Accepted but Unpublished Op-Ed on Particulate Matter by James E. Enstrom, Ph.D.

The Desert Sun Saga: March 11, 2012 to April 3, 2012

Date: Tue, 03 Apr 2012 11:04:08 -0700
To: "Folmer, James" <jfolmer@palmspri.gannett.com>
From: "James E. Enstrom" <jenstrom@ucla.edu>
Subject: Final Version of Op-Ed on PM Health Effects in CV

Dear James,

Thank you for sending me the edited version of my Op-Ed. Your version is acceptable to me. If possible, at the end of the Op-Ed, I would like you to include links to the March 11 Desert Sun Special Report and to your March 14 Editorial, above the links from my Op-Ed. I inserted the direct link to the California Energy Commission assessment.

Just to clarify, my last name is spelled without a "g": Enstrom.

Jim

From: "Folmer, James" <jfolmer@palmspri.gannett.com>
To: "James E. Enstrom" <jenstrom@ucla.edu>
Date: Tue, 3 Apr 2012 09:44:35 -0700
Subject: RE: Proposed Op-Ed on Particulate Matter Health Effects in CV

Dr. Engstrom, here's the edited version. I did minimal editing, just a few tweaks to match AP style. I replaced $\mu g/m^3$ with "micrograms per cubic meter." Please let me know if that's acceptable.

Also, I took your website references out of the body of the column and put them in a breakout (below) to make it more readable.

It will be in Wednesday's edition. Thanks for the contribution.

The Desert Sun has recently published a special report and an editorial on the Sentinel power plant that is under construction by Competitive Power Ventures. Substantial concern has been expressed about the impact of the particulate matter (PM) pollution that will be generated by the plant. I would like to provide my perspective on the PM levels associated with the plant and the health effects associated with PM. PM consists of "inhalable course particles" (PM10) and "fine particles" (PM2.5).

Based on the April 15, 2010, California Energy Commission air quality assessment for the Sentinel plant, Table 13 indicates that the maximum annual background PM10 level in the Coachella Valley will be increased from 54.9 microgram per cubic meter to 55.33 during plant operation. This represents a

"worse case (maximum)" increase of only 0.8 percent. Based on the South Coast Air Quality Management District (AQMD) Final 2007 Air Quality Management Plan, the maximum annual average PM10 level in the Coachella Valley (Salton Sea Air Basin) is only 45.7 micrograms per cubic meter.

All these levels are quite similar to the U.S. EPA's 1987-2006 annual standard for PM10 of 50 micrograms per cubic meter. However, this standard was revoked in 2006 due to "inadequate" evidence of long-term health effects of PM10, as summarized in the 2004 and 2009 EPA Integrated Science Assessment for Particulate Matter.
The Desert Sun claim that "the Sentinel plant would increase the (PM10) level to 277 percent above the state standard" is highly misleading because it is based on the California Energy Commission's Table 13 comparison of 55.33 micrograms per cubic meter with the California annual standard for PM10 of 20. But this state standard was established by the California Air Resources Board in 2002 and does not reflect the extensive null evidence on PM10 health effects that has been published since 2002.

In January 2007, the Air Resources Board and AQMD approved $1,034,358 in funding, half from each agency, for two major epidemiologic studies on the relationship between PM (PM10 and PM2.5) and death in California. The study based on the American Cancer Society cohort was conducted by UC Berkeley professor Michael Jerrett and 13 other investigators.

The study based on the California Teachers Study cohort was conducted by Michael Lipsett of the California Department of Public Health and nine other investigators. A primary purpose of these studies was to produce new California evidence "to assist with the review of ambient air quality standards."

The results of these two studies were published in 2011 and they both found no relationship between PM and total mortality in California. The Jerrett Study found that total mortality during 1982-2000 among about 75,000 California adults was not related to either PM10 or PM2.5 in eight of nine models tested. The Lipsett Study found that total mortality during 2000-2005 among about 75,000 female

California teachers was not related to either PM10 or PM2.5.
The studies found some unexplained evidence of increased cardiovascular disease risk and decreased cancer risk, but there was no overall increased risk of death. These null results agree with the overwhelmingly null results for California that have been published since 2000, which include my 2005 results.

