



Republic Solar Highways

California Energy Commission

DOCKETED
12-EPIC-1

TN # 66402

JUL 31 2012

July 31, 2012

California Energy Commission
Dockets Office, MS-4
1516 Ninth Street
Sacramento, CA 95814-55-12

RE: EPIC Investment Plan Workshop: Docket No. 12-EPIC-01

Republic Solar Highways – A Caltrans Technology Demonstration Project

Introduction

The purpose of this memo to illustrate to the California Energy Commission (CEC) and affected Investor Owned Utilities that the Republic Solar Highways (Solar Highways) project should qualify for funding from the Electric Program Investment Charge (EPIC) as a “technology deployment demonstration project.”

The Solar Highways project will be a partnership between private investors and the State of California through the Department of Transportation (“Caltrans”). Together, we will create a first-of-its-kind, commercial scale solar facility within an existing national highway system right-of-way (ROW). As detailed below, this project will advance the goals of the EPIC program by providing significant environmental, economic, and societal benefits.

Solar Highways Project Description

The project will develop and maintain ground mounted solar arrays along a 20-mile stretch of US Route 101 on seven separate locations of Caltrans-owned ROW in Santa Clara County, California. The project will consist of 64,000 ground mounted solar panels on 75 net acres of operating ROW. Utilizing the latest thin film panel technology manufactured in the United States by General Electric, the project will produce up to 15 megawatts (MW) of energy, enough to power 2,250 homes and offset 15,000 metric tons of carbon emissions. This table describes the locations of the solar energy generating facilities and the amount of power that each facility will generate.

The Solar Highways project is a good example of a “technology demonstration and deployment” project and should qualify for EPIC funding based on the values and principles stated in the CPUC decision. The Solar Highways project would be a smart and safe investment of EPIC funds, and we urge CEC and CPUC to support it.

Interchanges Along U.S. Route 101	Solar Energy Megawatts(dc)
Branham Lane	1.5 MW
Highway 85	3.6 MW
Coyote Creek Golf Drive	3.3 MW
East Dunne Avenue	1.2 MW
Tennant Avenue	1.5 MW
East San Martin Avenue	1.5 MW
Masten Avenue	2.4 MW

1) Value Chain:

Solar Highways qualifies within EPIC and can be mapped to the different elements of the electricity system “value chain” which include the following categories:

- Grid operations/market design
- Generation
- Transmission
- Distribution
- Demand side management

The Solar Highways project falls within the “Generation” category. Our solar arrays will interconnect through PG&E’s “fast-track” interconnection process at distribution voltages that avoid large interconnection upgrades. The solar power will be sent directly to the local electric grid. The utility that purchases the power would receive the Renewable Energy Credits.

2) Guiding Principles:

Solar Highways qualifies for EPIC funding under most of the “guiding principles” for CEC or IOU Investment Plans. These include:

- Societal benefits
- Greenhouse emissions mitigation and adaptation in the electricity sector at the lowest possible cost
- The loading order
- Low-emission vehicles/transportation
- Safe, reliable, and affordable energy services
- Economic development
- Efficient use of ratepayer monies

The Solar Highways project advances each of these guiding principles.

a) Electricity Ratepayer Benefits: EPIC states that a “key consideration will be provided to activities/projects that provide a benefit to help the Commission-regulated electricity sector meet its compliance obligations for AB 32 in the form of reduced greenhouse gas emissions at the lowest possible cost.” The Solar Highways project will produce clean energy for over 3,000 Santa Clara County Households. Our project will yield a reduction in greenhouse gas emissions of approximately 15,000 metric tons of carbon a year for a 24-year period of operation.¹ The Solar Highways project is expected to yield a net reduction in greenhouse gas emissions of roughly 330,000 metric tons over 24-years, and applying the EPA recommended benefit values to this analysis estimates a total of \$10.1

¹ Solar Highways Community Outreach Grant- 2012

million in undiscounted benefit associated with reduced emissions. In addition, as discussed below, the Solar Highways project will provide a new source of revenue and savings for Caltrans.

b) Societal Benefits: EPIC places investment priority with projects that have high societal benefits. The Solar Highways has large societal benefits using economic and workforce development as “guiding principles. Some examples of the project’s societal benefits are:

