Independent System Operator's (CAISO) generation interconnection procedure (GIP) queue. Staff did this analysis through a review of confidential data received from the CAISO from a quarterly subpoena. To date, staff has been unable to determine the WDAT queue

[14] The data on environmental reviews used for this analysis was last updated on June 14, 2011.

[15] For this analysis, staff used the database on IOU-RPS contracts that was last updated in April, 2011 and the POU database was last updated November 17, 2010.

status of the projects due to Federal Energy Regulatory Commission restrictions on data confidentiality.

Next, staff assigned regions to the wholesale projects by the county in which the project is located. Staff used Microsoft Excel's pivot table function to divide the projects into the categories shown below, also by region and technology.

a. Wholesale projects that are online, 50 MW

b. Wholesale projects in the environmental review database, the IOU or POU contracts database, and the GIP interconnection queue, 20 MW

c. Wholesale projects in the IOU or POU contracts database and the environmental review database, 197 MW

d. Wholesale projects in the IOU or POU contracts database and the GIP interconnection queue, 0 MW (one project would qualify for inclusion in this category, but because it is also under environmental review, the project is included under bullet "b.")

e. Wholesale projects in the GIP interconnection queue and the environmental review database, 169 MW

Estimated Potential for Interconnection at the Distribution Level

For this final piece of analysis, Energy Commission staff investigated California's distribution infrastructure, hoping to gain visibility into which geographic areas had capacity to interconnect distributed generation projects without requiring extensive upgrades. Following the CPUC Rule 21 guidelines, staff estimated total distributed generation interconnection capacity by first applying a screen based on "15% of the distribution line section annual peak load,"[16] commonly referred to as "excess capacity." Next, staff estimated region's total available capacity by adding in its queued and waitlisted CSI and NSHP capacity, and its previously calculated wholesale capacity. This final number, a region's total capacity available for localized generation, estimates a cap on feasible interconnections on current infrastructure.. Staff assumes that projects developed in areas with available capacity will have low interconnection costs. However, staff recognizes that application of the 15% screen does not guarantee that project development will not require costly circuit upgrades to accommodate

[16] CAISO's Small Generator Interconnection Procedures: http://www.caiso.com/27c3/27c3ecd2556e0.pdf.

interconnection. Also, staff recognizes that although a line may have interconnection capacity, there may not be adequate space available to develop a project, or there may be other site constraints that preclude development.

Staff generated estimates for 9 of its 13 identified regions. For this effort, the Energy Commission requested substation capacity information calculated under the CPUC's Renewable Auction Mechanism procurement program from the state's three largest investor owned utilities. The utilities made this data available to the public in a limited fashion through the Renewable Auction Mechanism maps, which are accessible through each utility's website. Considerable heterogeneity exists between different utilities' data, which constrained staff's ability to conduct the analysis. PG&E provided geographic data for all of its substations; SCE and SDG&E did not. For this reason, staff made the simplifying assumption that all of SDG&E's substations were in San Diego County, despite the fact that SDG&E's territory extends into southern Orange County. The Energy Commission staff did not obtain data from publicly owned utilities or smaller investor owned utilities, and therefore does not have excess capacity numbers for Imperial County, Los Angeles, Orange County, or the Inland Empire. The numbers provided for Central Coast, Central Valley, East Bay, North Bay, North Valley, SACOG, SF Peninsula, and Sierras only reflect capacity on the PG&E distribution grid.