Thus, based on all the evidence described above, there is no health risk associated with PM in the Coachella Valley or in California as a whole and there will be no health risk from PM after the Sentinal power plant is operational. However, since AQMD and others have a different perspective and since The Desert Sun stated that "Robust debate on this issue is needed," I propose that an open forum be organized so that AQMD Executive Officer Barry Wallerstein and I can debate our different views on the health effects of PM in the Coachella Valley. Hopefully, our debate will help resolve the PM health effects issue.

James E. Enstrom is on the research faculty at the UCLA School of Public Health and has been conducting epidemiologic research there since 1973. Email him at jenstrom@ucla.edu

LEARN MORE ABOUT PARTICULATE MATTER
Read the California Energy Commission air quality assessment for the Sentinel plant at mydesert.com/opinion

Websites cited by James E. Engstrom:
www.epa.gov/pm/
www.aqmd.gov/aqmp/07aqmp/aqmp/Chapter_2.pdf
www.epa.gov/ttn/naaqs/standards/pm/s_pm_history.html
cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546
www.arb.ca.gov/board/books/2007/012507/07-1-4pres.pdf
wmbriggs.com/blog/?p=4587
ajrccm.atsjournals.org/content/184/7/828.short
www.scientificintegrityinstitute.org/Enstrom081111.pdf

From: "Folmer, James" <jfolmer@palmspri.gannett.com>
To: "James E. Enstrom" <jenstrom@ucla.edu>
Date: Wed, 28 Mar 2012 13:11:05 -0700
Subject: RE: April 5 DSun Op-Ed on PM Health Effects & Enstrom Photo

Photo is fine. I'll try to remember to send you the edited version. Feel free to pester me on Tuesday, but we can never promise exactly when a column will run depending on what's happening in the news.

Thanks.

Date: Wed, 28 Mar 2012 12:56:20 -0700
To: "Folmer, James" <jfolmer@palmspri.gannett.com>
From: "James E. Enstrom" <jenstrom@ucla.edu>
Subject: April 5 DSun Op-Ed on PM Health Effects & Enstrom Photo

Thank you very much for accepting my Op-Ed. Can I see the edited final version of the Op-Ed before April 5? Attached is a JPG photo of me. Please let me know if this photo is not satisfactory.

EnstromPhotoE4.JPG

From: "Folmer, James" <jfolmer@palmspri.gannett.com>
To: "James E. Enstrom" <jenstrom@ucla.edu>
Date: Tue, 27 Mar 2012 08:01:36 -0700
Subject: RE: Proposed Op-Ed on Particulate Matter Health Effects in CV

Thanks for the column. I put it on the schedule for April 5. Hopefully, that will stick.

I downloaded that photo from Forbes, but it's too small to use in print. Please send a jpeg attachment. Ideal size is 1mg at 200dpi. Thanks again.

Date: Wed, 21 Mar 2012 10:03:29 -0700
To: "James Folmer" <james.folmer@thedesertsun.com>
From: "James E. Enstrom" <jenstrom@ucla.edu>
Subject: Proposed Op-Ed on Particulate Matter Health Effects in CV

March 21, 2012

James Folmer
Community Conversations Editor
The Desert Sun
james.folmer@thedesertsun.com

Dear Mr. Folmer,

I spoke to you last Friday about responding to your March 14, 2012 Editorial "Reducing pollution must be the Sentinel fee's goal." You stated that you would consider a 600-word Op-Ed from me that could be published in early April. I have attached my proposed Op-Ed "Particulate Matter is Not Harming Coachella Valley Residents." I have included web links in my Op-Ed so that you can confirm all the statements that I have made, but these links do not have to be retained in the final version. Because my Op-Ed is quite detailed, I am willing to work with you in order to make it as clear and understandable as possible. A photo of me is included in my June 9, 2010 Forbes.com Commentary "California's Diesel Regulations are Hot Air" < http://www.forbes.com/2010/06/08/california-diesel-regulation-pollution-opinions-columnists-henry-i-miller-james-e-enstrom.html >. I can send you another photo.

Thank you very much for your interest and assistance.