- The Solar Highways project will provide job-training with San Jose Conservation Corps and Charter School to disadvantaged youth. Training will be provided on the clean technology industry as well as maintenance services of the solar facilities and the highway right-of-way.
- Solar Highways will reduce vehicle-related road debris through litter removal thereby reducing traffic fatalities within the project boundary.
- Solar Highways will provide litter and removal abatement services of 20-mile project boundary decreasing litter by 31-45% providing Caltrans with a long-term plan for “state of good repair.” Over a 24-year period, this is a savings to the State over \$1.5 million.
- The Solar Highways project will promote the renewable energy industry, which has been identified by the Federal government as central to the long term economic competitiveness of the United States.
- The 20-mile stretch of US Route 101 where the Solar Highways project will be built currently contributes 155,000 metric tons of carbon emission per year. The Solar Highways project will offset approximately 15,000 metric tons of carbon. These offsets will provide a long-term “Best Practices” strategy for the State/Caltrans and other municipalities for greenhouse gas emission reduction. The Solar Highways project will provide these offsets by using existing ROWs, thereby avoiding the placement of solar panels on productive farmland and critical biological habitats.
- The project is consistent with state and regional plans to reduce greenhouse gas emissions and promote renewable energy development, including:
 - Governor Brown’s *Clean Energy Jobs Plan*
 - California Energy Commission’s Memorandum of Understanding with Eight State Departments to develop energy generating infrastructure
 - Caltrans Deputy Directive: *Creating new Opportunities for Solar Energy Systems on State Owned Lands*
 - MTC: *Bay Area Principals for Establishing Greenhouse Reduction Targets*
 - Valley Transportation Authority: *Transportation, Energy and Air Quality Program*
 - City of San Jose: *Green Jobs Plan, San Jose Green Vision*

c) The Loading Order: The Loading Order was adopted by the CPUC and CEC in 2003 as part of the Energy Action Plan I. It establishes the priority set of resources on which the state should rely in the provision of energy services. The loading order identifies energy efficiency and demand response as the resources of first choice, followed by renewable energy, both distributed generation and utility scale, followed by clean fossil generation, if necessary. The Solar Highways project would contribute 15 megawatts toward CEC/Governor Brown’s goal to install 2,500 megawatts of distributed renewables to assist with the 20,000 megawatt statewide goal.² Statewide application of the Solar

² April 2011 CEC Report – Developing Renewable Generation on State Property

Highways business plan could yield the State an additional 220-400 megawatts of renewable power on highway intersections within load centers.³

d) Low-Emission Vehicles/Transportation: EPIC-supported activities should be consistent with and/or advance the objectives codified by SB 626 (Kehoe, 2009) as section 740.2 of the Public Utilities Code, which directs the CPUC to “evaluate policies and develop infrastructure sufficient to overcome any barriers to the widespread deployment and use of plug-in hybrid and electric vehicles.” Solar Highways can serve as a wholesale/behind the meter provider (less expensive than IOU peak hour commercial rates) for electric vehicle (EV) charging station providers, thereby providing 100% clean transportation. In addition, Solar Highways can assist in the siting, planning and development of EV charging stations within key Caltrans intersections.

e) Safe, Reliable and Affordable Energy: The Solar Highways project will provide safe, reliable and affordable renewable energy.

f) Economic Development: The EPIC decision states that “given the profound economic challenges the state currently faces, it is incumbent upon the CPUC to seek to maximize the economic benefits that accrue to California as a result of any ratepayer-funded activities.” EPIC specifically recognizes that workforce development is “consistent with the goals of EPIC and provides benefits to electric ratepayers by ensuring that other activities are successful.”

The Solar Highways project would promote EPIC’s economic development goals in several respects:

- The Solar Highways project will create 728 direct and indirect induced job-years in the first year of the project and 922 total job-years over the duration of the project (24-years).⁴
- Santa Clara County is defined by the Federal Government as an “Economically Distressed Area” due to its high unemployment rate which is measured over the last 42 months. A fully funded Solar Highways project will have an immediate and long-term impact on the local and state economy.⁵
- Solar Highways will generate NEW revenue for Caltrans and the State on an on-going basis through a long-term ground lease and revenue sharing plan with the California Transportation Commission (CTC).
- Litter removal to be provided by Solar Highways along the 20-mile project boundary will save Caltrans and the State general fund \$131,130 annually.⁶
- Alternative energy production and the creation of green jobs will make California and the US economy more “economically competitive.”
- Solar Highways will produce roughly 22 million kilowatt-hours of energy per year valued at over \$100 million over the 24-year life of the system.⁷
- Solar Highways will improve the economic productivity of underutilized state owned land.

³ April 2011 CEC Report – Developing Renewable Generation on State Property

⁴ EPS “Silicon Valley Solar Highways TIGER Grant application BCA”- tables 17,18-19

⁵ Solar Highways TIGER Grant Application- page 18-19 – “Job Creation”

⁶ Solar Highways TIGER Grant Application – page 12-“Longt Term Operation and Maintenance”

