LAWRENCE
LIVERMORE
NATIONAL
LABORATORY

LLNL-TR-489273

Geologic CO2 Sequestration Potential of 42 California Power Plant Sites: A Status Report to WESTCARB

K. B. L. Myers, J. L. Wagoner

June 21, 2011

Disclaimer

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Geologic CO_2 Sequestration Potential of 42 California Power Plant Sites

A Status Report to WESTCARB

Lawrence Livermore National Laboratory

June 2011

LLNL-TR-489273

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344

Geologic CO_2 Sequestration Potential of 42 California Power Plant Sites

A Status Report to WESTCARB

Katherine B. L. Myers and J. L. Wagoner
Lawrence Livermore National Laboratory

Abstract

Forty-two California natural gas combined-cycle (NGCC) power plant sites were evaluated for geologic carbon dioxide (CO_2) sequestration potential. The following data were collected in order to gauge the sequestration potential of each power plant site: nearest potential CO_2 sink, proximity to oil or gas fields, subsurface geology, surface expression of nearby faults, and subsurface water. The data for each site were compiled into a one-page, stand-alone profile to serve as a quick reference for future decision-makers. A subset of these data was compiled into a summary table for easy comparison of all 42 sites. Decision-makers will consider the geologic CO_2 sequestration potential of each power plant in concert with its CO_2 capture potential and will select the most suitable sites for a future carbon capture and storage project. Once the most promising sites are selected, Lawrence Livermore National Laboratory (LLNL) will conduct additional geologic research in order to construct a detailed 3D geologic model for those sites.

Introduction

This work was conducted on behalf of the West Coast Regional Carbon Sequestration Partnership (WESTCARB), which is one of seven partnerships established by the United States Department of Energy (DOE) to evaluate CO_2 capture, transport, and storage technologies best suited to different regions of North America. Co-funded and managed by the California Energy Commission (CEC), WESTCARB's territory comprises seven states (Alaska, Arizona, California, Hawaii, Nevada, Oregon, and Washington) and one Canadian province (British Columbia).[1]

WESTCARB's initial geologic characterization studies examined major sedimentary basins in the region to assess their potential to serve as carbon sinks. Key criteria included overall size, as well as the depth, thickness, porosity, and permeability of sediments. Value-added benefits that may be realized from enhanced oil recovery (EOR) or enhanced coal bed methane recovery (ECBM) were a consideration in the screening process. Some sedimentary basins were excluded because they are too shallow, lack porous or permeable rocks, or have land use restrictions such as those pertaining to wilderness areas or military bases. The screening process in California was conducted by the California Geologic Survey (CGS) as part of a project named WESTCARB Phase I, and the results were published in various WESTCARB reports.[2,3]

---

[1], http://www.westcarb.org, accessed 19 April 2011.

[2],Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[3]Downey, C., and J. Clinkenbeard. 2010. *Preliminary Geologic Assessment of the Carbon Sequestration Potential of the Upper Cretaceous Mokelumne River, Starkey, and Winters Formations—Southern Sacramento Basin, California.* California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2009-068.

CGS's research results from WESTCARB Phase I established the foundation for more detailed geologic characterization, such as this project, which is part of WESTCARB Phase II. Phase II focuses on geologic characterization research at specific, multiple sites to lay the groundwork for commercialization of carbon capture and storage. This project is also a sub-task of a larger, multi-disciplinary, Phase II project with the following title: Assessment of NGCC for CO_2 Capture and Storage in a Gas-Dominated Electricity Market. The goal of the larger project is to consider geologic data in concert with carbon capture-related data to determine which power plant sites should be considered for a capture and storage project.

Methodology

Forty-two California natural gas combined-cycle (NGCC) power plant sites were evaluated for geologic CO_2 sequestration potential. Figure 1 shows site locations. The following data were collected in order to gauge the sequestration potential of each site: nearest potential CO_2 sink, proximity to oil or gas fields, subsurface geology, surface expression of nearby faults, and subsurface water. The data collection methodology is described below. The data for each researched site were compiled into one-page, stand-alone profiles to serve as a quick reference for future decision-makers. The profiles are organized alphabetically in Appendix A of this report. A subset of these data is listed in Table 1, which is a summary table for easy comparison of all 42 sites.

While all 42 California power plant sites were researched, a detailed profile was not generated for each individual site. Co-located sites or those clustered together were not all documented in an individual profile. Furthermore, if our initial geologic research indicated that the clustered sites had similar geology, individual profiles were not generated. Instead, a profile was created for one site within the geographic cluster, and the reader is referred to that profile for the nearby analogous sites. Table 1 lists all 42 sites and directs the reader to an analogous profile if none was generated for a specific site.

Below, we describe the specific methodology and data sources for each type of data used to generate the profiles listed in Appendix A. Certain data sources are described below, and all applicable sources are cited in each profile.

Power Plant Site Names

Site names used in this report and shown at the top of each profile are derived from CEC siting documents, which are written when the plant is in planning stages. Over the life of a plant, ownership can change, and nicknames can become established. Sometimes several names are encountered when researching one site. Aliases encountered during research are listed in a separate section at the bottom of the profile table.

Nearest Potential CO_2 Sink

This section of the profile lists distances to one or two of the closest potential CO_2 sinks and sometimes the name and brief description of the sink. For the purposes of this report, potential CO_2 sinks include: 1) basins shown in Figure 1 that CGS selected after research and screening during WESTCARB Phase I studies[4] and 2) saline aquifers shown in Figure 2 that are those listed in Herzog et al, 2007[5].

Proximity to Oil or Gas Fields

This section of the profile lists distances to and names of the closest oil and/or gas fields. The oil and gas field locations were obtained from California Division of Oil and Gas and Geothermal Resources (DOGGR) publications. Certain profiles contain additional information about the fields, such as pool depth or API oil gravity value, which are applicable to EOR potential. These data were included when applicable and available.

Subsurface Geology

This section of the profile contains the following three subsections, each described below: 1) Depth to geologic units suitable for injection, 2) description of geologic unit, and 3) description of caprock. The first subsection lists the depth to a potentially suitable sequestration rock unit directly beneath the site. If the potentially suitable sequestration rock unit exists some distance

[4]Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[5]Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

from the site, that is noted. The second subsection describes the rock unit, if one exists. Also, stratigraphy beneath or in the vicinity of the site is described. The third subsection describes the caprock, if one exists.

Surface Expression of Nearby Faults
This section of the profile lists the distance to the surface expression of the nearest faults that are of Quaternary age or younger. In one or two cases, an older fault is listed as the nearest fault, but only when previous fault investigations indicated that the older fault has the potential to become reactivated. Fault locations and ages are from the California Geologic Survey, 2010 Fault Activity Map of CA. Certain profiles contain additional fault information, when applicable and available.

Subsurface Water
This section of the profile lists the following data, when available: depth to groundwater, base of freshwater aquifer, and depth to saline aquifer (>10,000 parts per million [ppm] total dissolved solids [TDS]). Depth to groundwater was obtained either from CEC siting documents or California Department of Water Resources Water Data Library website. Data for the base of freshwater aquifer and depth to saline aquifer (>10,000 ppm TDS) was obtained from California Division of Oil and Gas and Geothermal Resources (DOGGR) publications.

ORISPL (Office of Regulatory Information Systems Plant Location)
This section of the profile lists the unique identification number assigned to each power plant. This number is helpful when a power plant has many nicknames.

Site Name Aliases
This section of the profile lists the different names for a power plant site encountered during research.

Future Work

Decision-makers will use the profiles to consider a plant's geologic CO_2 sequestration potential in concert with its CO_2 capture potential and will select the most suitable sites for a future carbon capture and storage project. An engineering firm selected by CEC will perform engineering studies to determine the CO_2 capture potential of each power plant. Once the most promising sites are selected, LLNL will conduct additional geologic research in order to construct a detailed 3D geologic model for those sites.