Best regards,

Jim
James E. Enstrom, Ph.D., M.P.H.
UCLA School of Public Health
Los Angeles, CA 90095-1772
jenstrom@ucla.edu
(310) 825-2048

 Enstrom Op-Ed for Desert Sun on PM Health Effects 032012.doc
(see below for Enstrom Op-Ed that was attached)

Proposed Desert Sun Op-Ed

Particulate Matter is Not Harming Coachella Valley Residents

James E. Enstrom, Ph.D., M.P.H.
UCLA School of Public Health
Los Angeles, CA 90095-1772
jenstrom@ucla.edu
(310) 825-2048

March 20, 2012

The Desert Sun has recently published a special report and editorial on the Sentinel power plant that is under construction by Competitive Power Ventures. Substantial concern has been expressed about the impact of the particulate matter (PM) pollution that will be generated by the plant. Thus, I would like to provide my perspective on the PM levels associated with the plant and the health effects associated with PM. PM consists of "inhalable course particles" (PM10) and "fine particles" (PM2.5) (http://www.epa.gov/pm/).

Based on the April 15, 2010 California Energy Commission (CEC) air quality assessment for the Sentinel plant (http://www.energy.ca.gov/2008publications/CEC-700-2008-005/CEC-700-2008-005-FSA-AD.PDF), Table 13 indicates that the maximum annual background PM10 level in the Coachella Valley will be increased from 54.9 $\mu g/m^3$ to 55.33 $\mu g/m^3$ during plant operation. This represents a "worse case (maximum)" increase of only 0.8%. Based on the currently operative South Coast Air Quality Management District (AQMD) Final 2007 Air Quality Management Plan (http://www.aqmd.gov/aqmp/07aqmp/aqmp/Chapter_2.pdf), the maximum annual average PM10 level in the Coachella Valley (Salton Sea Air Basin) is only 45.7 $\mu g/m^3$.

All these levels are quite similar to the US EPA's 1987-2006 annual standard for PM10 of 50 $\mu g/m^3$ (http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_history.html). However, this standard was revoked in 2006 due to "inadequate" evidence of long-term health effects of PM10, as summarized in the 2004 and 2009 EPA Integrated Science Assessment for Particulate Matter (http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546).

The Desert Sun claim that "the Sentinal plant would increase the [PM10] level to 277% above the state standard" is highly misleading because it is based on the CEC Table 13 comparison of 55.33 $\mu g/m^3$ with the California annual standard for PM10 of 20 $\mu g/m^3$. But this state standard was established by the California Air Resources Board (CARB) in 2002 and does not reflect the extensive null evidence on PM10 health effects that has been published since 2002.

In January 2007 CARB and AQMD approved $1,034,358 in funding, half from each agency, for two major epidemiologic studies on the relationship between PM (PM10 and PM2.5) and death in California (http://www.arb.ca.gov/board/books/2007/012507/07-1-4pres.pdf). The study

based on the American Cancer Society cohort was conducted by UC Berkeley Professor Michael Jerrett and thirteen other investigators. The study based on the California Teachers Study cohort was conducted by Dr. Michael Lipsett of the California Department of Public Health and nine other investigators. A primary purpose of these studies was to produce new California evidence "to assist with the review of ambient air quality standards."

The results of these two studies were published in 2011 and they both found no relationship between PM and total mortality in California. The Jerrett Study found that total mortality during 1982-2000 among about 75,000 California adults was not related to either PM10 or PM2.5 in 8 of 9 models tested (http://wmbriggs.com/blog/?p=4587). The Lipsett Study found that total mortality during 2000-2005 among about 75,000 female California teachers was not related to either PM10 or PM2.5 (http://ajrccm.atsjournals.org/content/184/7/828.short). The studies found some unexplained evidence of increased cardiovascular disease risk and decreased cancer risk, but there was no overall increased risk of death. These null results agree with the overwhelmingly null results for California that have been published since 2000, which include my 2005 results (http://www.scientificintegrityinstitute.org/Enstrom081111.pdf).

Thus, based on all the evidence described above, there is currently no health risk associated with PM in the Coachella Valley or in California as a whole and there will be no health risk from PM after the Sentinal power plant is operational. However, since AQMD and others have a different perspective and since the Desert Sun stated that "Robust debate on this issue is needed," I propose that an open forum be organized so that AQMD Executive Officer Barry Wallerstein and I can debate our different views on the health effects of PM in the Coachella Valley. Hopefully, our debate will help resolve the PM health effects issue.