⁷ Solar Highways TIGER Grant Application –page 13- “Value of Energy Produced”

g) **Efficient Use of Ratepayer Monies:** EPIC states that “funding should not be used to support activities or efforts that are duplicative of efforts that are being undertaken elsewhere or that are more expensive than necessary to achieve the goals. Furthermore, administrative costs need to be minimized to the greatest extent practicable without compromising programmatic oversight functions and efficacy.” The Solar Highways project meets these objectives. Our public/private partnership model provides unique benefits. **Over 68% of the total project costs will be financed through private equity sources.** Only through the public/private partnership financing model will Caltrans be able to attract federal tax credits that are vital to the profit and overall success of the project. Without this partnership, Caltrans would not be able to utilize this incentive. Moreover, a percentage of the profits from Solar Highways will be returned to the highway system for critical on-going maintenance and upgrades to the State’s transportation network. In addition, as described above, the Solar Highways project will create new revenue sources and maintenance costs savings for a major state department. These revenues and savings can help the state realize lower tax burden and/or higher level of service than could otherwise be feasible.⁸

3) **Other Factors:**

Solar Highways is a partnership of Republic Family of Companies and Caithness Energy, representing over a billion dollars of private equity and long-term international banking/financing relationships. Caithness Energy has over 40 years of experience of developing, financing, owning and operating all types of renewable and fossil fuel energy production projects throughout the United States.

EPIC Use of Funds

EPIC funds would be used solely for surface transportation improvements associated with the construction of the solar generation facilities. The transportation improvements related to the solar generation facilities include all additional construction costs that are necessary due to locating this project in the Caltrans ROW. Republic believes its private investment in this project represents an “efficient use of rate payer investment”.

Below is a detailed breakdown of each cost category.

- **Site Preparation Grading and Access:** These costs include the clearing and grubbing of existing vegetation in the ROW as well as tree removal. It also includes the grading of the sites and the construction of access roads (gravel), curb cuts and temporary storm water prevention.
- **Drainage:** The majority of the sites currently have swales to deal with drainage. These drainage costs are for some new drainage structures and some swale modifications. The costs also include permanent water quality best management practices (BPM’s).
- **Security and Traffic Safety:** These costs include the construction of metal beam guardrails at high run-off locations, six foot chain-link fence surrounding each solar installation as protective structure and a deterrent for potential thieves and vandals. The security for the systems will be in the form of motion detection cameras mounted on break-away poles every 100 yards along the perimeter fence in the ROW. Video surveillance as a part of the security system will not only monitor and protect the solar facilities, but will also be used as part of the general highway

⁸ EPS “Silicon Valley Solar Highways TIGER Grant application BCA”- page 6- “CA and Taxpayers”

safety and security operation. The system will provide information on incursions into the interchange areas and thus contribute to the safe and secure operation of the highway.

- **Planting and Erosion Control:** As a part of the overall project, some planting will be required to mitigate the trees that will be removed to install the system. The erosion control includes the application of a permeable fabric with three inches of pea gravel on the ground under the systems. This ground application also helps with fire prevention.

Item	EPIC Funds	Private Equity	Total
Site Preparation Grading & Access	\$3,315,864	\$0	\$3,315,864
Drainage	\$1,725,000	\$0	\$1,725,000
Security & Traffic Safety	\$2,915,474	\$0	\$2,915,474
Planting and Erosion Control	\$2,147,038	\$0	\$2,147,038
Electrical (AC Onsite Collection)	\$3,298,210	\$0	\$3,298,210
Electrical (Offsite to Interconnection)	\$361,918	\$0	\$361,918
Utility Interconnection	\$3,283,000	\$0	\$3,283,000
Electrical (Panels & Racking System)	\$0	\$27,609,644	\$27,609,644
Solar Contingency (15%)	\$1,561,106	\$5,137,316	\$6,698,422
Project Total	\$18,607,610	\$32,746,960	\$51,354,570

It should be noted that the Solar Highways Project is “scalable” and the above total represents cumulative project costs. In other words, these costs above represent the total project costs of all seven intersections being proposed by Solar Highways, or 15 megawatts of solar energy development. Republic and Caltrans are open to phasing the project in order to maximize potential rate payer investment.

Conclusion

Solar Highways is a good example of the EPIC definition of “Technology and Deployment”, and we respectfully request the project be strongly considered for rate payer investment. The project is “shovel ready” (deployment) with excellent societal benefits ranging from workforce development to meeting the tangibles goals of AB 32. In addition, the project has a financial sponsor which makes it an efficient investment of rate payer financing.

We would encourage all involved to visit our website at www.cloverleafsolarhighways.com as well as YouTube under Solar Highways for more detailed information on the project.