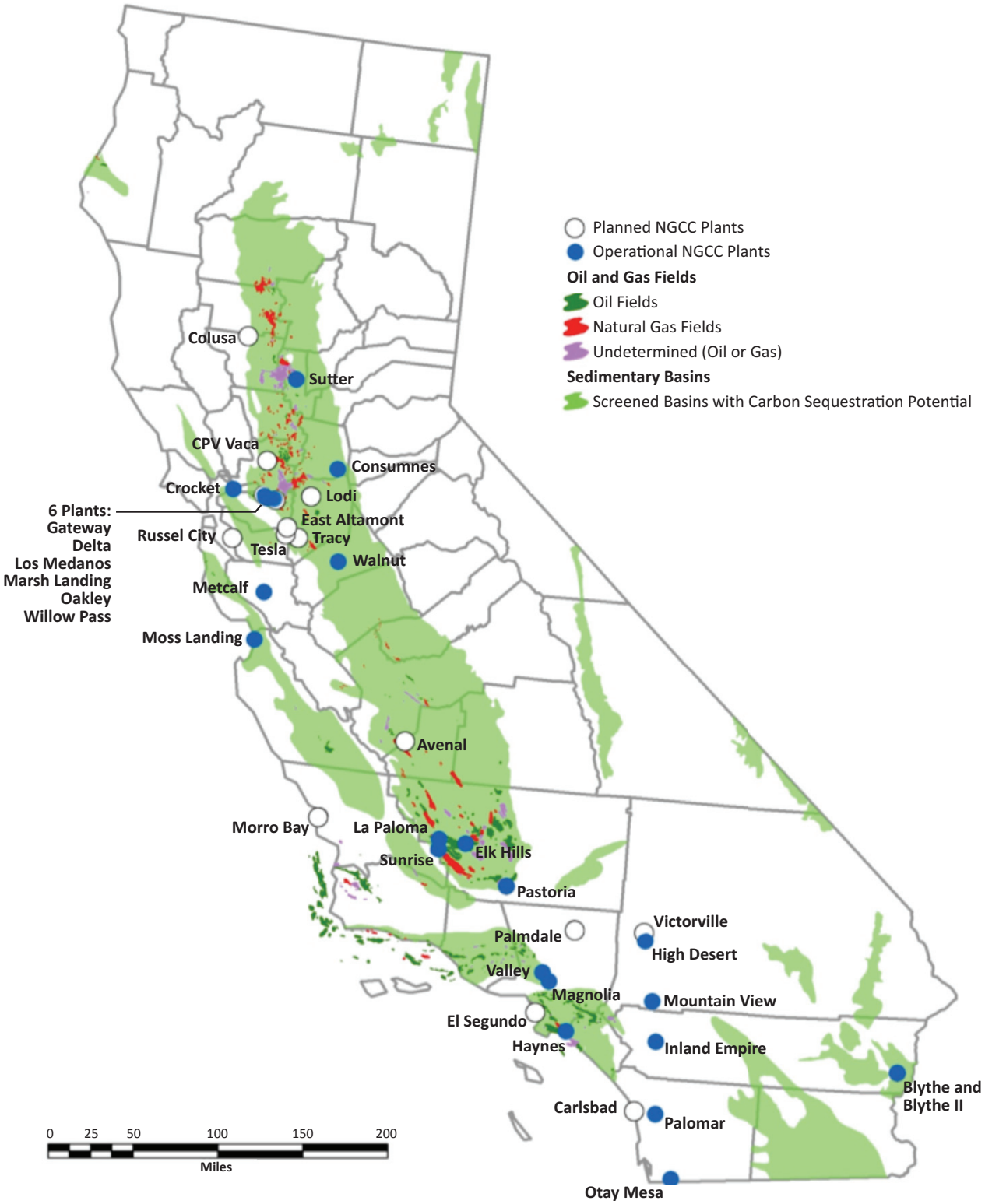

Figure 1. California Natural Gas Combined-Cycle (NGCC) Power Plant Sites

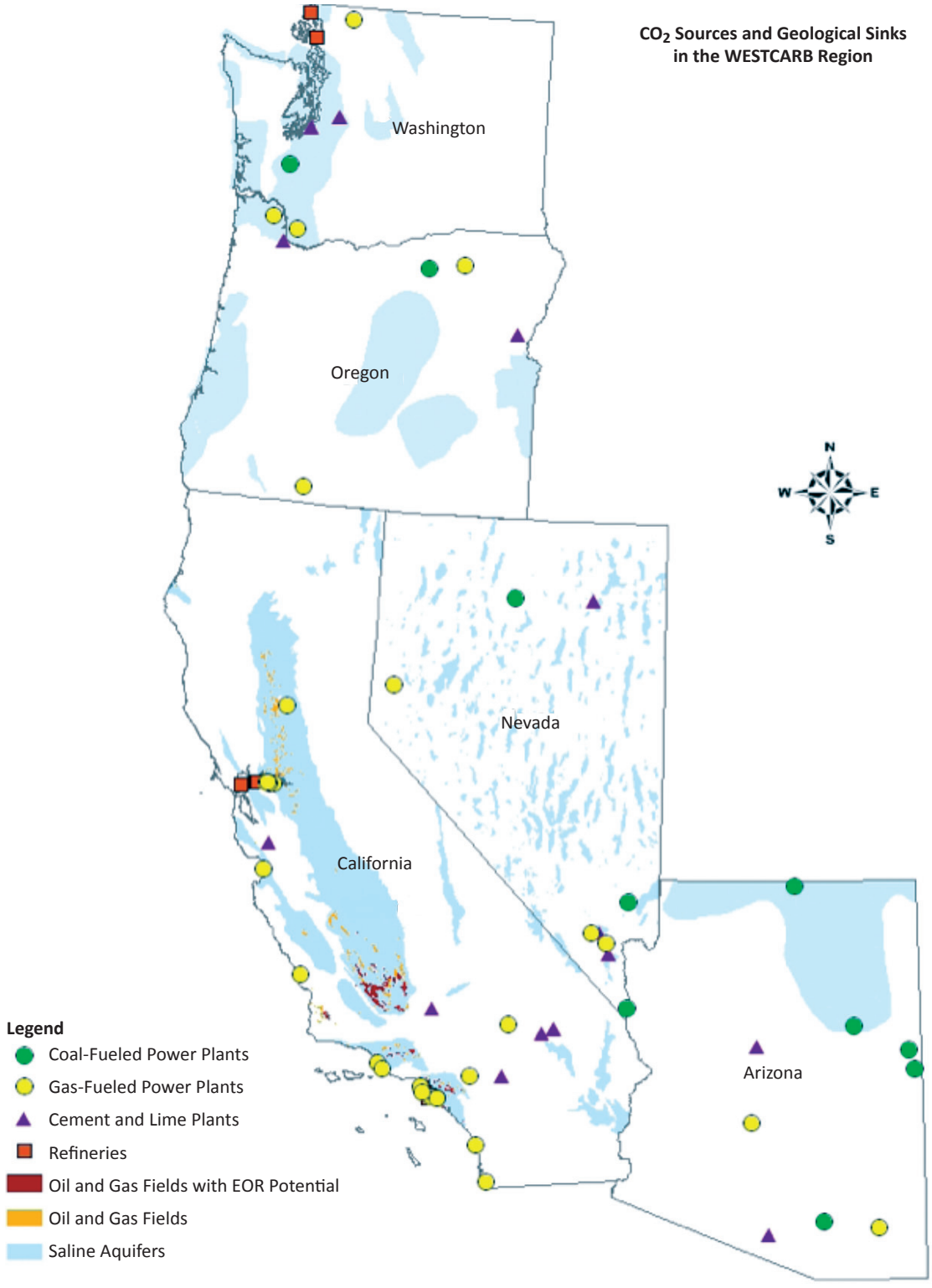

Figure 2. Saline Aquifers in the WESTCARB Region (from Herzog et al, 2007).

Table 1. Summary of Geologic Data Considered for CO2 Sequestration Potential

Name of Power Plant Site	ORISPL (Unique Plant ID #)	Power Generating Capacity (MW)	Distance to Nearest Surface Expression of a Fault (km)	Fault Age (Timing of Most Recent Displacement)	Presence of Oil/Gas Fields Within 20 km Radius?	Distance to Nearest Potential Sink (km)
Avenal Energy Power Plant	NA	600	36	Historic	Yes	0
Blythe Energy Power Plant Project	55295	520	17	Late Quaternary	No	0
Blythe II - Caithness	NA	520	See other Blythe profile above			
Carlsbad Energy Center Project	NA	540	3	Quaternary	No	34
Colusa Generating Station	NA	660	5	Quaternary	No	1 - 5
Consumnes Power Plant Project	NA	500	17	Late Quaternary	Yes	26
CPV Vaca Station	55499	660	5	Late Quaternary	Yes	0
Crockett Cogeneration	55084	247	1	Quaternary	Yes	0
Delta Energy Center	55333	860.2	See Gateway Profile			
East Altamont Energy Center	NA	1100	6	Late Quaternary	Yes	0
El Segundo Power Redevelopment Project	330	630	5	Late Quaternary	Yes	0
El Segundo Amendment - NRG	NA	560	See other El Segundo profile above			
Elk Hills Power Project	55400	567	3	Quaternary	Yes	0
Gateway Generating Station	228	530	2	Quaternary	Yes	0
Haynes No. 3 and No. 4 Generating Station	400	575	2	Holocene	Yes	0
High Desert Power Plant Project	55518	854.9	16	Late Quaternary	No	60
Inland Empire Energy Center	NA	800	15	Holocene	No	30
La Paloma Generating Power Plant Project	55151	1200	3	Quaternary	Yes	0
Lodi Energy Center	7451	296	21	Late Quaternary	Yes	0
Los Medanos Energy Center	55217	594	See Gateway Profile			
Magnolia Power Plant Project	56046	309.74	1	Holocene	Yes	8
Marsh Landing Generating Station	NA	760	See Gateway Profile			
Metcalf Energy Center	55393	565.8	<1	Quaternary	Yes	20
Morro Bay Power Project	259	1200	2	Late Quaternary	No	25
Moss Landing Power Plant Project	260	1020	1	Pre-Quaternary	No	0
Mountainview Power Plant	358	1054	2	Holocene	No	55
Oakley Generating Station	NA	624	See Gateway Profile			
Otay Mesa Generating Project	52204	600	7	Quaternary	No	80
Palmdale Hybrid Power Project	NA	617	10	Historic	No	48
Palomar Energy Project	NA	559	23	Holocene	No	50
Pastoria Energy Facility	55656	760	1	Holocene	Yes	0
Pastoria Simple Cycle Addition	NA	160	See other Pastoria above			
Russell City Energy Center Project	NA	600	5	Historic	No	8
San Gabriel Generating Station	NA	696	5	Late Quaternary	No	35
Sunrise Power Project	55182	572	11	Holocene	Yes	0
Sutter Power Project	55112	551.8	15	Quaternary	Yes	0

Table 1. Summary of Geologic Data Considered for CO2 Sequestration Potential (continued)

Name of Power Plant Site	ORISPL (Unique Plant ID #)	Power Generating Capacity (MW)	Distance to Nearest Surface Expression of a Fault (km)	Fault Age (Timing of Most Recent Displacement)	Presence of Oil/Gas Fields Within 20 km Radius?	Distance to Nearest Potential Sink (km)
Sunrise Power Project	55182	572	11	Holocene	Yes	0
Sutter Power Project	55112	551.8	15	Quaternary	Yes	0
Tesla Power Project	NA	1120	0	Late Quaternary	Yes	5
Tracy Combined Cycle Power Plant	55933	314	2	Quaternary	Yes	0
Valley Power Plant	408	533	See Magnolia Profile			
Victorville Hybrid Gas-Solar	NA	563	See High Desert Profile			
Walnut Energy Center	4256	275	24	Late Quaternary	No	0
Willow Pass - Mirant	NA	550	See Gateway Profile			

Explanation of Fault Displacement Ages:

Pre-Quaternary = older than 1.6 million years or without recognized Quaternary displacement
Quaternary = younger than 1.6 million years, age differentiated
Late Quaternary = during past 700,000 years
Holocene = during past 11,700 years without historic record
Historic = during last 200 years

Appendix

Site-Specific Profiles of Geologic CO_2 Sequestration Potential

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Avenal Energy Power Plant

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	0 km; located above a saline aquifer in the San Joaquin Basin, which is one of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [iii]	5 km to Kettleman North Dome Oil Field. API gravity ranges from 28-60 in the Temblor pool of the Kettleman North Dome Oil Field. The average depth of the pool is 1800 m. The field also contains the following additional pools, listed in order of increasing average depth: Vaqueros, Kreyenhagen, Upper McAdams, and Lower McAdams.
Subsurface Geology [iii, iv]	***Depth to geologic units suitable for injection (desired is >800 m):*** 2700 m
	Description of geologic unit: According to records from an abandoned dry well located 2 km southwest, the site is likely above the east flank of an anticline, where the Oligocene- to Miocene-age Temblor Formation occurs at depths of over 2700 m. The Temblor Formation contains sandstones with porosities reported from 17–20% in the nearby Kettleman North Dome Oil Field.
	Description of caprock: Further research is needed to locate a suitable caprock. According to records from an abandoned dry well located 2 km southwest, shale is encountered 460 m above the Temblor Formation and is described as "brown shale or Reef Ridge." In this area, the Temblor Formation could be overlain by shale of the Miocene-age Monterey Formation, which locally is referred to by several different names, such as Reef Ridge Shale. Monterey Formation shale in the San Joaquin Basin can be fractured, especially when folded in an anticline such as the nearby Kettleman North Dome. Fractured oil shales in the area have been porous, productive oil reservoir targets and thus would not likely be effective caprocks.
Surface Expression of Nearby Faults [v]	***Distance to nearest surface expression of a fault:*** 36 km
	Description of nearby fault(s): The closest fault is the Nunez, which is Historic age and located 36 km northwest. It last experienced displacement in 1983. The San Andreas Fault (also Historic age) is located 39 km southwest; displacement occurred on this segment in 2004, 1966, 1922, 1901, and 1857. Several pre-Quaternary-age faults are located between the site and the San Andreas Fault.
Subsurface Water [iii]	***Depth to base of fresh water aquifer:*** According to records from an abandoned dry well located 2 km southwest, the "base of freshwater sands" was encountered at 580 m.
	Depth to saline aquifer (>10,000 ppm TDS): Salinity is approximately 33,900 ppm TDS in the nearby Temblor pool of the Kettleman North Dome Oil Field. The average depth of the pool is 1800 m. The Temblor pool is the shallowest of the five pools in this oil field and has the highest TDS. TDS decreases with depth in the other four pools. For example, the deepest two pools, which have an average depth between 2800 and 3500 m, have reported salinities of 7600 and 8900 ppm TDS.
ORISPL [vi]	Not available; plant has not operated yet.
Site Name Aliases [vii]	Avenal Energy Project

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[iv] http://www.evaluateenergy.com/Universal/View.aspx?type=Story&id=98434. Accessed 11 May 2011.

[v] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vi] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

[vii] California Energy Commission. February 2008. *Avenal Energy Application for Certification*. http://www.energy.ca.gov/sitingcases/avenal/documents/applicant/afc/Vol_I/CITY_OF_AVENALcoverVI.pdf

Blythe Energy Power Plant Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i]	0 km; overlies a saline aquifer in the Palo Verde Valley, which is a small, terrestrial basin with unknown sequestration potential.
Proximity to Oil or Gas Fields [ii]	The nearest oil and gas fields are over 200 km away in Riverside County.
Subsurface Geology [i, iii, iv, v, vi]	***Depth to geologic units suitable for injection (desired is >800 m):*** 240–3000 m
	Description of geologic unit: Miocene-age fanglomerate (alluvial-fan deposits) of gravel and sand that underlie limestone or tufa of the Bouse Formation. The unit consists of well-consolidated, reddish-brown, sandy conglomerate containing abundant clasts of gneiss and schist. It occurs at an estimated depth of 240 m but varies widely throughout the basin. It is unknown if the fanglomerate extends to the bottom of the basin. The unit is considered a water-bearing deposit, although no wells are known to have been completed in it because of its depth relative to other water-bearing deposits. The total basin depth is 2000–3000 m based on gravity surveys conducted northwest of Blythe.
	Description of caprock: The Bouse Formation overlies the Miocene fanglomerate and occurs at a depth of 150–180 m. It consists of interbedded clay, silt, and sand. The lower Bouse Formation is considered an aquitard.
Surface Expression of Nearby Faults [vii, viii]	***Distance to nearest surface expression of a fault:*** 17 km
	Description of nearby fault(s): The closest fault is a graben of Late Quaternary age located 17 km northeast of the site. The next closest is Quaternary age located 53 km to the southwest. The nearest Historic-age fault is the San Andreas Fault, located approximately 95 km southwest of the site.
Subsurface Water [vi, vii]	***Depth to groundwater:*** 27 m. This aquifer is hydrologically linked with the Colorado River, which is located about 14 km east of the site. The site elevation is approximately 21 m above the Colorado River Valley.
	Depth to base of fresh water aquifer: Likely greater than 150 m. The site is underlain by the older alluvium of the Colorado River, which is the primary aquifer for the mesa. The older alluvium is more than 150 m thick in the vicinity of the project site.
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available. Ground water quality at the site is poor. Fifteen constituents identified in groundwater samples exceeded drinking water standards, including TDS and low concentrations of various organic solvents. TDS measured in six samples varied from 1160–1230 ppm. A USGS study showed that water quality improves with depth in some parts of this basin, such as beneath Blythe.
ORISPL [ix]	55295
Site Name Aliases [ii]	Blythe Energy Project (BEP)

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] California Division of Oil and Gas, *California Oil & Gas Fields, Northern California, Volume 3.* ftp://ftp.consrv.ca.gov/pub/oil/publications/Datasheets/Dtasheet_vol_3.pdf

[iii] Rotstein, Y., J. Combs, and S. Biehler. "Gravity Investigation in the Southeastern Mojave Desert, California." *Geological Society of America Bulletin*, **87**, July 1976.