Dr. Enstrom is on the research faculty at the UCLA School of Public Health and has been conducting epidemiologic research there since 1973.

http://www.mydesert.com/apps/pbcs.dll/article?AID=2012203160311

AQMD air quality workshop draws a crowd

7:32 AM, Mar. 16, 2012

Written by

Erica Felci

The Desert Sun

PALM DESERT — A variety of nonprofit organizations, public agencies and green energy companies sent a clear signal Thursday that there's wide interest in securing some of the $53 million of air quality funding coming to the Coachella Valley.

The bidders' workshop was part of a months-long process to determine which investments will help offset the pollution that will come from the Sentinel power plant near Desert Hot Springs.

More than 70 people sat through a short presentation by regional air quality professionals and spent the rest of the two-hour session asking technical questions about how they should submit ideas.

Starting today, the South Coast Air Quality Management District will hold smaller question-and-answer sessions throughout the desert.

“When there's money available, I can understand why a lot of people are particularly interested,” Riverside County Supervisor John Benoit, a voting member of the air quality board, told the crowd.

“These are not tax dollars. These are mitigation dollars. There's going to be a lot of accounting, a lot of scrutiny.”

The money is the result of Assembly Bill 1318, which state lawmakers passed in 2009 to speed up the Sentinel plant's development.

Instead of purchasing emission-offset credits on the private market, the legislation allowed the plant's developers to buy them directly from South Coast.

The result was a pot of funds that has since been earmarked for projects in the Coachella Valley.

The idea of available money is prompting local agencies and elected leaders to quickly gather consensus around both new ideas and long-shelved projects.

The biggest proposal to become public is a 54-mile green parkway along the Whitewater River wash. The plan, with an estimated $80 million total cost, would allow bikers, joggers and drivers of golf carts and neighborhood electric vehicles to travel from Desert Hot Springs to Coachella.

The Coachella Valley Association of Governments' will ask the air quality board for as much as $40 million toward the parkway.

Other ideas come with smaller price tags.

Suzanne Seivright, who coordinates the Coachella Valley's Clean Cities coalition, said the group is working on a proposal that would replace diesel or outdated public vehicles and school buses with natural gas fleets.

The public-private partnership is still finalizing the details. But Seivright says it should cost less than $3 million and promised air quality officials on Thursday that it “will knock your socks off.”

Except for promising to spend all of the money in the desert, the air quality board hasn't provided a lot of hints on how it would prefer to invest the $53 million.

“We're looking for the best list of projects. A very large project could qualify, a very small project could qualify,” said Barry Wallerstein, the air quality district's executive officer.

“I doubt the board will fund just one project.”

Groups must apply for funding before June 8.

By law, at least 30 percent of the money must be spent within 6 miles of the plant.

Another 30 percent must be spent in the desert's environmental justice areas, where at least 10 percent of the population is below the poverty level and residents experience disproportionate impacts from poor air quality.

“When we've had other pots of money like this, it hasn't gone to a single community,” Wallerstein said.

“This is kind of unique.”

Erica Felci is a political reporter for The Desert Sun. She can be reached at (760) 778-4644, erica.felci@thedesertsun.com, or @EricaFelci on Twitter.

http://www.mydesert.com/apps/pbcs.dll/article?AID=2012203130357

Our Voice: Reducing pollution must be the Sentinel fee's goal

10:03 AM, Mar. 14, 2012

Written by

The Desert Sun Editorial Board

The Desert Sun loves the idea of the 54-mile Whitewater River Trail for electric vehicles, bikers, hikers and horses from Desert Hot Springs to Coachella. But we doubt it would be the most effective way to mitigate the pollution that will be generated by the Sentinel natural gas power plant under construction west of Desert Hot Springs.

Its eight 90-foot smokestacks are expected to generate 1 million tons of carbon dioxide a year. While that will enlarge our carbon footprint, the real threat to public health is small particle matter pollution known as PM-10. The valley's PM-10 levels are already 200 percent above the state standard. The Coachella Valley Association of Governments funds street sweepers to control PM-10. The Sentinel plant could increase the level to 277 percent above the state standard. This is the most difficult pollutant to control because that's how the plant will operate — converting natural gas into particulate matter.

This area already has some the highest rates of air pollution in the country, mostly because of smog that blows in from the Los Angeles basin.

Competitive Power Ventures, which is financing the plant, is required to contribute $53 million toward projects to protect the air quality of the Coachella Valley.