Regards,

Michael R. Van Every, President
 Republic Solar Highways

Cc: Pamela Doughman, CEC
Jim Bozioneles, Caltrans District 4
Brent Green, Caltrans HQ
Ann Smart, SVLG
Cliff Rechtschaffen, Governor Brown's Office
Wade Crowfoot, Governor Office of Planning and Research
Julia Sullivan, Akin-Gump

Attachment: Republic Solar Highways –EPIC Information



**Republic
Solar Highways**

GRID UNLOCK

THE SOLAR HIGHWAYS PROJECT





Republic
Solar Highways

We Are

CAITHNESS



imagination at work



ROSENDIN
ELECTRIC

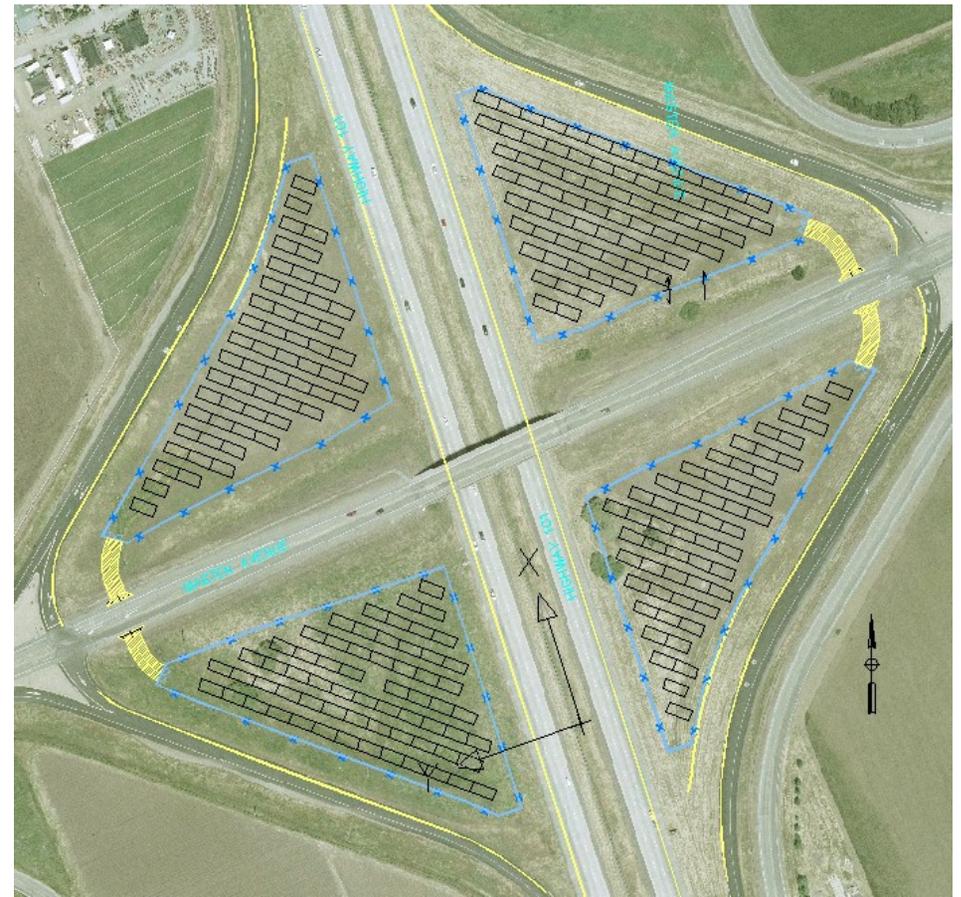


Solar Highways

Creating Commercial Solar Power Plants on Caltrans Right of Ways

Project Summary

- 15 megawatt (dc) system
- 22 million kilowatt hours per year
- 64,000 fixed solar panels
- 65 acres of land
- 7 intersections along U.S. Route 101
- Sell power to utility through 20-year Power Purchase Agreement
- 35 year ground lease with Caltrans



U.S. Route 101 and Masten Ave – 2.396 MW

Caithness Energy

25 years of experience developing and operating 42 power projects.

- 3,000 MW of gas-fired projects
- 495 MW of geothermal projects
- 160 MW of solar projects
- 345 MW of wind projects