SCE provided interconnection potentials that were originally calculated for their Solar Photovoltaic Program (SPVP). This program sought to encourage the installation of 1 to 2 MW rooftop solar PV systems. SCE capped each line's interconnection potential at 2 MVA, following the Merchant Plant interconnection under the federal WDAT application. This cap remained in place for the numbers provided for staff's analysis, making it unclear just how reflective the provided capacities are of SCE's true interconnection potential. Instead, staff attempted to use public information from SCE's RAM program.[17] Unfortunately, SCE's RAM maps identify only preferred geographic areas for interconnection, without including any indication of an area's interconnection potential. Nevertheless, SCE has stated that their RAM program target is 500 MW; looking at the maps provided, Energy Commission staff estimate that at least one tenth of this appears to be along the Central Coast. Based on these basic parameters, staff added 50 MW of excess capacity to the Central Coast region.[18]

---

[17] The maps are available here: http://www.sce.com/EnergyProcurement/renewables/renewable-auction-mechanism.htm.

[18] Ventura County and parts of Santa Barbara are in SCE's territory, while PG&E serves the rest of the Central Coast region.

Staff used the calculated available capacity for each region as a ceiling for a region's capacity to accommodate relatively inexpensive interconnection, seeking to ground a region's total goal in feasible possibilities for future project development. Ultimately, however, these regional goals reflect policy decisions. Therefore, staff used regional targets set by the Governor's Office[19], which took economic development and resource potential[20] into account, in addition to other considerations, to set their overall distribution. Staff's analysis and projections for wholesale and behind the meter installations resulted in some areas exceeding these regional targets. This meant that the Governor's Office goals were used as a guideline, for the final capacity allocation, but staff's final projections do not perfectly match these original allocations.

The results of this analysis are a rough cut for development potential. As California strives to integrate more distributed generation into the grid, the shortcomings of Rule 21 and its underlying screen have become more apparent. Stakeholders and utilities have convened workshops to revise these guidelines, recognizing that technology, existing distribution and substation infrastructure, and facility characteristics are also important in determining grid impacts.

The resulting goals distribute local generation across the state, focusing on urban centers like Los Angeles and San Diego that have relatively good climate and available space relative to the San Francisco Peninsula and East Bay regions, and areas of high resource potential, like the Central Valley. Staff's final distribution places 571 MW on the Central Coast, 2054 MW in the Central Valley, 682 MW in the East Bay, 147 MW in Imperial County, 1000 MW in the Inland Empire, 3842 MW in Los Angeles, 223 MW in the North Bay, 316 MW in the North Valley, 740 MW in SACOG, 1091 MW in San Diego, 770 MW on the San Francisco Peninsula, 66 MW in the Sierras, and 500 MW in Orange County.

CHALLENGES

[19]Presentation by Michael Picker at the May 6, 2011 Integrated Energy Policy Report workshop, http://www.energy.ca.gov/2011_energypolicy/documents/2011-05-09_workshop/presentations/02b_Off_of_Gov_Picker_Background.pdf

[20] The estimate of technical potential was based on a NREL/Lawrence Livermore study available at the California *Renewable Resource Portal*, January 28, 2010. www.calrenewableresource.llnl.gov/solar/potential-by-county.php

This analysis assumes aggressive development in low income housing areas totaling 564 MW. The analysis assumes that installations under the MASH program's Track 1 continue on the initial program activity trajectory, despite the closure of the rebate due to lack of funding. According to the MASH Semi-annual progress report (ftp://ftp.cpuc.ca.gov/gopher-data/energy_division/CSI/MASHSemi-AnnualProgressReport_Feb 2011.pdf), there has been 2.031 MW installed through Track 1. There is no data on installation for Track 2 but so far only 1.327 MW has been reserved. Staff estimates that if MASH had continued on its current trajectory through 2020, there would be 244 MW installed on multifamily low-income housing. Clearly, there is a large disconnect between program progress to date and the policy direction pursued through these regional targets.

For the SASH program, the methodology assumes build-out of the technical potential in the Enterprise Zones of PG&E, SCE, and SDG&E service territories, totaling about 320 MW. The SASH Program budget is $108.34 million, with $92 million allocated to incentives. As of the first quarter of 2011, a total of 992 homes requested $17 million in incentives, for 2 MW of solar.[21] If SASH continues on its current trajectory, an estimated 5,700 solar homes would be incentivized by the end of the program, for approximately 14.5 MW. Achieving the targets proposed in this paper for low income housing will be extremely challenging.