[iv] Mickus, K., and W. James. "Regional Gravity Studies in Southeastern California, Western Arizona, and Southern Nevada." *Journal of Geophysical Research*, **96**, July 1991.

[v] U.S. Department of the Interior, U.S. Geological Survey. 2006. *Geologic Map of the West Half of the Blythe 30' by 60' Quadrangle, Riverside County, California and La Paz County, Arizona*. Scientific Investigations Map 2922. http://pubs.usgs.gov/sim/2006/2922/

[vi] California Department of Water Resources. 2004. "Palo Verde Valley Groundwater Basin." *California's Groundwater Bulletin 118*. http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/7-38.pdf

[vii] California Energy Commission. March 2001. *Blythe Energy Project Application for Certification (99-AFC-8).* http://www.energy.ca.gov/sitingcases/blythe/documents/2001-03-21_FINAL_DECISION.PDF

[viii] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[ix] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Carlsbad Energy Center Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	34 km in the Los Angeles Basin.
Proximity to Oil or Gas Fields [ii]	The nearest oil field is 41 km away in the Los Angeles Basin.
Subsurface Geology [iii, iv]	***Depth to geologic units suitable for injection (desired is >800 m):*** Not applicable.
	Description of geologic unit: No suitable units. Mesozoic plutonic rocks underlie the site. The nearest mapped Mesozoic rocks are approximately 4 km east of the proposed site. Relatively thin Tertiary and Quaternary sediments (middle Eocene Santiago Formation) deposited in marine and transitional environments overlie the crystalline basement rocks.
	Description of caprock: Not applicable.
Surface Expression of Nearby Faults [v]	***Distance to nearest surface expression of a fault:*** 3 km
	Description of nearby fault(s): The site is located between two fault zones—the nearby Newport-Inglewood-Rose Canyon Fault Zone and the more distant Elsinore Fault Zone. The nearest fault appears to be a Quaternary-age strand of the Newport-Inglewood-Rose Canyon Fault Zone, which lies 3 km southwest of the site (offshore). A Holocene-age strand of the same fault zone lies 7 km southwest of the site. The Wildomar Fault (Holocene age) lies 38 km northeast and appears to be part of the Elsinore Fault Zone. Displacement has occurred in the last 200 years on the Willard Fault (also in the Elsinore Fault Zone), which is located 40 km northeast.
Subsurface Water [iv]	***Depth to ground water:*** 5 m
	Depth to base of fresh water aquifer: Not readily available.
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available. Groundwater at this site is described as brackish.
ORISPL[vi]	Not available yet for this proposed plant; however, it would be co-located with plant number 302, which is the existing Encina Power Station.
Site Name Aliases	None

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] California Geologic Survey. *2010 Geologic Map of California*.
http://www.quake.ca.gov/gmaps/GMC/stategeologicmap.html

[iv] California Energy Commission. November 2009. *Final Staff Assessment for the Carlsbad Energy Center Project*.
http://www.energy.ca.gov/2009publications/CEC-700-2009-017/CEC-700-2009-017-FSA.PDF

[v] California Geologic Survey. *2010 Fault Activity Map of CA*.
http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vi] Office of Regulatory Information Systems Plant Location. Number found at
http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Colusa Generating Station

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	Located near the edge of a saline aquifer in the Sacramento Basin, which is one of California's larger marine basins with potential sequestration opportunities. The lateral distance to the saline aquifer needs further study (possibly 1–5 km).
Proximity to Oil or Gas Fields [ii]	The nearest gas field is 29 km southeast.
Subsurface Geology [i, iii, iv, v]	***Depth to geologic units suitable for injection (desired is >800 m):*** Unknown; further investigation needed.
	Description of geologic unit: It is possible that desired storage formation properties are available near (but not beneath) the site. The California Geologic Survey identified a suitable sink 40 km away in the Winters Formation. Bedrock beneath the site consists of tilted upper Cretaceous marine sediments of the Great Valley, which are thrust upon Franciscan basement along the western Sacramento Valley margin. Bedrock is partially covered by 1–3 m of Pleistocene-age gravel of the Red Bluff Formation. A gas exploration well drilled 7 km west to a depth of 1900 m encountered primarily shale with several sandstone beds less than 1 m thick.
	Description of caprock: The site is likely underlain by hundreds of meters of shale, as evidenced by drilling logs from a nearby gas well. Capay Formation shale is ~76 m thick at a location 40 km from the site where it overlies the Winters Formation sandstone.
Surface Expression of Faults [iv, vi]	***Distance to nearest surface expression of a fault***: 5 km
	Description of nearby fault(s): Seventeen major faults lie within 120 km of the site. However only three are nearby; the remaining 14 are over 39 km away and will not be discussed below. The nearest is a small, northeast-striking fault located within 2 km of the site. However, this structure is interpreted as a minor tear fault between thrust ramps and is not considered an active seismogenic source. The next closest fault is the Sites-Paskenta segment (Quaternary) of a blind ramp system, located 5 km west. It underlies the Sites anticline and is potentially active. The third closest is the Coast Ranges-Sierran Block Boundary Zone (a region of contractional deformation), which lies 8 km away.
Subsurface Water [iv]	***Depth to groundwater:*** 14 m
	Depth to base of fresh water aquifer: > 335 m
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available
ORISPL[vii]	Not available
Site Name Aliases	Colusa II Generation Station

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] Downey, Cameron, and John Clinkenbeard. 2010. *Preliminary Geologic Assessment of the Carbon Sequestration Potential of the Upper Cretaceous Mokelumne River, Starkey, and Winters Formations—Southern Sacramento Basin, California*. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2009-068.

[iv] California Energy Commission. November 2006. *Colusa Generating Station Application for Certification*. http://www.energy.ca.gov/sitingcases/colusa/documents/applicant/afc/Volume-I/8.14%20Water%20Resources.pdf

[v] DOGGR Online Mapping System (DOMS). http://owr.conservation.ca.gov/WellRecord/011/01100367/01100367_DATA_05-08-2006.pdf

[vi] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vii] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Consumnes Power Plant Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii, iii]	26 km; near a saline aquifer in the Sacramento Basin, which is one of California's larger marine basins with potential sequestration opportunities
Proximity to Oil or Gas Fields [ii, iv, v]	The nearest oil field is Brentwood, approximately 50 km southwest. The site is 13–16 km northeast of the Galt and Lodi gas fields.
Subsurface Geology [iii, iv, vi]	***Depth to geologic units suitable for injection (desired is >800 m):*** >1000 m, 26 km west
	***Description of geologic unit*:** This site is located where shallow Eocene sediments rest on basement; potential injection units lie to the west, according to the California Geologic Survey (CGS). A dry well drilled 4 km northwest encountered basement at a depth of 754 m. A storage option is available 26 km west of the site, where CGS identified a suitable sink deeper than 1000 m and overlain by more than 30 m of shale. CGS mapping also indicated that Starkey or Mokelumne Formation sands (with 30 m seal) may occur 26 km west of the site and that Winters Formation sands may occur approximately 30 km west of the site.
	Description of caprock: CGS mapping indicates that seals thicker than 30 m would overlie Starkey or Mokelumne Formation sands approximately 26 km west.
Surface Expression of Nearby Faults [vii]	***Distance to nearest surface expression of a fault:*** 17 km
	Description of nearby fault(s): The closest fault is a Late Quaternary-age strand of the Bear Mountains Fault Zone located 17 km east of the site. The next closest fault is the Quaternary-age Midland Fault Zone located 52 km southwest. The nearest fault to have experienced displacement in the last 200 years is the Concord Fault located 92 km southwest.
Subsurface Water [v]	***Depth to groundwater:*** 46 m
	Depth to base of fresh water aquifer: Not readily available.
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available.
ORISPL[viii]	Not available.
Site Name Aliases	SMUD Consumnes River Phase 1

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] Downey, Cameron, and John Clinkenbeard. 2010. *Preliminary Geologic Assessment of the Carbon Sequestration Potential of the Upper Cretaceous Mokelumne River, Starkey, and Winters Formations—Southern Sacramento Basin, California*. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2009-068.

[iv] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[v] California Energy Commission. February 2003. *Consumnes Power Plant Project Final Staff Assessment*. http://www.energy.ca.gov/sitingcases/smud/documents/2003-02-11_COSUMNES_FSA.PDF

[vi] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[vii] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[viii] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

CPV Vaca Station

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii, iii]	0 km; above a saline aquifer in the Sacramento Basin, which is one of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [ii, iv]	The nearest oil field is Brentwood, approximately 35 km south, which appears to be amenable to CO_2–enhanced oil recovery (depth >900 m, API gravity > 25). The site is approximately 2 km west of the Maine Prairie Gas Field.
Subsurface Geology [iii, iv, v]	***Depth to geologic units suitable for injection (desired is >800 m):*** > 2500 m
	Description of geologic units: The Winters Formation may be the most promising CO_2 storage unit near the site. It occurs at a depth of 3000 m with a thickness of approximately 150 m and is overlain by a thick seal, according to the California Geologic Survey (CGS). A well in the nearby Maine Prairie Gas Field encountered the Winters Formation at 3000 m. CGS has also mapped the Mokelumne River Formation in this area and found that the site is located approximately 3 km east of the western pinchout of the Mokelumne River Formation and within the Markley Submarine Canyon. A well in the NE corner of the section (30-6N-1E) found the top of the Mokelumne River sand at 2612 m. An abandoned dry well from 1970 located 1 km northeast encountered "top of Cretaceous" at a depth of 3020 m.
	Description of caprock: A thick seal overlies the Winters Formation but not the Starkey Formation. This site coincides with the western feather edge of the Starkey Formation and within a broad area where the shale overlying the Starkey is less than 30 m thick, according to CGS mapping.
Surface Expression of Nearby Faults [vi]	***Distance to nearest surface expression of a fault***: 5 km
	Description of nearby fault(s): The closest fault is a Late Quaternary-age strand of the Vaca Fault located 5 km southwest of the site. The next closest fault is the Quaternary-age Midland Fault Zone located 12 km northeast. The nearest fault to have experienced displacement in the last 200 years is the Green Valley Fault located 25 km southwest.
Subsurface Water [iv, v, vii]	***Depth to ground water:*** 4 m
	Depth to base of fresh water aquifer: 765 m
	Depth to saline aquifer (>10,000 ppm TDS): Two wells in the Maine Prairie Gas Field encountered saline water at 1) a depth of 1878 m, Starkey Formation, 14,466 ppm NaCl, and 2) a depth of 1963 m, Mokelumne River Formation, 17,120 ppm NaCl. CGS provided the following calculated salinity data: 1) 14,500 ppm NaCl in Mokelumne River sand at 2612-m depth located at the NE corner of the section (30-6N-1E) and 2) 14,000 ppm NaCl in Winters Formation sand at 2999-m depth.
ORISPL [viii]	55499
Site Name Aliases	None

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] Downey, Cameron, and John Clinkenbeard. 2010. *Preliminary Geologic Assessment of the Carbon Sequestration Potential of the Upper Cretaceous Mokelumne River, Starkey, and Winters Formations—Southern Sacramento Basin, California*. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2009-068.