Republic
Solar Highways

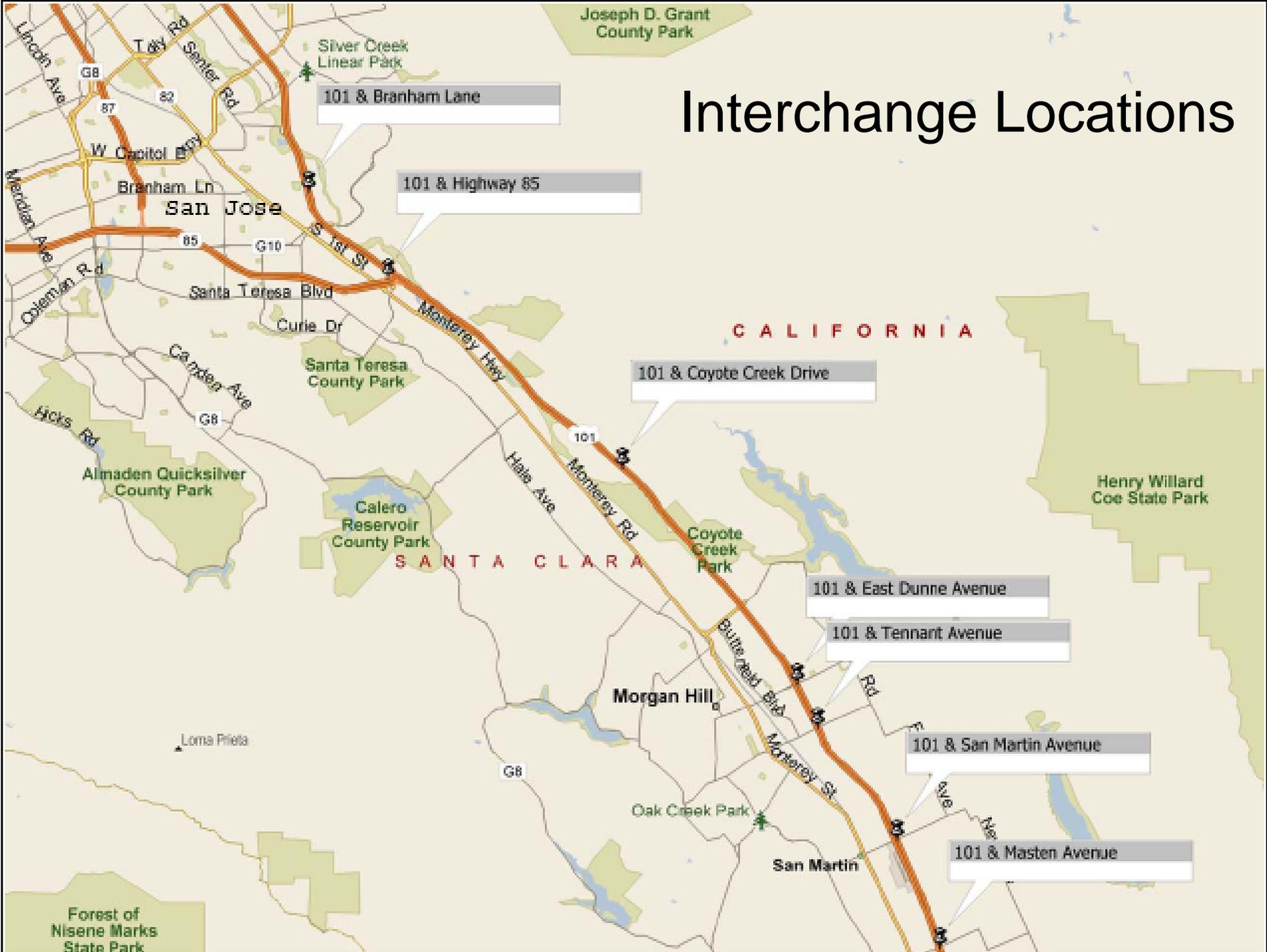
Caithness Energy

Projects under construction and development.

- 350 MW Soda Mountain Solar Project in the Mohave Desert
- 520 MW Blythe II-natural gas-fired plant in Blythe California
- 800 MW wind farm in New Mexico
- 490 MW wind farm in Oregon



Interchange Locations



Intersections on U.S. Route 101



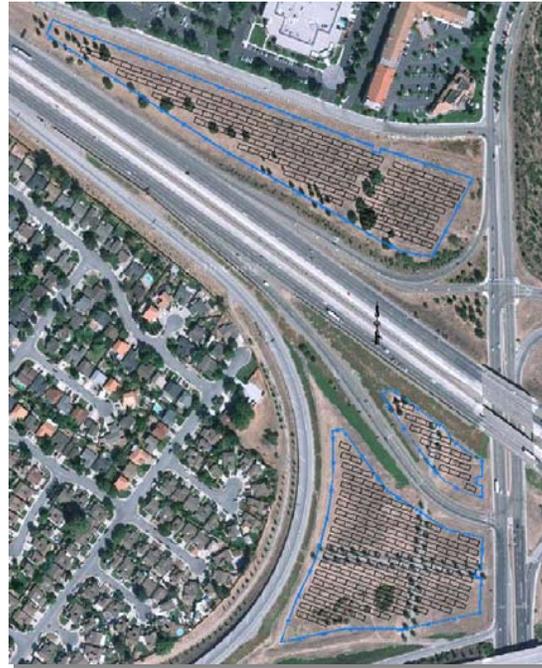
**Coyote Creek Dr - 3.255 MW
San Jose**



**East San Martin Ave - 1.352 MW
Santa Clara County**



**Tennant Ave - 1.449 MW
Morgan Hill**



**State Route 85 - 3.603 MW
San Jose**



**Branham Ln - 1.459 MW
San Jose**



**Masten Ave - 2.396 MW
Santa Clara County**



**East Dunne Ave - 1.198 MW
Morgan Hill**

U.S. Route 101 @ Golf Creek Drive



U.S. Route 101 @ State Route 85



Economic Benefits for California

- Monthly lease payments and revenue sharing with Caltrans creating NEW long term revenue for California's highways
- Cost savings by eliminating maintenance costs for weed and litter abatement
- Branding, goodwill and publicity: Republic Solar Highways' installations will be seen by 1 million people per day
- Consistent with Caltrans directive to explore solar energy generation on existing Caltrans facilities