The “peaker” plant is a state-of-the-art project that will kick in during times of peak power demands, 15 percent to 30 percent of the year. The peak periods occur when it becomes extremely hot in the desert and when air conditioning is most essential. The South Coast Air Quality Management District board, which controls the money, wisely voted to devote all of the mitigation fee to the Coachella Valley.

The multi-use trail would encourage the use of zero-emission vehicles and bicycles for short trips. It also would encourage a healthy lifestyle, a godsend for cyclists, runners, hikers and equestrians. It also could be a tourist attraction. But other proposals would have a greater impact on air quality.

For instance, CVAG wants to spend some of the money to provide up-front financing for property owners to install solar panels or other energy-efficient improvements. That could help,

but Coachella Valley could power itself 100 percent with solar and wind and that still might not reduce emissions from the plant. Clouds over solar panels could make the plant more active.

Another idea is to convert more school buses from diesel to compressed natural gas. In the Desert Sands Unified School, 34 of its 48 buses run on CNG, which saves $200,000 a year in fuel costs. Palm Springs Unified has 14 CNG buses and Coachella Valley Unified has 10. However, there is no CNG fueling station in Coachella and it costs more than the potential savings to drive to Indio to gas up. Converting all school buses to CNG and building a CNG station in Coachella would help. However, burning more natural gas also increases PM-10.

A million trucks a year and about 70 freight trains a day pass through the valley. If more of those were powered by more efficient engines, that also would help.

CVAG's executive committee voted 12-1 to endorse the trail and commit $20 million in highway funds toward it. Coachella Councilman Steve Hernandez was the lone dissenting vote, saying east valley groups are concerned about getting their fair share, even though 30 percent of the funds must be spend in economically depressed areas and 30 percent must be spent in the area most directly affected — Desert Hot Springs.

Robust debate on this issue is needed. The air quality board's primary goal must be to find the most effective ways of protecting the health of Coachella Valley residents, no matter how much fun that happy trail might be.

Pollution-reduction ideas

A workshop will be held at 2 p.m. **Thursday** at the UCR Palm Desert campus, 75-080 Frank Sinatra Drive. For more information, call (909) 396-3106 or visit www.aqmd.gov

An earlier version of this editorial listed an incorrect date for the workshop.

Proposals include:
School bus retrofit or replacement
Heavy-duty diesel truck replacement
Agricultural diesel engine replacement and dust control for fields and roads
Truck stop electrification to reduce idling
Air filtration in schools or commercial buildings
Weatherizing buildings and homes
Renewable power generation at public buildings
Renewable distributed power
Infrastructure improvements, such as paving of parking lots or unpaved roads; pathway construction to reduce congestion and promote walking, bicycling and/or near-zero or zero emission vehicles; and electric charging or CNG refueling stations

http://www.mydesert.com/apps/pbcs.dll/article?AID=2012203110328

Sentinel peaker plant brings power, pollution and $53 million

Desert Sun special report: New power plant's benefits come at a cost to valley's air quality

1:13 AM, Mar. 11, 2012

Workers build a foundation at the CPV Sentinel peaker power plant. The plant, which would be able to run up to 116 days a year, will have eight General Electric LMS-100 turbines that each will be able to produce 100 megawatts. / Omar Ornelas, The Desert Sun

Written by

K Kaufmann

The Desert Sun

For the past four years, what most people in the Coachella Valley have heard about Competitive Power Ventures' natural gas-fired Sentinel electric plant can be summed up in two words: Power and money.

The 800-megawatt peaker plant now under construction in North Palm Springs amid hundreds of windmills has been promoted as the answer to the valley's need for extra power during its blistering summer days and for a supplement to its growing supplies of solar and wind energy.

The $900 million, privately funded project would power the desert economy as well, creating hundreds of jobs and generating millions of dollars in sales and property taxes for local coffers.

Then there's the windfall $53 million coming to the region in mitigation fees CPV has paid to the South Coast Air Quality Management District to fund clean air initiatives.

“It's important to note as well that by bringing a new facility like this one online, it enables us to put offline older, less efficient and more heavily polluting facilities,” said Assemblyman V. Manuel Pérez, the Coachella Democrat who wrote the law that created the mitigation fund.