[iv] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[v] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[vi] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vii] California Department of Water Resources Water Data Library. http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/report_html.cfm?wellNumber=06N01E31A001M

[viii] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Crockett Cogeneration

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	0 km from the Orinda Basin and 15 km from the southern Sacramento Basin.
Proximity to Oil or Gas Fields [v]	13 km to the abandoned Pinole Point Oil Field and 16 km to the Los Medanos Gas Field.
Subsurface Geology [i, vi, vii]	***Depth to geologic units suitable for injection (desired is >800 m):*** Possibly > 800 m in the Orinda Basin; more research required.
	Description of geologic unit: The site is located at the north end of the Orinda Basin, which may contain a total sandstone thickness of 240 m at depths exceeding 800 m, according to a California Geologic Survey isopach map. The site appears to lie above the east flank of an anticline that folds Upper Cretaceous Chico sandstone. Geology in the vicinity of the site consists of faulted and folded Mesozoic sedimentary and metasedimentary rocks. Two km west of the site the Franklin Thrust Fault puts Upper Cretaceous Chico sandstone in contact with the Paleocene Martinez formation.
	Description of caprock: Unknown; more research required.
Surface Expression of Nearby Faults [viii]	***Distance to nearest surface expression of a fault:*** 1 km
	Description of nearby fault(s): The site is located between two segments of the Quaternary-age Franklin Thrust Fault, 1 km from the western segment, and 3 km from the eastern segment. The Concord Fault is located 11 km east of the site and has experienced displacement in the last 200 years. The site is co-located with a pre-Quaternary fault that terminates at the Franklin Fault.
Subsurface Water [ix]	***Depth to base of fresh water aquifer:*** Not readily available
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available
ORISPL [x]	55084
Site Name Aliases	Crockett Cogen Project

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[v] California Division of Oil & Gas. *California Oil & Gas Fields, Northern California, Volume 3.*
ftp://ftp.consrv.ca.gov/pub/oil/publications/Datasheets/Dtasheet_vol_3.pdf

[vi] California Geologic Survey. *2010 Geologic Map of California.*
http://www.quake.ca.gov/gmaps/GMC/stategeologicmap.html

[vii] Kelley, F. R. 1957. *Field trip to the Ione clay area*. http://www.clays.org/journal/archive/volume%206/6-1-1.pdf

[viii] California Geologic Survey. *2010 Fault Activity Map of CA*.
http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[ix] California Department of Water Resources. 2003. Bulletin 118.
http://www.water.ca.gov/pubs/groundwater/bulletin_118/california's_groundwater__bulletin_118_-_update_2003_/bulletin118-chapter7.pdf

[x] Office of Regulatory Information Systems Plant Location. Number found at
http://cfpub.epa.gov/egridweb/view.cfm?reset=1

East Altamont Energy Center

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii, iii]	0 km; above a saline aquifer in the Sacramento Basin, which is one of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [ii, iv]	The nearest oil fields are Livermore, approximately 14 km southwest, and Brentwood, approximately 19 km northwest, both of which appear to be amenable for CO_2-enhanced oil recovery (depth >900 m, API gravity > 25). The site is less than 11 km west of the Union Island Gas Field and 12-16 km from the Tracy Gas Field.
Subsurface Geology [iii, iv, v]	***Depth to geologic units suitable for injection (desired is >800 m):*** >1000 m
	Description of geologic unit: At this location, the California Geologic Survey (CGS) mapped the Winters Formation deeper than 1000 m and overlain by more than 30 m of shale. A well located less than 2 km east encountered the Winters Formation at a depth of 2844 m and the Cretaceous Lathrop Formation at 3067 m. CGS mapping indicates many hundreds of feet of Eocene and Cretaceous sandstone in the Domengine, Mokelumne ("Massive Sands"), Tracy, Winters, and Lathrop formations occur in close proximity to the site at depths ranging from 1,750–3,550 m. Extensive faulting and Mokelumne sand exposures occur just to the west. Nearby gas fields have produced gas from the Winters and Tracy/Blewett formation sandstones.
	Description of caprock: More than 30 m of shale overlies the Winters Formation at this location, according to CGS mapping.
Surface Expression of Nearby Faults [vi]	***Distance to nearest surface expression of a fault:*** 6 km
	Description of nearby fault(s): The closest fault is the Late Quaternary-age Midway Fault located 6 km southwest. The next closest faults are the Quaternary-age Vernalis Fault located 8 km northeast and the Midland Fault Zone located 8 km northwest. The nearest Historic-age fault (experienced displacement in 1980) is the Greenville Fault located 14 km southwest.
Subsurface Water [iv, v, vii]	***Depth to ground water:*** 2 m; site is near the Sacramento–San Joaquin River Delta.
	Depth to base of fresh water aquifer: 91 m according to well data from nearby Union Island gas field.
	Depth to saline aquifer (>10,000 ppm TDS): Salinity is 39,900 ppm NaCl in a well drilled to 3818 m in the nearby Union Island gas field. CGS provided the following calculated salinity data: 1) 30,000 ppm NaCl in Mokelumne River sand at 1646 m located 2 km north; 2) 30,000 ppm NaCl in Mokelumne River sand at 1783 m located 5 km east; 3) 14,000 ppm NaCl in Winters Formation sand at 2844 m located 2 km east; and 4) 23,000 ppm NaCl in Winters Formation sand at 2957 m located 5 km east.
ORISPL [viii]	Not available.
Site Name Aliases	EAEC

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] Downey, Cameron, and John Clinkenbeard. 2010. *Preliminary Geologic Assessment of the Carbon Sequestration Potential of the Upper Cretaceous Mokelumne River, Starkey, and Winters Formations—Southern Sacramento Basin, California*. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2009-068.

[iv] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[v] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[vi] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vii] California Department of Water Resources Water Data Library. http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/report_html.cfm?wellNumber=01S04E32H001M

[viii] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

El Segundo Power Redevelopment Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	0 km; located above a saline aquifer in the Los Angeles Basin, which is one of California's larger marine basins with significant sandstone and seal developments as demonstrated by its numerous large oil fields and abundant well control.
Proximity to Oil or Gas Fields [iii]	1 km to an active well in the El Segundo Oil Field, where API gravity ranges from 14-28. The average depth of the deeper pools is 2200 m. Gas sands in the field were previously used for liquid propane gas storage.
Subsurface Geology [iii, iv]	***Depth to geologic units suitable for injection (desired is >800 m):*** 2200 m
	Description of geologic unit: According to nearby El Segundo Oil Field records, oil-bearing rocks lie at a depth of 2200 m, including the late Miocene Puente Formation and fractured Cretaceous Catalina schist. Hyperion, Torrance, and Lawndale oil fields are within a few additional km of the site. These fields produce from multiple sandstone intervals within the Pico, Repetto, and Puente formations at depths of 850–2400 m, as well as fractured basement schist at depths of about 2150 m. This part of the Los Angeles Basin contains hundreds of meters of sandstone development and basin depths in the vicinity of 2130–3050 m. The area is highly faulted.
	Description of caprock: Further investigation required, but caprocks/traps likely exist given the numerous gas and oil fields in the area.
Surface Expression of Nearby Faults [v]	**Distance to nearest surface expression of a fault:** 5 km
	Description of nearby fault(s): The site is centered between two faults both 5 km away: 1) Charnock Fault, Late Quaternary age, located 5 km northeast, and 2) Palos Verdes Fault Zone, Quaternary, located 5 km southwest. The nearest Historic-age fault is the Newport Inglewood Fault, located 11 km northeast.
Subsurface Water [iii]	***Depth to base of fresh water aquifer:*** According to El Segundo Oil Field records, "freshwater sands" were encountered at 488 m.
	Depth to saline aquifer (>10,000 ppm TDS): Salinity is approximately 17,500 NaCl ppm in the 2200-m deep pools of the nearby El Segundo Oil Field.
ORISPL [vi]	330
Site Name Aliases [vii]	El Segundo Repower NRG

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[iv] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[v] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vi] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

[vii] California Energy Commission. December 2000. *El Segundo Power Redevelopment Project Application for Certification*. http://www.energy.ca.gov/sitingcases/elsegundo/documents/applicants_files/afc_cd-rom/VOLUME%201A/V1%20TOC.pdf

Elk Hills Power Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	0 km; located above a saline aquifer in the San Joaquin Basin, which is one of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [iii]	0 km to the actively producing North Coles Levee Oil Field. API gravity is 33–49 in the Stevens pool, which has an average depth of 2400 m. CO_2 flooding was conducted in 1981. There are several active injection wells within 2 km of the site.
Subsurface Geology [i, iii, iv]	***Depth to geologic units suitable for injection (desired is >800 m):*** 2400 m
	Description of geologic unit: The Stevens sand in the Miocene Monterey Formation is approximately 2400 m below the surface and has 20% porosity.
	Description of caprock: It is likely that thick shales overlie the Stevens sand because of its location in the central part of the San Joaquin Basin.
Surface Expression of Nearby Faults [v]	***Distance to nearest surface expression of a fault:*** 3 km
	Description of nearby fault(s): The closest faults are a group of four parallel, unnamed, Quaternary-age faults located 3 km northwest. The next closest fault is the Buena Vista Fault (Historic age) located 15 km southwest. Two other Historic-age faults in the area include the San Andreas, 34 km southwest, and unnamed faults near the White Wolf Fault, 25 km southeast.
Subsurface Water [iii, vi]	***Depth to base of fresh water aquifer:*** The "base of fresh water" is at a depth of 366 m, according to oil field records for the North Coles Levee Oil Field. Siting documents state that groundwater was encountered at a depth of more than 305 m below existing grade.
	Depth to saline aquifer (>10,000 ppm TDS): 2400 m is the average depth of the Stevens pool of the North Coles Levee Oil Field where 26,912 ppm TDS was measured.
ORISPL [vii]	55400
Site Name Aliases	Elk Hills Generating Project

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[iv] Wagoner, J. 2009. *3D Geologic Modeling of the Southern San Joaquin Basin for the Westcarb Kimberlina Demonstration Project—A Status Report*. https://e-reports-ext.llnl.gov/pdf/370372.pdf

[v] California Geologic Survey. *2010 Fault Activity Map of CA.* http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vi] California Energy Commission. January 2000. *Final Staff Assessment Elk Hills Power Project*. http://www.energy.ca.gov/sitingcases/elkhills/documents/2000-01-06_FSA_PART-1.PDF

[vii] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Gateway Generating Station

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	0 km; overlies a saline aquifer in the Sacramento Basin, which is one of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [ii, iii]	6 km to Brentwood Oil Field and 3 km to River Break Gas Field.
Subsurface Geology [i, iv, v]	***Depth to geologic units suitable for injection (desired is >800 m):*** ~3000 m
	Description of geologic unit: At or near this site, the California Geologic Survey (CGS) identified sandstone deeper than 1000 m and overlain by more than 30 m of shale. The site may be underlain by reasonably thick Winters Formation sandstones with sufficient seal for sequestration.
	Description of caprock: CGS research indicates that more than 30 m of shale is present above potentially suitable sandstone.
Surface Expression of Nearby Faults [vi, vii, viii]	***Distance to nearest surface expression of a fault:*** 2 km
	Description of nearby fault(s): Seven faults aged Quaternary or younger occur within 25 km of the site. The nearest is the Davis Fault (Quaternary age), which lies 2 km south. The most active is the Kirby Hills Fault, which lies 12 km northwest. Earthquakes as large as magnitude 3.7 have been associated with the fault near the site over the past 32 years. Most of these small events occurred 15–28 km below the surface, which is deep for this part of California. The remaining five faults lie within 25 km: the Concord Fault (active within the last 200 years), Clayton Fault (Holocene), Rio Vista Fault (Quaternary), Midland Fault (Quaternary), and Marsh Creek Fault (Holocene).
Subsurface Water [iv, vi, ix]	***Depth to ground water:*** Varies between approximately 2.1 m below existing grade at low tide to approximately 0.12 m below existing grade at high tide. Portions of the north end of the facility are within the 100-year flood zone for the San Joaquin River.
	Depth to base of fresh water aquifer: 76 m at nearby River Break Gas Field
	Depth to saline aquifer (>10,000 ppm TDS): Salinity is approximately 7000 ppm NaCl, and TDS is also approximately 7000 ppm in the nearby River Break Gas Field. CGS provided the following calculated salinity data: 1) less than 10,000 ppm NaCl, which is typical in the Mokelumne River sand in this area, and 2) 35,000 ppm NaCl in the Winters Formation sand at 3307 m depth located approximately 5 km southeast.
ORISPL [x]	228
Site Name Aliases [ii, vi]	Contra Costa, Contra Costa Power Plant (CCPP) Unit 8 Power Project

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[iv] Downey, Cameron, and John Clinkenbeard. 2010. *Preliminary Geologic Assessment of the Carbon Sequestration Potential of the Upper Cretaceous Mokelumne River, Starkey, and Winters Formations—Southern Sacramento Basin, California*. California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2009-068.