Another challenge is that some of the most promising, and possibly least-cost, resource areas are in the Central Valley where load is relatively low. Wide-scale development of distributed generation in the Central Valley does little to create jobs in low-income areas, but may be a lower-cost course of development in a time when the state is undergoing a financial crisis.

A challenge in developing this methodology was to getting access to data. For example, staff would like to do additional analysis of the interconnection queue but has not been able to do so to date due to confidentiality issues. Also, staff was unable to obtain regional specific information on locations on the distribution grid where there is capacity available to allow for a streamlined interconnection process. Lack of information about the distribution grid is also a challenge for developers. However, even when developers have information about the best places to develop, they may still prefer to develop in areas that are not beneficial to the distribution grid and require costlier interconnection.

---

[21] http://www.cpuc.ca.gov/NR/rdonlyres/BE2A2B11-A16A-4687-A556-39E337E9F1E4/0/2011Q1SASHREPORT.pdf

Also, this methodology largely builds off of market trends as a proxy for future development. This approach does not account for new developments that are not yet considered in the market.

Another challenge is developing a common definition of a renewable localized generation facility to clarify discussion and planning related to achieving the Governor's goal for 12,000 MW of renewable localized generation by 2020. The following initial definitions have been proposed by Energy Commission staff as a starting point for further discussion.

- ***Renewable localized electricity generation*** – electricity generation from an in-state renewable electrical generation facility that is 20 MW or smaller. The facility is located close to where electricity is consumed and may generate electricity for use on-site or generate wholesale electricity.
- ***Central station facility*** — an electric generation facility that interconnects to the electricity transmission system.
- ***Distributed generation facility*** — a small-scale electricity generation facility that interconnects to a distribution network and is generally 20 MW or smaller. Distributed generation facilities may serve on-site or off-site load or both.
- ***Distribution network*** — Utility-controlled network of electrical lines that interconnect homes, buildings, and other customer locations to the electricity system. Some of the electricity customers may be customer-generators with electricity generation facilities that serve on-site, offsite, or both on-site and offsite electricity loads. The voltage of distribution lines varies by utility in California. For example, SCE's distribution network includes 66kV and 115 kV systems. However, SDG&E systems of 138 kV and 69 kV are considered transmission and they are controlled by the California ISO. Similarly, much of PG&E's 115 kV system is also considered transmission.

IMPORTANT QUESTIONS TO PURSUE

This methodology attempts to reflect the policy goal that distributed generation in low-income areas can help stimulate job growth. What other public policy considerations should be built into the targets and how? How should policy makers balance various policy objectives such as protecting ratepayer costs and creating jobs in low-income areas? What are the primary policy drivers of the 12,000 MW goal and how should regional targets reflect those goals?

The State Water Resource Control Board policy on once-through cooling (OTC) is likely to result in the retirement of a large share of the state's gas-fired generation that utilizes this technology between now and 2020. There are currently 15,053 megawatts (MW) of such capacity at 14 locations.[22] What role can distributed generation play in providing any capacity and capacity-related products needed as a result of OTC retirement?

In 2010, coal fired electricity accounted for almost 8 percent of the state's electric power. Nuclear accounted for about 14 percent. How much of the state's coal and nuclear power could be substituted with renewable, localized generation?

Within what agency or other body does the mission to set regional goals reside? Who has the authority to set regional goals?

---

1 A share of this capacity may be found to be in compliance, a share may be able to come into compliance by modifying cooling structures and/or operation, and a share may not be required to come into compliance until after 2020, pending SWRCB rulings on requests to push back compliance deadlines. The state's nuclear facilities at San Onofre and Diablo Canyon, totaling 4,486 megawatts (MW) must also comply with the policy, doing so at the time their licenses expire in 2022 and 2024, respectively.