But — as controversy grows over what kind of projects that money should be used for — what's been missing from the equation are the hundreds of thousands of pounds of pollution and greenhouse gases the plant will pump into the valley's air over its expected 30-year life-span.

As a peaker plant — able to run a maximum of 116 days a year once it begins operating next winter — Sentinel and its eight 90-foot-tall smokestacks could spew more than 1 million tons of carbon dioxide per year, according to the final approval from the California Energy Commission.

That's the equivalent of adding 188,334 cars per year to the valley's roads, using formulas from the Environmental Protection Agency.

The region already suffers from high pollution rates from smog, ozone and other emissions blown in from Los Angeles ports and carried east with about a million trucks that travel Interstate 10. The valley's surrounding mountains, low elevations and strong winds further aggravate the problem.

In the American Lung Association's annual air pollution rankings, Riverside County has received an “F” every year since 1999.

Regional air quality figures — using maximum, worst-case estimates — indicate emissions from Sentinel could push already-high pollution levels as much as 277 percent over annual state limits for particulate matter, the tiny particles from the plant's combustion that can have major health impacts.

“Natural gas power plants are really PM facilities. They take natural gas and turn it into particulate matter, really small particulate matter,” said Angela Johnson Meszaros, attorney for California Communities Against Toxics, an L.A. nonprofit organization that has filed a series of lawsuits to stop the plant.

Sentinel supporters counter that the plant's future pollution has already been offset by emission credits that CPV was required to buy from the air district — the source of the $53 million.

“The offsets represent emissions permanently erased from regional facilities permanently shut down or no longer emitting,” said Sam Atwood, spokesman for the Air Quality Management District.

“As growth occurs, air pollution increases; we've accomplished growth without that increase.”

The catch — and a point of the continuing litigation — is that CPV's purchase of the offsets from the district represents a unique situation, the result of the law Pérez wrote to help the project overcome its legal obstacles.

The recent suit California Communities filed against the Environmental Protection Agency, AQMD and CPV is in the U.S. 9th District Court of Appeals. A hearing is likely between May and November, Johnson Meszaros said.

With concrete poured on the project site, and turbines and eight 90-foot-tall smokestacks waiting to be assembled and installed, such matters may seem a moot point. The litigation has yet to stop construction, and neither CPV nor AQMD officials expect it will.

Still, with $53 million on the table, balancing the plant's economic benefits and public health impact might be a critical first step in deciding how to spend the money.

Michael Kleinman, a professor at University of California, Irvine's School of Medicine, who has studied the health impact of air pollution, says the district's use of offsets doesn't guarantee clean air.

“If you look at it as a zero-sum game, if you're reducing the total amount of pollution, it's good for someone,” he said. “It's not going to improve your air quality; it's going to make the local air quality worse.”

“When you are talking about energy generation, you are always going to have tradeoffs,” Pérez agreed.

“There's still going to be an impact to public health, and therefore it's essential to accurately quantify those impacts and then aggressively work to mitigate them. That's what the mitigation fund is for.”

Plant will help fill in several power gaps

The need for peaker plants such as Sentinel is undeniable and essential for maintaining California's energy supplies, says Stephanie McCorkle, director of communications for the California Independent System Operator Corporation, which regulates power supplies for the grid statewide.

Beyond providing quick power at times of high demand, a peaker's ability to fire up or shut down in minutes can smooth out uneven power flows on the grid resulting from new "smart" technology and the addition of wind and solar energy supplies. Integrating renewables is a high priority to meet California's 33 percent renewable energy standards by 2020, she said.

The state also faces the possible loss of 12,000 megawatts of power due to a new rule on the water cooling of coastal power plants that may result in the retrofitting or closure of up to 11 of these facilities over the next five years.

"There's more interaction on the grid for demand response; there are more dynamics. We're seeing a historic shift in the electricity industry; we haven't seen a change like this in 100 years," McCorkle said.

"We're trying to educate policy-makers about the need for flexible capacity. We're not going to have as much hydro. Gas-fired generation is critical to reliability. The faster you can get power on the grid, the more valuable those megawatts will be."

If run at maximum capacity, Sentinel's eight natural gas turbines will produce enough electricity to power 640,000 homes, CPV spokesman Will Mitchell said.