[v] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[vi] California Energy Commission. May 30, 2001. *Contra Costa Unit 8 Power Project Application for Certification (00-AFC-1) Contra Costa, California,*. http://www.energy.ca.gov/sitingcases/gateway/documents/2001-05-30_CONTRACOSTA.PDF

[vii] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[viii] Myer, L., L. Chiaramonte, T. M. Daley, D. Wilson, W. Foxall, and J. H. Beyer. 2010. *Potential for Induced Seismicity Related to the Northern California CO_2 Reduction Project Pilot Test, Solano County, California*. Lawrence Livermore National Laboratory. LLNL-TR-435831.

[ix] California Division of Oil & Gas. *California Oil & Gas Fields, Northern California, Volume 3.* ftp://ftp.consrv.ca.gov/pub/oil/publications/Datasheets/Dtasheet_vol_3.pdf

[x] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Haynes No. 3 and No. 4 Generating Station

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	0 km; located above a saline aquifer in the Los Angeles Basin, which is one of California's larger marine basins with significant sandstone and seal developments as demonstrated by its numerous large oil fields and abundant well control.
Proximity to Oil or Gas Fields [iii]	1 km to active wells in the Seal Beach Oil Field, where API gravity ranges from 20 to 34 depending on the pool. Average depth of pools ranges from 790 m to 1980 m.
Subsurface Geology [iii, iv]	***Depth to geologic units suitable for injection (desired is >800 m):*** 790 to 1980 m
	Description of geologic unit: According to records from nearby Seal Beach Oil Field, oil-bearing rocks lie at various depths depending on the pool, ranging from 790 m to 1980 m. Oil-bearing rocks include late Miocene Puente and early Pliocene Repetto formations. Other large, nearby oil fields include Huntington Beach, Long Beach, and Wilmington. These fields produce from numerous sands within the Pico, Repetto, and Puente formations at depths ranging from about 550 to 2500 m. This area is highly faulted.
	Description of caprock: Further investigation required, but caprocks/traps likely exist given the numerous gas and oil fields in the area.
Surface Expression of Nearby Faults [v]	***Distance to nearest surface expression of a fault:*** 2 km
	Description of nearby fault(s): The site is centered between two faults both 2 km away: 1) Los Alamitos Fault, Late Quaternary, located 2 km northeast, and 2) Newport Inglewood Fault, Holocene, located 2 km southwest. The nearest Historic-age fault is the Banning Fault, located 19 km northeast.
Subsurface Water [iii]	***Depth to base of fresh water aquifer:*** 549 m, according to Seal Beach Oil Field records.
	Depth to saline aquifer (>10,000 ppm TDS): Approximately 800 m, which is the average depth of Seal Beach Oil Field's San Gabriel pool where salinities are listed as 31,645 ppm TDS. This field has several pools in several areas and reported salinities are all more than 20,000.
ORISPL[vi]	400
Site Name Aliases [vii]	Haynes

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[iv] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[v] California Geologic Survey. *2010 Fault Activity Map of CA*.
http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vi] Office of Regulatory Information Systems Plant Location. Number found at
http://cfpub.epa.gov/egridweb/view.cfm?reset=1

[vii] http://www.kiewit.com/projects/power/haynes-no3-and-no4-generating-station-repowering.aspx

High Desert Power Plant Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	60 km southwest in the Los Angeles Basin.
Proximity to Oil or Gas Fields [iii, iv]	Nearest oil fields are over 60 km southwest.
Subsurface Geology [v, vi, vii]	***Depth to geologic units suitable for injection (desired is >800 m):*** Not applicable.
	Description of geologic unit: No suitable units. Located on the northern margin of the Apple Valley Basin, which contains less than 1.0 km of non-marine sediments resting on Cretaceous or Jurassic igneous rocks. Mesozoic plutonic rocks and Paleozoic sedimentary and metasedimentary rocks are exposed 2 km east.
	Description of caprock: Not applicable.
Surface Expression of Nearby Faults [viii]	***Distance to nearest surface expression of a fault:*** 16 km
	Description of nearby fault(s): While no faults aged Quaternary or younger cross the site footprint, the site is between two faults, both of which have experienced displacement in the last 200 years. The nearest fault is the Late Quaternary Mirage Valley Fault, located 16 km northwest. Next closest is the Helendale Fault (Holocene age), located 17 km northeast. The Oro Mountains Fault is a Holocene-age thrust fault located 25 km southeast. Lastly, the two nearby faults that experienced displacement in the last 200 years include the San Andreas Fault (displacement in 1857, located 36 km southwest) and the Camp Rock Fault (displacement in 1992, located 59 km northeast).
Subsurface Water [ix]	***Depth to ground water:*** 85 m
	Depth to base of fresh water aquifer: Not readily available.
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available.
ORISPL [x]	55518
Site Name Aliases	High Desert-Constellation; High Desert Power Project (HDPP)

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. *District 1 Oil and Gas Fields.* ftp://ftp.consrv.ca.gov/pub/oil/maps/dist1/w1-7/Mapw1-7.pdf

[iv] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[v] California Geologic Survey. *2010 Geologic Map of California*. http://www.quake.ca.gov/gmaps/GMC/stategeologicmap.html

[vi] Saltus, R. W., and Jachens, R. C. 1995. *Gravity and Basin-Depth Maps of the Basin and Range Province, Western United States*. U.S. Geological Survey. Geophysical Investigations Map GP-1012.

[vii] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[viii] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[ix] California Department of Water Resources Water Data Library. http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/report_html.cfm?wellNumber=06N05W27D002S

[x] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Inland Empire Energy Center

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	30 km away in the Los Angeles Basin.
Proximity to Oil or Gas Fields [iii, iv]	The Prado-Corona Oil Field is located approximately 50 km northwest.
Subsurface Geology [v, vi, vii]	***Depth to geologic units suitable for injection (desired is >800 m):*** Not applicable
	Description of geologic unit: No suitable units. Located on the east side of the small Perris Valley, which contains a sedimentary section less than 0.5 km thick resting on granitic basement. Major geologic units in the vicinity of the site include Mesozoic metamorphic rocks, Cretaceous granite, granodiorite and gabbro, and Quaternary alluvial deposits (>30 m deep). The Mesozoic metamorphic rocks consist of quartzite, phyllites, and metasediments.
	Description of caprock: Not applicable
Surface Expression of Nearby Faults [viii]	***Distance to nearest surface expression of a fault:*** 15 km
	Description of nearby fault(s): While no faults aged Quaternary or younger cross the site footprint, the site is centered between two fault zones, both of which have experienced displacement in the last 200 years. The San Jacinto Fault Zone is located 16 km to the northeast and contains the Casa Loma Fault, which experienced displacement in the last 200 years. The Elsinore Fault Zone is 15 km southwest of the site and consists of the following individual faults: the Glen Ivy North Fault, Holocene, 15 km southwest; Wildomar Fault, displacement in last 200 years, 17 km southwest; and Hot Springs Fault, Late Quaternary, 19 km south.
Subsurface Water [v]	***Depth to ground water***: 15-30 m
	Depth to base of fresh water aquifer: Not readily available.
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available.
ORISPL [ix]	Not available
Site Name Aliases	IEEC

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. *District 1 Oil and Gas Fields.* ftp://ftp.consrv.ca.gov/pub/oil/maps/dist1/w1-7/Mapw1-7.pdf

[iv] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[v] California Energy Commission. May 3003. *Final Staff Assessment, Inland Empire Energy Center Project, Riverside County*. http://www.energy.ca.gov/sitingcases/inlandempire/documents/2003-05-23_INLAND_FSA.PDF

[vi] Saltus, R. W., and Jachens, R. C. 1995. *Gravity and Basin Depth Maps of the Basin and Range Province, Western United States*. U.S. Geological Survey. Geophysical Investigations Map GP-1012.

[vii] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[viii] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[ix] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

La Paloma Generating Power Plant Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	0 km; located above a saline aquifer in the San Joaquin Basin, which is one of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [iii]	0 km to the actively producing Asphalto oil field. Five oil-producing units lie between depths of 900 and 2600 m. There are active injection wells within 2 km of the site.
Subsurface Geology [iii]	***Depth to geologic units suitable for injection (desired is >800 m):*** 900 to 2600 m
	Description of geologic unit: The following four oil-producing formations in the Asphalto oil field lie between 900 and 2600 m and may provide suitable sinks: Etchegoin, Reef Ridge, Monterey (Stevens), and Temblor. Most beds are flat-lying, according to a cross section that traverses the site and was created from oil well data.
	Description of caprock: Suitable seals exist in the oil field.
Surface Expression of Nearby Faults [iv]	***Distance to nearest surface expression of a fault***: 3 km
	Description of nearby fault(s): The closest fault is part of a cluster of unnamed, Quaternary-age faults located 3 km northeast. Other nearby faults include 1) Recruit Pass Fault, Late Quaternary, 16 km, 2) San Andreas Fault, Historic, 18 km, and 3) Buena Vista Fault, Historic, 18 km.
Subsurface Water [iii]	***Depth to base of fresh water aquifer***: Not readily available. No "base of fresh water" is recorded in oil field records.
	Depth to saline aquifer (>10,000 ppm TDS): 1725 m is the average depth of the Stevens pool of the Asphalto oil field where 26,930 ppm TDS was measured.
ORISPL [v]	55151
Site Name Aliases [vi]	La Paloma Generating Project; La Paloma Units 1, 2, 3, 4

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[iv] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[v] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

[vi] California Energy Commission. *La Paloma Generating Power Project*. Energy Commission Docket Number 98-AFC-2C. http://www.energy.ca.gov/sitingcases/lapaloma/compliance/index.html

Lodi Energy Center

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii, iii]	0 km; above a saline aquifer in the Sacramento Basin, which is one of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [ii, iv]	The nearest oil field is Brentwood, approximately 35 km southwest, which appears to be amenable to CO_2-enhanced oil recovery (depth >900 m, API gravity > 25). The site appears to be less than 2 km east of the King Island Gas Field (produces from Mokelumne Formation at 1400 m depth). The site is located between two gas storage fields: Lodi Gas Field is 18 km northeast and McDonald Island Gas Field is 11 km southwest.
Subsurface Geology [iii, iv, v]	***Depth to geologic units suitable for injection (desired is >800 m):*** >1000 m
	Description of geologic unit: The California Geologic Survey (CGS) identified a suitable sink deeper than 1000 m and overlain by more than 30 m of shale within 3 km of the site. CGS mapping indicated that the site is located within 2–3 km of reasonably thick developments of both Starkey and Winters formation sandstones.
	Description of caprock: CGS mapped more than 30 m of shale near this location. A plugged, abandoned 1993 well located less than 1 km north encountered the Capay Shale Formation (Eocene age) at a depth of 1395 m.
Surface Expression of Nearby Faults [vi]	***Distance to nearest surface expression of a fault***: 21 km
	Description of nearby fault(s): The closest fault is the Late Quaternary-age Midland Fault Zone located 21 km west. The nearest active fault (experienced displacement in 1980) is the Greenville Fault located 46 km southwest. The next closest fault is a Late Quaternary-age strand of the Bear Mountains Fault Zone located 49 km northeast of the site.
Subsurface Water [iv, v vii]	***Depth to ground water:*** 1.4 m; site is on the eastern edge of the Sacramento–San Joaquin River Delta.
	Depth to base of fresh water aquifer: 137 m
	Depth to saline aquifer (>10,000 ppm TDS): CGS provided the following calculated salinity data: 1) 10,000 to 35,000 ppm NaCl in Mokelumne River sand from nearby well data and 2) 14,500 to 15,500 ppm NaCl in Starkey Formation sand at 1730 m depth located approximately 5 km southeast in the Harte Gas Field.
ORISPL [viii]	7451
Site Name Aliases	None

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] Downey, Cameron, and John Clinkenbeard. 2010. *Preliminary Geologic Assessment of the Carbon Sequestration Potential of the Upper Cretaceous Mokelumne River, Starkey, and Winters Formations—Southern Sacramento Basin, California*. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2009-068.