SOLAR FARM POWERING 500 SILICON VALLEY HOMES

POWERED BY:

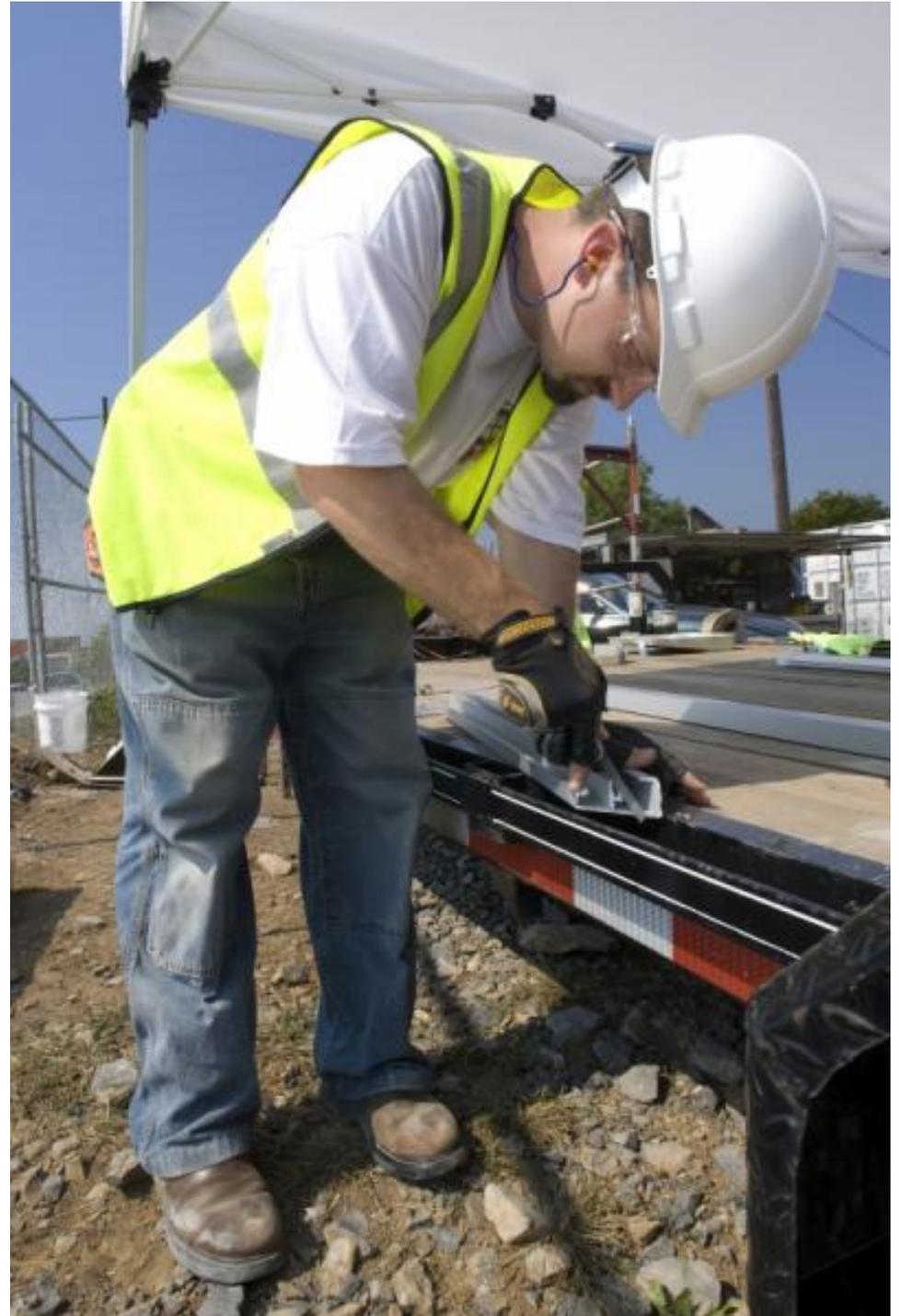
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- Signage to be placed on development sites



Job Creation

- 280 construction jobs and 30 permanent jobs
- Green jobs union agreement with Santa Clara & San Benito Counties Building & Construction Trades Council
- Future “Youth Build Program” agreement with San Jose Conservation Corps
- Enhancing the maintenance and litter abatement of Caltrans right of way