The company has a 10-year contract to sell all of the power from the plant to Southern California Edison, and Mitchell expects that will keep Sentinel running at or near full capacity.

Edison officials confirmed the contract but said it's not possible to know how often the plant will be online, how much of its power will be needed or whether it will be used in the Coachella Valley.

That will be determined by California ISO through competitive bidding on its spot market to ensure adequate power reserves.

"Power plant units bid in a day ahead and the day of to provide standby power in case we lose a power plant or demand suddenly skyrockets," McCorkle said.

Fewer construction jobs created so far in valley

The plant also has delivered on local jobs, though not quite as many as promised.

CPV originally estimated Sentinel would take about 18 months to build and employ an average of 200 workers, with a peak of 370 by its sixth month.

Now almost halfway through construction, the project is running on schedule but has only 150 workers onsite, with about 120 coming from union hiring halls in Riverside and San Bernardino, said Mark McDaniels, manager for the project.

Expected job numbers for the project now top out at 250, Mitchell said.

Much of the work so far has been done by subcontractors, so day-to-day employment figures are hard to pin down, said Bill Perez, business manager for the Riverside & San Bernardino Counties Building and Construction Trades Council.

He estimated about 25 percent of the workers on-site are valley residents, with the balance coming from the Inland Empire. The percentage of valley workers should rise as the turbines and plants are built, he said.

Riverside County Supervisor John J. Benoit said the project's contributions to the county's budget will be helpful but modest — about $5.1 million in property taxes and $2.3 million in sales taxes.

The lower jobs numbers are predictable, Benoit said.

“When we get down to all these projects, they're a little overoptimistic in their projections.”

Air studies still unclear on micro-particles

Natural gas is, undoubtedly, the cleanest burning of all fossil fuels, with greenhouse gas emissions about 43 percent less than coal and 30 percent less than oil, according to the Union of Concerned Scientists.

Sentinel's eight GE turbines will use the best available technology for reducing and containing emissions — a process called selective catalytic reduction.

Particulate matter, called PM-10 and PM-2.5, is very small particles that result from the combustion of fossil fuels, including natural gas. PM-10 stands for particles of 10 microns or less; PM-2.5 is 2.5 microns or less. A micron is one-millionth of an inch.

The estimates for Sentinel have the plant pumping about 118,000 pounds of PM-10 into the air its first year of operation and an additional 112,000 pounds each year for the life of the plant.

A growing number of studies suggest there is no threshold below which these particulates don't cause health problems.

More worrisome, and harder to quantify, are even smaller, ultrafine particles — under 2.5 microns — that natural gas plants also produce, Kleinman said.

“We've been doing studies in Riverside, Los Angeles and Orange County,” he said. “Exposure to ultra-fine particles contributes to a number of health effects. We're finding effects on lungs, and ultra-fine particles contribute to heart disease.”

While Kleinman's studies to date have been on animals, he and other researchers say the valley's children, whose lungs are still developing, and older residents with preexisting heart or lung conditions, could be the most affected.

James Gauderman, a professor at the University of Southern California's Keck School of Medicine, has tracked the connection between lung development and air pollution in children across Southern California for nearly 20 years.

In highly polluted areas, he's found an average of 5 percent of children with abnormally low lung development — about 80 percent of normal growth, he said.

Gauderman has not included Coachella Valley children in his studies but he said, on top of regional air pollution from Interstate 10, “any new source of particulate matter would be of concern to children's health.”

“These ultrafine particles contain a lot of chemicals that are generated during combustion, many of them are known to be mutagenic and carcinogenic,” he said.

Johnson Meszaros calls the ultra-fines the worst sort of pollution.

“This is not dust from a road,” she said. “These are ultra-fines that are going to embed themselves in your DNA; these are the products of incomplete combustion.”

Atwood says the Air Quality Management District does not have the power to set standards beyond monitoring compliance with federal or state clean air limits, but it is funding studies on ultrafine particles similar to Gauderman's.

EPA officials said the agency's standards for PM-2.5 also include ultra-fines.

More research on the particles is needed, Atwood said.

“There is a lot of concern,” he said. “Until you understand what's harmful, you can't figure out how to regulate them.”

Benoit's view is more pragmatic.

“The truth of the matter is we still all like to use our refrigerators and flat-screen TVs,” he said. “People are willing to trade off a rational amount of pollution to get that power.”

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