[iv] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[v] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[vi] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vii] California Department of Water Resources Water Data Library. http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/report_html.cfm?wellNumber=03N05E26H002M

[viii] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Magnolia Power Plant Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	8 km; located near the edge of the Ventura Basin, which is one of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [iii]	Approximately 20 km to the Pacoima Oil Field.
Subsurface Geology [i]	***Depth to geologic units suitable for injection (desired is >800 m):*** Not applicable
	Description of geologic unit: Depth to crystalline basement rocks is less than 800 m, according to a depth-to-basement map created by the California Geologic Survey (CGS). The site is located approximately 8 km east of thick sandstone deposits within the Sespe through Pico formations, according to CGS.
	Description of caprock: Not applicable
Surface Expression of Nearby Faults [iv]	***Distance to nearest surface expression of a fault*:** 1 km
	Description of nearby fault(s): The site is 1 km from the Holocene-age Verdugo Fault and 4 km from another unnamed Holocene-age fault. The nearest Historic-age fault is the San Fernando Fault, located 10 km north.
Subsurface Water [v]	***Depth to base of fresh water aquifer:*** Fresh water could extend to the top of crystalline basement, given that the Saugus Formation is the main water-bearing unit in the vicinity, and it could reach depths of 800 m in this area.
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available
ORISPL [vi]	56046
Site Name Aliases	None

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[iv] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[v] http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/4-12.pdf

[vi] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Metcalf Energy Center

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	20 km away in the Salinas Basin.
Proximity to Oil or Gas Fields [iii, iv]	Moody Gulch is the nearest oil field. It is located approximately 3 km southwest and is abandoned. The last oil production was in 1960.
Subsurface Geology [v]	***Depth to geologic units suitable for injection (desired is >800 m):*** Not applicable
	Description of geologic unit: Not applicable. Bedrock occurs approximately 1–2 m below grade and consists of greenstone and serpentinized ultramafic rock.
	Description of caprock: Not applicable
Surface Expression of Nearby Faults [vi]	***Distance to nearest surface expression of a fault:*** 0.3 km
	Description of nearby fault(s): The Coyote Creek Fault (Quaternary age) is located 0.3 km northeast. Three additional Quaternary-age faults lie within 2.7 km of the site: 1) Silver Creek Fault, 2) San Jose Fault, and 3) an unnamed fault. The San Andreas Fault lies 18 km southwest; this strand was last active in 1989. The Calaveras Fault lies 16 km southeast; this section was last active in 1979.
Subsurface Water [v]	***Depth to ground water:*** 4 m
	Depth to base of fresh water aquifer: Not readily available
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available
ORISPL [vii]	55393
Site Name Aliases	None

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. *District 3 Oil and Gas Fields.* ftp://ftp.consrv.ca.gov/pub/oil/maps/dist3/w3-10/Mapw3-10.pdf

[iv] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[v] California Energy Commission. August 2001. *Metcalf Energy Center Application for Certification 99-AFC-3 Santa Clara County*. http://www.energy.ca.gov/sitingcases/metcalf/documents/2001-08-24_REVISED_PMPD.PDF

[vi] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vii] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Morro Bay Power Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	25 km away in the Salinas Basin.
Proximity to Oil or Gas Fields [ii]	The nearest oil field is 30 km away. The site ranked 9th of 31 California CO_2 sources in MIT's least-cost analysis for transporting CO_2 to enhanced oil recovery (EOR) fields. (MIT assumes the nearest EOR field is 73 km away. See reference below.)
Subsurface Geology [i,iii, iv]	***Depth to geologic units suitable for injection (desired is >800 m):*** Not applicable.
	Description of geologic unit: No suitable units. Franciscan Formation bedrock is at a depth of 15 m beneath the site. Morro Rock is located approximately 600 m west of the site and consists of Tertiary age dacite (intrusive igneous rock). The site is approximately 8–10 km north of the Santa Maria Basin. The Santa Maria Basin was excluded from CGS's WESTCARB Phase 1 review due to a preponderance of fractured Monterey shale reservoirs and shortage of coarse clastic sediments.
	Description of caprock: Not applicable
Surface Expression of Nearby Faults [iii, v]	***Distance to nearest surface expression of a fault:*** 2 km
	Description of nearby fault(s): The nearest fault is the Late Quaternary-age Cambria Fault, located 2 km northeast. The closest known active fault is the Los Osos Fault, which is located 8 km south of the project site. Most of the fault is Late Quaternary age; however, there is a nearby Holocene-age segment. The Los Osos Fault is a 56- to 60-km-long, west-northwest-trending, southwest-dipping reverse fault that separates the San Luis Range from the Morro Bay structural basin. It is designated a class "B" fault (a fault with a maximum magnitude earthquake greater than 6.5 and less than 7, and a slip rate of less than 5 mm/year). The maximum moment magnitude earthquake for the Los Osos Fault is a 6.8 event. In addition, the Hosgri Fault (Holocene age) is located approximately 17.5 km offshore, and the San Andreas Fault (active in the last 200 years) is located approximately 66 km northeast of the Morro Bay Power Plant. Both the Hosgri and San Andreas faults are north-northwest trending, right-lateral, strike-slip faults. The Hosgri Fault is part of an offshore system of right-lateral, strike-slip faults that extend from Point Arguello to the San Francisco Bay Area. The maximum moment magnitudes for the Hosgri and San Andreas faults are 7.3 and 7.8, respectively.
Subsurface Water [iii]	***Depth to ground water:*** 1.2 m
	Depth to base of fresh water aquifer: Not readily available
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available
ORISPL [vi]	259
Site Name Aliases	None

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] California Energy Commission. November 2001. *Final Staff Assessment for the Morro Bay Power Plant Project*.
http://www.energy.ca.gov/sitingcases/morrobay/documents/2001-11-15_FSA_PART1.PDF

[iv] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[v] California Geologic Survey. *2010 Fault Activity Map of CA*.
http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vi] Office of Regulatory Information Systems Plant Location. Number found at
http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Moss Landing Power Plant Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	0 km from the Salinas Basin, which is one of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [ii]	The nearest oil field is 23 km away. The site ranked 10th of 31 California CO_2 sources in MIT's least-cost analysis for transporting CO_2 to enhanced oil recovery (EOR) fields (assuming the nearest EOR field is 133 km away. See reference below.)
Subsurface Geology [i, iii]	***Depth to geologic units suitable for injection (desired is >800 m):*** Not applicable
	Description of geologic unit: There are no suitable units directly beneath the site, which is underlain by approximately 350 m of marine sediments. Granite is beneath the sediments. However a suitable unit may exist to the southeast where the Salinas Basin is deeper and has better sandstone development.
	Description of caprock: not applicable
Surface Expression of Nearby Faults [iii, iv]	***Distance to nearest surface expression of a fault***: 1 km
	Description of nearby fault(s): The Monterey Canyon Fault is the closest known fault, located approximately 1 km west. At Pre-Quaternary age, it is not considered active. The closest active fault, Zayante-Vergeles Fault (Late Quaternary age), is located approximately 12 km northeast. This fault is considered to be a minor part of the San Andreas Fault system. Other nearby faults include the 1) Monterey Bay Fault, Quaternary age, 14 km southwest; 2) San Andreas Fault, displacement in last 200 years, 18 km northeast; and 3) Calaveras Fault, displacement in last 200 years, 32 km northeast. Two major earthquakes have affected the site within the last 100 years, the 1906 San Francisco earthquake and the 1989 Loma Prieta earthquake. Surface rupture from the magnitude 8.3 1906 San Francisco earthquake was reported in San Juan Bautista, which is located about 21 km east.
Subsurface Water [iii]	***Depth to ground water:*** 3 m
	Depth to base of fresh water aquifer: 366 m
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available, but possibly deeper than 366 m. The groundwater below this depth is described as of "poor quality and high salinity."
ORISPL [v]	260
Site Name Aliases	None

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] California Energy Commission. May 2000. *Final Staff Assessment for the Moss Landing Power Plant Project*.
http://www.energy.ca.gov/sitingcases/mosslanding/documents/2000-05-16_MOSS_FSA_PART_01.PDF

[iv] California Geologic Survey. *2010 Fault Activity Map of CA*.
http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[v] Office of Regulatory Information Systems Plant Location. Number found at
http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Mountainview Power Plant

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	55 km southwest in the Los Angeles Basin.
Proximity to Oil or Gas Fields [iii, iv]	Nearest oil fields (Prado-Corona) are located over 40 km southwest.
Subsurface Geology [v, vi, vii]	***Depth to geologic units suitable for injection (desired is >800 m):*** Not applicable.
	Description of geologic unit: No suitable units. Located about 10–15 km north of the nearest sedimentary basin, the Moreno Valley basin. Basin fill consists of less than 0.5 km of non-marine fill underlain by Mesozoic igneous rocks. Mesozoic plutonic rocks are exposed 6 km southwest. Pre-Cambrian rocks are exposed 8 km north.
	Description of caprock: Not applicable
Surface Expression of Nearby Faults [viii]	***Distance to nearest surface expression of a fault:*** 2 km
	Description of nearby fault(s): The site is located between two major Holocene-age faults: 1) San Andreas Fault, 7 km northeast, and 2) San Jacinto Fault, 2 km southwest. Both of these faults contain segments located less than 60 km from the site that have experienced displacement in the last 200 years.
Subsurface Water [ix]	***Depth to ground water:*** 34 m. Site is on the Santa Ana River (typically dry).
	Depth to base of fresh water aquifer: Not readily available
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available
ORISPL [x]	358
Site Name Aliases	None

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. *District 1 Oil and Gas Fields.* ftp://ftp.consrv.ca.gov/pub/oil/maps/dist1/w1-7/Mapw1-7.pdf

[iv] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[v] California Geologic Survey. *2010 Geologic Map of California*. http://www.quake.ca.gov/gmaps/GMC/stategeologicmap.html

[vi] Saltus, R. W., and Jachens, R. C., 1995*, Gravity and Basin-Depth Maps of the Basin and Range Province, Western United States*. U.S. Geological Survey, Geophysical Investigations Map GP-1012.