Carbon Emissions

Interchange	Acreage	MW(dc)	MWh per Year	Metric Tons of CO2 Offset Per Year	Car Miles Offset Per Year**	Trees Offset Per Year
Highway 85 South	14.78	3.41	4,842	3,477	500,000	17,700
Masten Avenue	9.69	2.24	3,174	2,279	327,808	11,604
East San Martin Avenue	6.24	1.44	2,044	1,468	211,096	7,473
Branham Lane	7.69	1.77	2,519	1,809	260,149	9,209
Coyote Creek Drive	13.00	3.00	4,259	3,058	439,784	15,568
East Dunne Avenue	5.53	1.28	1,812	1,301	187,077	6,623
Tennant Avenue	6.14	1.42	2,011	1,444	207,713	7,353
TOTAL	63.07	14.55	20,662	14,835	2,133,627	75,530

* All Estimates Computed Using www.carbonify.com/carbon-calculator.htm

**Assumes car gets 21mpg



Safety & Security

Safety

- Maintenance access from local roads only
- Minimum 52-foot setback for clear recovery zone from right of way
- Guardrails and concrete barriers at high risk runoff locations

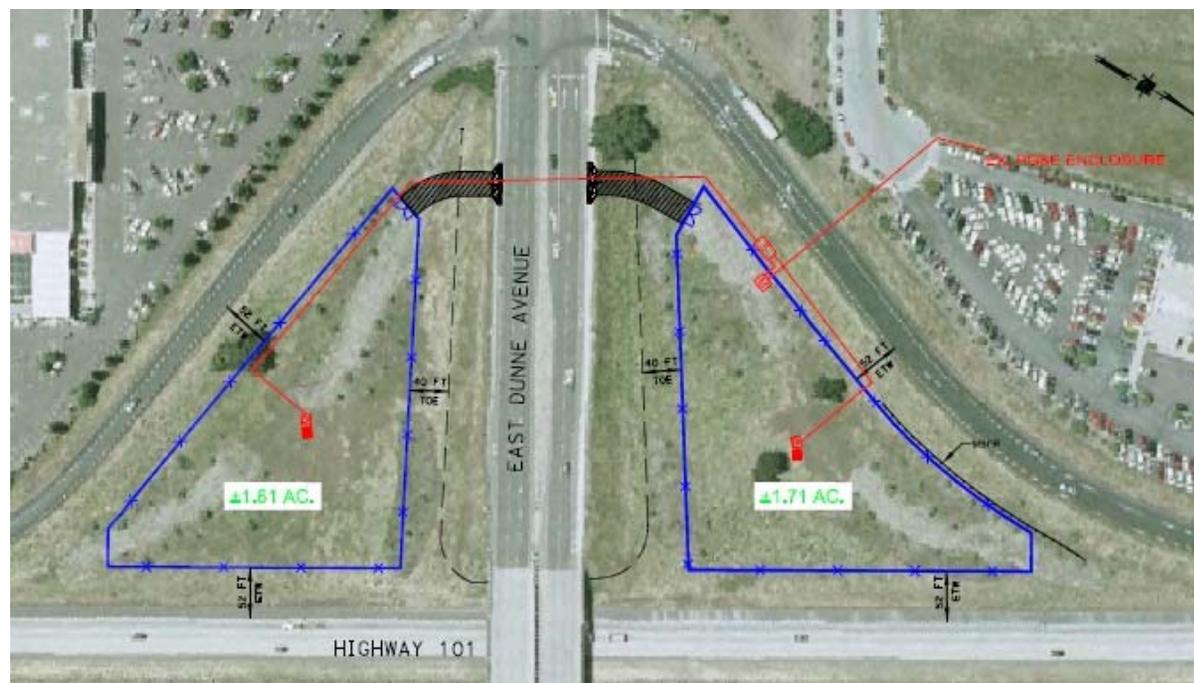
Security

- Security fencing and video surveillance system
- Specialized screws, nuts, bolts and fasteners to prevent theft
- 24-hour monitoring with alerts to California Highway Patrol



Electrical Connections to the Grid

- 7 interconnection points (one for each interchange) onsite or very close to projects.
- Submitted Interconnection Applications to PG&E in February 2011
- The PG&E distribution grid will have capacity with no upgrades for this project
- PG&E Distributed Generation Interconnection Process:
 - Fast Track Study – 3 interchanges
 - Independent Study Process – 3 interchanges
 - Cluster Study – 1 interchange



Visual Aesthetics

Reflection

- Solar panels are designed to absorb light
- Any reflection would come from glass cover
- Dust on panels mutes the reflection
- Exposure of panels to the elements “roughs up” the glass surface after 6 to 8 months further muting the reflection
- Studies will be conducted to ensure driver safety

Look & Feel

- Crushed gravel will be placed under panels to reduce the risk of grass fires, shading potential and maintenance costs
- Existing landscaping at State Route 85 interchange will be replaced



Construction of System



- Foundations are 3-inch galvanized pipe driven into the ground 20 feet deep
- Pipe length and pier design are determined by soils report - resistance to uplift usually governs