[vii] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[viii] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[ix] California Department of Water Resources Water Data Library. http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/report_html.cfm?wellNumber=01S03W19G002S

[x] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Otay Mesa Generating Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	80 km east in the Salton Trough.
Proximity to Oil or Gas Fields [iii, iv]	The nearest oil field, Cristianitos Creek, is abandoned and located 121 km northwest.
Subsurface Geology [v, vi]	***Depth to geologic units suitable for injection (desired is >800 m):*** Not applicable
	Description of geologic unit: No suitable units. The site is at the base of the San Ysidro Mountains, at the contact between Tertiary sedimentary rocks and Mesozoic metavolcanic rocks. The Santiago Peak Volcanics are exposed along the eastern margin of the site. Plutonic rocks underlie the San Ysidro Mountains.
	Description of caprock: Not applicable
Surface Expression of Nearby Faults [vii]	***Distance to nearest surface expression of a fault:*** 7 km
	Description of nearby fault(s): The nearest fault appears to be a strand of the Quaternary La Nacion Fault Zone located 7 km southwest. The next closest is an unnamed Late Quaternary fault located 15 km northwest. The nearest strand of the Rose Canyon Fault Zone (Holocene age) lies offshore, 22 km west.
Subsurface Water [vi]	***Depth to ground water:*** 30-45 m
	Depth to base of fresh water aquifer: Not readily available
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available
ORISPL [viii]	52204
Site Name Aliases	None

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. *District 1 Oil and Gas Field.* ftp://ftp.consrv.ca.gov/pub/oil/maps/dist1/w1-7/Mapw1-7.pdf

[iv] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[v] California Geologic Survey. *2010 Geologic Map of California*. http://www.quake.ca.gov/gmaps/GMC/stategeologicmap.html

[vi]California Energy Commission. October 2000. *Final Staff Assessment, Otay Mesa Generating Project, San Diego County*. http://www.energy.ca.gov/sitingcases/otaymesa/documents/2000-10-13_OTAY_MESA_FSA.PDF

[vii] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[viii] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Palmdale Hybrid Power Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	48 km away in the Ventura Basin.
Proximity to Oil or Gas Fields [ii]	The nearest oil field is 48 km away.
Subsurface Geology [iii, iv, v]	***Depth to geologic units suitable for injection (desired is >800 m):*** Not applicable
	Description of geologic unit: No suitable units. The site is located in the Antelope Valley Basin, which is a non-marine basin with less than 1 km of sedimentary fill. Mesozoic plutonic rocks are exposed 15 km southeast and also 10 km southwest of the site. Minor exposures of Pelona schist (pre-Cretaceous metamorphic unit) are present 6 km west of the site.
	Description of caprock: Not applicable
Surface Expression of Nearby Faults [iv, vi]	***Distance to nearest surface expression of a fault:*** 10 km
	Description of nearby fault(s): The Mojave segment of the San Andreas Fault Zone is the closest major active fault, located 10 km southwest. This segment last experienced displacement in 1857. The Garlock Fault is located 50 km northwest and last experienced displacement in 1952. While the potential for earthquake ground rupture is low, at least 52 faults are located between 10 and 80 km of the site. Studies on the Mojave segment indicate average fault slip rates in Holocene time of between 7 and 38 mm per year. Earthquakes resulting in surface faulting are estimated to have occurred in the range of every 125 to 150 years over the last 1500 years. Assuming that the maximum slip rate occurs during an earthquake at the estimated 150-year return period, right-lateral slip of 5.7 m is likely to develop on the San Andreas or parallel faults during a local earthquake on the Mojave segment.
Subsurface Water [iv]	***Depth to ground water:*** 122 m
	Depth to base of fresh water aquifer: Not readily available
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available
ORISPL [vii]	Not available
Site Name Aliases	None

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] California Geologic Survey. *2010 Geologic Map of California*. http://www.quake.ca.gov/gmaps/GMC/stategeologicmap.html

[iv] California Energy Commission. December 2010. *Final Staff Assessment for the Palmdale Hybrid Power Project.* http://www.energy.ca.gov/2010publications/CEC-700-2010-001/CEC-700-2010-001-FSA.PDF

[v] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[vi] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vii] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Pastoria Energy Facility

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	0 km; located near the edge of a saline aquifer in the San Joaquin Basin, which is one of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [iii]	2 km to nearest oil fields. Nearby oil/gas fields include the Tejon Oil Field, Tejon Flats, and Tejon Hills. The nearest two producing wells lie 2 km northwest in the Tejon Oil Field and have been producing since 1976. Enhanced oil recovery (EOR) projects have been conducted in oil fields 6 km west ("Western Area" of Tejon Oil Field), and further investigations could be conducted to determine what type of EOR was utilized and if EOR has been or could be conducted in closer fields.
Subsurface Geology [iv v]	***Depth to geologic units suitable for injection (desired is >800 m):*** >3300 m
	Description of geologic unit: The Uvas Conglomerate Member of the Eocene Tejon Formation contains sandstone. It ranges in thickness across the outcrop belt from zero to about 125 m, with a gradational upper contact.
	***Description of caprock*:** Marine shales of the Liveoak Shale Member overlie the Uvas Conglomerate. Drilling logs indicate that the Liveoak Shale was encountered at 3300 m in the southeast area of Tejon Oil Field. The Liveoak Shale Member ranges in thickness from zero to about 610 m, pinches out eastward into the underlying and overlying sandstone members, and thickens to the west and northwest.
Surface Expression of Nearby Faults [vi, vii]	***Distance to nearest surface expression of a fault:*** 1 km
	Description of nearby fault(s): The closest known active fault is the Pleito Fault (Holocene-age thrust fault), which is located 1 km south of the site. The Springs Fault (Quaternary) is 4.5 km north. According to Pastoria Energy Facility, LLC, the Springs Fault may have experienced displacement during the 1952 Bakersfield earthquake. The White Wolf fault is located approximately 16 kilometers north of the proposed power plant footprint. In July 1952 a magnitude 7.5 earthquake occurred on this fault to the east of the site. The San Andreas Fault lies 17 km southwest; this strand was last active in 1916.
Subsurface Water [iv, vii]	***Depth to ground water:*** Generally occurs at depths below 55 m
	Depth to base of fresh water aquifer: 340–520 m according to well data
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available. Salinity is approximately 4,800 ppm NaCl according to data from two wells (~500 m deep) in the nearby southeast area of Tejon Oil Field.
ORISPL [viii]	55656
Site Name Aliases [vii]	PEF

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. *District 4 Oil and Gas Field.* http://www.consrv.ca.gov/dog/maps/Pages/d4_index_map1.aspx

[iv] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[v] Critelli, S. and T. H. Nilsen**. "**Provenance and Stratigraphy of the Eocene Tejon Formation, Western Tehachapi Mountains, San Emigdio Mountains, and Southern San Joaquin Basin, California." *Sedimentary Geology*, **136**, Issues 1-2, October 2000, pp. 7-27.

[vi] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vii] California Energy Commission. September 2000. *Pastoria Energy Facility Application for Certification (99-AFC-7)*. http://www.energy.ca.gov/sitingcases/pastoria/documents/2000-09-05_PASTORIA_FSA.PDF

[viii] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Russell City Energy Center Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	8 km from the Orinda Basin and 30 km from the Livermore Basin.
Proximity to Oil or Gas Fields [ii]	The nearest oil field is 30 km away in the Livermore Basin, which is a separate basin.
Subsurface Geology [iii, iv]	***Depth to geologic units suitable for injection (desired is >800 m):*** Not applicable
	Description of geologic unit: No suitable units directly beneath the site. Franciscan Complex rocks likely lie at the 800-m target depth for injection. The site is underlain by approximately 300 m of marine and terrestrial sediments, which contain various aquifers. These sediments are underlain by bedrock, which consists of relatively impermeable graywacke, shale, sandstone, mafic volcanic rocks, mélange, and ultramafic rocks. This bedrock is likely the Franciscan Complex.
	Description of caprock: Not applicable
Surface Expression of Nearby Faults [iii, v]	***Distance to nearest surface expression of a fault:*** 5 km
	Description of nearby fault(s): The closest known active fault is the Hayward Fault, which is located 5 kilometers east. This fault is designated a class "A" fault (a fault with a maximum magnitude earthquake greater than 7 and a slip rate in excess of 5 mm/year). The maximum magnitude earthquake for the segment of the Hayward Fault closest to the project is a moment magnitude 7.0 event. In addition, the San Andreas Fault is located 22 kilometers west, and the Calaveras fault is located 20 kilometers east. These faults are also capable of generating a major earthquake.
Subsurface Water [iii, iv]	***Depth to ground water:*** 6 m
	Depth to base of fresh water aquifer: 300 m
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available
ORISPL [vi]	Not available
Site Name Aliases	None

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] California Energy Commission. June 2002. *Final Staff Assessment for the Russell City Energy Center Project*.
http://www.energy.ca.gov/sitingcases/russellcity/documents/2002-06-10_FSA.PDF

[iv] California Energy Commission. November 2006. *Russell City Energy Center Application for Certification*.
http://www.energy.ca.gov/sitingcases/russellcity/documents/applicant_files/afc/vol-1/8.15%20Water.pdf

[v] California Geologic Survey. *2010 Fault Activity Map of CA*.
http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vi] Office of Regulatory Information Systems Plant Location. Number found at
http://cfpub.epa.gov/egridweb/view.cfm?reset=1

San Gabriel Generating Station

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	35 km southwest in the Los Angeles Basin.
Proximity to Oil or Gas Fields [iii, iv]	The nearest oil field, Prado-Corona, is located 24 km southwest.
Subsurface Geology [v]	***Depth to geologic units suitable for injection (desired is >800 m):*** Not applicable
	Description of geologic unit: No suitable units. Mesozoic plutonic rocks are exposed 6 km southwest. Pre-Cambrian rocks are exposed 8 km north.
	Description of caprock: Not applicable
Surface Expression of Nearby Faults [vi]	***Distance to nearest surface expression of a fault:*** 5 km
	Description of nearby fault(s): The nearest fault is an unnamed Late Quaternary fault located 5 km southeast. The Late Quaternary Red Hill Fault is located 5 km northwest. A Holocene-age thrust fault, the Cucamonga Fault, lies 8 km north. Nearby major fault zones include the San Andreas Fault, 23 km northeast, last active in 1857, and the Glen Helen Fault, which appears to be the northern extent of the San Jacinto Fault Zone, 15 km northeast, Holocene age.
Subsurface Water [vii]	***Depth to ground water:*** 101 m
	Depth to base of fresh water aquifer: Not readily available
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available
ORISPL [viii]	Not available
Site Name Aliases	None

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. *District 1 Oil and Gas Field.* ftp://ftp.consrv.ca.gov/pub/oil/maps/dist1/w1-7/Mapw1-7.pdf

[iv] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[v] California Geologic Survey. *2010 Geologic Map of California*. http://www.quake.ca.gov/gmaps/GMC/stategeologicmap.html

[vi] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vii] California Department of Water Resources Water Data Library. http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/report_html.cfm?wellNumber=01S06W25C001S

[viii] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Sunrise Power Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	0 km; located above a saline aquifer in the San Joaquin Basin, which is one of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [iii]	0 km to the actively producing Midway-Sunset oil field (northwest portion). Depths of oil-producing units in this area are between 300 and 600 m. There are active injection wells within 2 km of the site.
Subsurface Geology [iii, iv]	***Depth to geologic units suitable for injection (desired is >800 m):*** 900 m
	Description of geologic unit: According to a cross-section created from oil well data 2 km northwest of the site, the following zones within the Monterey Formation could occur below 900 m in this region: Spellacy, Republic, and McDonald. Most beds are tilted because the area consists of a series of anticlines.
	Description of caprock: Further research is needed to locate a suitable caprock. Monterey Formation shale in the San Joaquin Basin can be fractured, especially when folded. Fractured oil shales in the area have been porous, productive, oil reservoir targets and thus would not likely be effective caprocks.
Surface Expression of Nearby Faults [v]	***Distance to nearest surface expression of a fault:*** 11 km
	Description of nearby fault(s): The site is surrounded by five faults, all located over 10 km away. The closest fault is a Holocene-age strand of the San Andreas Fault located 11 km southwest. The remaining four include: Recruit Pass Fault, Late-Quaternary age, 12 km; San Andreas Fault, Historic age, 12 km; a cluster of unnamed Quaternary-age faults, 12 km; and Buena Vista Fault, Historic age, 13 km.
Subsurface Water [iii]	***Depth to base of fresh water aquifer:*** Not readily available. No "base of fresh water" is recorded in oil field records.
	Depth to saline aquifer (>10,000 ppm TDS): 900 m is the predicted depth of the Spellacy pool of the Midway-Sunset oil field where 4,000 to 27,800 ppm TDS was measured.
ORISPL [vi]	55182
Site Name Aliases [vii]	Sunrise II

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[iv] http://www.evaluateenergy.com/Universal/View.aspx?type=Story&id=98434. Accessed 11 May 2011.

[v] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vi] Office of Regulatory Information Systems Plant Location. Number found at http://cfpub.epa.gov/egridweb/view.cfm?reset=1

[vii] California Energy Commission. *Sunrise Power Project*. Energy Commission Docket Number 98-AFC-4C. http://www.energy.ca.gov/sitingcases/sunrise/compliance/index.html

Sutter Power Project

Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	0 km; located above a gas field and a saline aquifer in the Sacramento Basin, which is one of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [ii, iii]	The site is above the Pierce Road Gas Field. A pipeline 523 km in length would be the least-cost path from the site to an oil field with enhanced oil recovery potential, according to the Herzog paper referenced below. The site ranked 30 out of 31 California CO_2 sources ranked by cost in the study.
Subsurface Geology [i, iii, iv]	***Depth to geologic units suitable for injection (desired is >800 m):*** 1400 m
	Description of geologic unit: Gas deposits are found in the Forbes Formation (Upper Cretaceous age) approximately 1400 m beneath the site, according to a report from an active, producing gas well located at the southeast corner of the site. Due to the extreme lenticularity of Forbes sandstone, the California Geologic Survey deemed it unsuitable for sequestration purposes during WESTCARB Phase I. Shallow Starkey Formation sands and thin Winters Formation sands also underlie the site. However, these sands do not reach sufficient depth (1000 m) and are not overlain by sufficient seal (100 feet or 30 m) to meet minimum criteria established in WESTCARB Phase I. A better storage option is available 13 km southwest of the site, where the California Geologic Survey identified a potential sink in the Starkey Formation. At this location, the Starkey Formation is deeper than 1000 m and overlain by more than 30 m of Capay shale.
	Description of caprock: A suitable seal likely lies beneath the site, as evidenced by the deep gas deposits present in the vicinity.
Surface Expression of Nearby Faults [v]	***Distance to nearest surface expression of a fault:*** 15 km
	Description of nearby fault(s): The site is located in an area mapped as "CBC Zone 3," which is described as the lowest level of potential shaking in California. The closest faults are Quaternary age, unnamed, and located 15 km northwest at the southern end of the Sutter Buttes. The next four closest faults lie over 30 km away, and they include: Dunnigan Hills Fault, Late Quaternary, 32 km southwest; Spenceville Fault, Late Quaternary, 33 km northeast; Swan Ravine Fault, Quaternary, 35 km northeast; and Cleveland Hill Fault, displacement in 1975, 46 km northeast.
Subsurface Water [vi]	***Depth to ground water:*** 3 m
	Depth to base of fresh water aquifer: > 88 m. The power plant extracts high quality water from an on-site, 88-m-deep well.
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available
ORISPL [vii]	55112
Site Name Aliases	Sutter-Calpine, Sutter EC

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053.
http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] DOGGR Online Mapping System (DOMS).
http://owr.conservation.ca.gov/WellRecord/011/01100367/01100367_DATA_05-08-2006.pdf

[iv] Downey, Cameron, and John Clinkenbeard. 2010. *Preliminary Geologic Assessment of the Carbon Sequestration Potential of the Upper Cretaceous Mokelumne River, Starkey, and Winters Formations—Southern Sacramento Basin, California*. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2009-068.

[v] California Geologic Survey. *2010 Fault Activity Map of CA*.
http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vi] California Energy Commission. October 1998. *Sutter Power Project Final Staff Assessment*.
http://www.energy.ca.gov/sitingcases/sutterpower/documents/98-10-22_SUTTERFSA.PDF

[vii] Office of Regulatory Information Systems Plant Location. Number found at
http://cfpub.epa.gov/egridweb/view.cfm?reset=1

Tesla Power Project
Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	5 km from the boundary between the San Joaquin and Sacramento basins, two of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [ii, iii]	The nearest oil fields are Livermore, approximately 10 km southwest, and Brentwood, approximately 27 km northwest, both of which appear to be amenable to CO_2-enhanced oil recovery (depth >900 m, API gravity > 25). The site is 13 km southwest of the Tracy Gas Field.
Subsurface Geology [iii, iv, v]	***Depth to geologic units suitable for injection (desired is >800 m):*** Further investigation required
	Description of geologic unit: This site is near the transition between the Southern Sacramento and San Joaquin basins, which are geologically distinct; therefore the geology may contain elements of both. California Geologic Survey (CGS) mapping indicates that this area is near the limit of the Mokelumne and Winters Formation sands, so they may or may not be present. Nearby gas fields produce from the Winters and Tracy/Blewett Formation sandstones. Producing depths in these fields range from about 1200–3050 m. Nearby well data (located in 29-2S-4E) indicates that hundreds of meters of Eocene and Cretaceous sandstone in the Domengine, Mokelumne ("Massive Sands"), Tracy, Winters, and Lathrop formations occur in close proximity to the site at depths ranging from 1400 to almost 3550 m. Extensive faulting and Mokelumne sand exposures occur just to the west. A 1984 abandoned dry well located 3 km southeast of the site encountered the top of the Forbes formation at 762 m. Total depth for the well was 1312 m. Bedrock at the site is highly deformed with beds dipping up to 30 degrees. The site is on the eastern flank of the Altamont Anticline, the largest fold in the area. The Miocene Neroly Formation is exposed at the site, and formations believed to be present beneath Neroly include the Cierbo, Tesla, Morano, Panoche, and Franciscan.
	Description of caprock: Further research required
Surface Expression of Nearby Faults [iv, vi]	***Distance to nearest surface expression of a fault:*** 0 km
	Description of nearby fault(s): The site is co-located with the Late Quaternary-age Midway Fault. Geomorphic evidence and the occurrence of a magnitude 3.5 earthquake near the fault trace suggest that the Midway Fault may instead be Historic age. A nearby Historic-age fault that experienced displacement in 1980 is the Greenville Fault located 10 km west.
Subsurface Water [iii, iv]	***Depth to ground water:*** 10 m
	Depth to base of fresh water aquifer: Unknown. Well drilled 4 km southwest of site encountered no freshwater sands to a depth of 1223 m.
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available. Salinity was 820 ppm NaCl at a depth of 1219 m in a well located 3 km southeast of the site.
ORISPL [ii]	Not available
Site Name Aliases	None

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[iv] California Energy Commission. October 2001. *Application for Certification Tesla Power Project*. http://www.energy.ca.gov/sitingcases/tesla/documents/applicant_files/afc/

[v] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[vi] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

Tracy Combined Cycle Power Plant
Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	0 km; located above a saline aquifer and the boundary between the San Joaquin and Sacramento basins, two of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [ii, iii]	The nearest oil field is Brentwood, approximately 32 km northwest, which appears to be amenable for CO_2-enhanced oil recovery (depth >900 m, API gravity > 25). The site is 8 km southeast of the Tracy gas field.
Subsurface Geology [iii, iv, v]	***Depth to geologic units suitable for injection (desired is >800 m):*** 860-2500 m, within 3 km of the site.
	Description of geologic unit: Less than 3 km north of this location, the California Geologic Survey (CGS) identified a potential sink deeper than 1000 m and overlain by more than 30 m of shale. This site is near the transition between the Southern Sacramento and San Joaquin basins, which are geologically distinct; therefore the geology may contain elements of both basins. CGS mapping indicates that this area is near the limit of the Mokelumne and Winters Formation sands, so they may or may not be present. Nearby gas fields produce from the Winters and Tracy/Blewett Formation sandstones. Producing depths in these fields range from about 900–1600 m. Nearby well data (located in 29-2S-4E) indicates that hundreds of meters of Eocene and Cretaceous sandstone in the Domengine, Mokelumne ("Massive Sands"), Tracy, Winters, and Lathrop Formations occur in close proximity to the site at depths ranging from 1400 to almost 3550 m. Extensive faulting and Mokelumne sand exposures occur just to the west. A plugged, abandoned 1967 well located approximately 2 km northeast of the site encountered the "top of the Cretaceous" at 861 m. A plugged, abandoned 1960 well located approximately 3 km northwest of the site encountered "Cretaceous sands" at 2506 m.
	Description of caprock: Further research required. A plugged, abandoned 1960 well located approximately 3 km northwest of the site encountered significant amounts of shale at depths greater than 800 m.
Surface Expression of Nearby Faults [vi, vi]	***Distance to nearest surface expression of a fault:*** 2 km
	Description of nearby fault(s): The nearest fault is the Black Butte Fault (Quaternary age) located approximately 2 km to the southwest. The Midway Fault (Late Quaternary age) lies approximately 4 km southwest. The Vernalis Fault (Quaternary age) lies approximately 10 km northeast of the project. The nearest Historic-age fault, which experienced displacement in 1980, is the Greenville Fault located 17 km west.
Subsurface Water [iii, vii]	***Depth to ground water:*** 8-15 m
	Depth to base of fresh water aquifer: A plugged, abandoned 1967 well located approximately 2 km northeast encountered the "base of freshwater sands" at 411 m.
	Depth to saline aquifer (>10,000 ppm TDS): Salinity is 39,900 ppm NaCl in a well

	drilled to 3818 m in the Union Island Gas Field, which is located 8 km northeast.
ORISPL[ii]	55933 (for the existing Tracy Peaker Project)
Site Name Aliases	GWF Tracy Combined Cycle Power Plant; GWF Tracy; Tracy Peaker Project (name of plant to be modified into NGCC)

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[iv] Downey, Cameron, and John Clinkenbeard. 2010. *Preliminary Geologic Assessment of the Carbon Sequestration Potential of the Upper Cretaceous Mokelumne River, Starkey, and Winters Formations—Southern Sacramento Basin, California*. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2009-068.

[v] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[vi] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vii] California Energy Commission. July 2008. *GWF Tracy Combined Cycle Power Plant*. http://www.energy.ca.gov/sitingcases/tracyexpansion/documents/applicant/afc/Volume_1/GWF_Tracy_Covers%20Vol%201%20and%202.pdf

Walnut Energy Center
Profile of Geologic CO_2 Sequestration Potential

Nearest Potential CO_2 Sink [i, ii]	0 km; above a saline aquifer in the San Joaquin Basin, which is one of California's larger marine basins with potential sequestration opportunities.
Proximity to Oil or Gas Fields [ii, iii]	The nearest oil field is Brentwood, approximately 85 km northwest, which appears to be amenable for CO_2-enhanced oil recovery (depth >900 m, API gravity > 25). The site is 29 km southeast of the Vernalis Gas Field.
Subsurface Geology [iii, iv, v]	***Depth to geologic units suitable for injection (desired is >800 m):*** >2000 m
	Description of geologic unit: Blewett Sands, Tracy Sands, and Forbes Formation are potentially suitable units that were logged in wells located several km from the site. A plugged, abandoned 1961 well located approximately 5 km north encountered the base of Blewett Sands at 2322 m and the top of Tracy Sands at 2408 m depth. A well located 10 km east of the site penetrated the Forbes Formation at a depth of 3475 m. California Geologic Survey research indicates that dozens of exploratory wells exist within a 20 km radius, most of which display many hundreds of feet of Cretaceous sands.
	Description of caprock: Potential caprocks include shales in the Kreyenhagen and Moreno Formations. Further research required.
Surface Expression of Nearby Faults [vi]	***Distance to nearest surface expression of a fault:*** 24 km
	Description of nearby fault(s): The nearest fault is the San Joaquin Fault (Late Quaternary age) located approximately 24 km to the west. The Vernalis Fault (Quaternary age) lies approximately 40 km northwest of the project. The Ortigalita Fault (Holocene age) lies approximately 40 km southwest. The nearest active fault, which experienced displacement in 1980, is the Greenville Fault located 56 km west. The site is located in an area mapped as "CBC Zone 3," which is described as the lowest level of potential shaking in California.
Subsurface Water [iii, vii]	***Depth to groundwater:*** 3 m
	Depth to base of fresh water aquifer: A plugged, abandoned 1961 well located approximately 5 km north encountered the "base of freshwater sands" at 244 and 1311 m.
	Depth to saline aquifer (>10,000 ppm TDS): Not readily available
ORISPL [ii]	4256
Site Name Aliases	None

[i] Myer, L., C. Downey, J. Clinkenbeard, S. Thomas, H. Zheng, H. Herzog, J.G. Price, R. H. Hess, S. Fitch, J. E. Faulds, L. J. Garside, L. Shevenell, S. Warren, S. Stevens, S. Benson, and B. Biediger. 2008. *Preliminary Characterization of West Coast States for Geologic Carbon Sequestration.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-019. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2008-019

[ii] Herzog, H., W. Li, H. Zhang, M. Diao, G. Singleton, and M. Bohm. 2007. *West Coast Regional Carbon Sequestration Partnership: Source-Sink Characterization and Geographic Information System-Based Matching.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-053. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-053

[iii] DOGGR Online Mapping System (DOMS). http://maps.conservation.ca.gov/doms/doms-app.html

[iv] Scheirer, A. H. 2007. *Petroleum Systems and Geologic Assessment of Oil and Gas in the San Joaquin Basin Province, California*. U.S. Geological Survey Professional Paper 1713. http://pubs.usgs.gov/pp/pp1713/

[v] Downey, C., California Geologic Survey. 10 March 2011. Personal Communication.

[vi] California Geologic Survey. *2010 Fault Activity Map of CA*. http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html

[vii] California Energy Commission. June 2003. *Walnut Energy Center Application for Certification*. http://www.energy.ca.gov/sitingcases/turlock/documents/applicant_files/