- Inverter pads are typically 10 feet by 30 feet with a height of 7 feet, 6 inches



- Panel configuration for PV racking system will stack 6 panels high and 7 panels wide



Community Outreach

- **Stakeholders:** Republic Solar Highways will assemble a contact list of public officials and agency staff, as well as local community groups, community leaders, businesses and other interested parties that may be effected/interested in learning about the project.
- **Issues:** The key issues revolve around visual aesthetics including reflection and landscaping, and safety.
- **Three-Dimensional Architectural Renderings:** These renderings will be used to show each intersection of the project from any number of angles.
- **Community Meetings:** Republic Solar Highways will conduct a series of community meetings (minimum of four) in the local area to discuss the project.
- **Project Website:** A website will be created and updated on a regular basis to show the progress of the project.
- **Private/Public Sector Media Outreach:** Preparation of materials for industry media and private sector and public sector entities throughout California and the nation.





Republic Solar Highways

Community Outreach

SILICON VALLEY / SAN JOSE

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Tech awards
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Hotel Los Gatos owner hopes to avert sale

BY ELI SEGALL

LOS GATOS - The upscale Hotel Los Gatos is scheduled for auction on near-these days this month, potentially taking it from a well-known developer who missed loan payments and saw the project go into default.

The trustee sale, slated for Dec. 7 at Santa Clara County Superior Court in San Jose, would come as hotel developers near in California. It would also signal yet another problem for the hotel's builder and co-owner, San Jose-based Pittin Bros., which in recent

years drastically cut its work force and faced piles of alleged unpaid bills on various projects.

Company vice president Greg Pittin said on Nov. 30 that the auction has been postponed, but as of Dec. 1 the auction was still scheduled to be held, according to county records.

The 12-room boutique hotel, located on East Main Street near Los Gatos High School, opened in 2002 to much fanfare and offers a day spa, the Greek restaurant The Delta and sweeping views of the Santa Cruz Mountains. The scheduled auction would come nine

months after a notice was filed with the Santa Clara County Clerk's office, saying Pittin Bros. had defaulted on a \$12 million loan.

As of last month the loan had an unpaid balance and other charges totaling \$12.7 million, according to the trustee sale notice.

The hotel's other owner, the Fagline family of Los Gatos, could not be reached for comment.

County records show that Pittin Bros. received the

See HOTEL, Page 25

Cloverleaf 'farmers' hope to grow solar power



RAMPUP: Republic Cloverleaf Solar Vice President Erik Hayden, left, and Senior Vice President Michael Far Eary wait to install solar farms along freeway.

BY LISA SIBLEY

SAN JOSE - Erik Hayden has a vision that one day the wasted space known as cloverleafs on freeway entrance and exit ramps will be transformed. Instead of collecting litter and discarded coaches, the land will host solar farms capable of generating enough electricity to power about 3,000 single family houses in

the surrounding South Bay communities.

His concept may not be that far off.

"It is under utilized, wood-infested land that the California Department of Transportation can't afford to maintain," Hayden said.

Hayden, vice president, director of land acquisition and development, with San Jose-based Republic Clover

See CLOVERLEAF, Page 25

@First starts to fill up @last, with retailers

BY DAVID GILL

SAN JOSE - A variety of eateries, a major retailer, a seven-story hotel and a major corporation all lay claim to @ First in North San Jose. The project, which had stalled during the rough economy, looks like it will fit nicely into what is known as Silicon Valley's Golden Triangle.

The mix of services is part of a 60-acre retail "village" concept that will sit between another tenant Target and 300,000 square feet of office space that houses the headquarters of Brocade Communications Systems Inc., a networking company that moved 2,200 employees to the site in June. Brocade plans to finish its eight-building campus by summer 2011.

When the campus is done, employees, visitors and residents living in the area will no longer lack services in a San Jose area long viewed as underserved.

In November, four restaurants - Premier Pizza, Pasa Express, Souplantation/Sweet Tomatoes and Chipotle Mexican Grill - signed leases in @ First for a total of 11,000 square feet. These eateries will make up about 14 percent of the 60,000 square feet of retail space available next year. The shops will be near the 161,000-square-foot Target store, which is already open.

Curtis Leigh, director of development for Hunter Properties, developer of @ First, said he's also talking with two potential supermarket tenants to occupy a 14,000-square-foot space as a junior anchor tenant. Nothing has been finalized.

See @FIRST, Page 24



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SMALL BUSINESS

IMVU

Palo Alto company shifts from virtual worlds to 'entertainment destination.'

Page 9




Oregon Solar Powered Highway

- Put into operation December 2008 by the Oregon Department of Transportation
- First state to with highway-side solar panels
- 104 kW system powers adjacent freeway lights
- Republic Solar Highways' project is 150 times larger than Oregon's project





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THE SOLAR HIGHWAYS PROJECT

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