



WEST VILLAGE

How UC Davis is Creating the
Largest Zero Net Energy Development in the U.S.

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BECC November 13, 2012

WEST VILLAGE CONTEXT

CORE DRIVERS FOR DEVELOPMENT ADVANCE THE UNIVERSITY'S MISSION

Linking home to school and work



Affordability

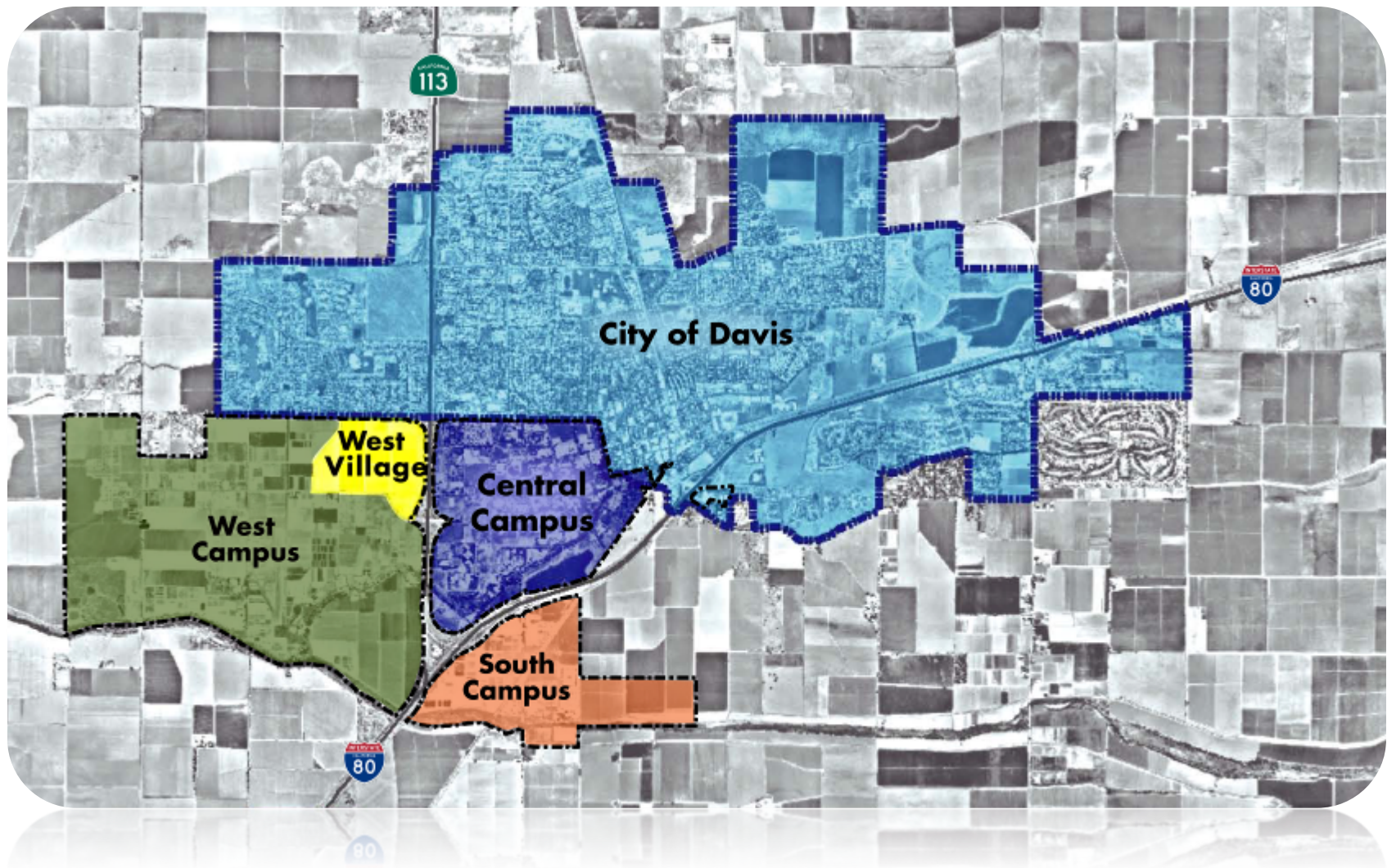


A community focused on education






Leadership role in environmental planning
and design





SITE PLAN







-  Village Square
-  Mixed-Use (45,000 sf retail + apartment units above)
-  Community College (60,000 sf)



SITE PLAN









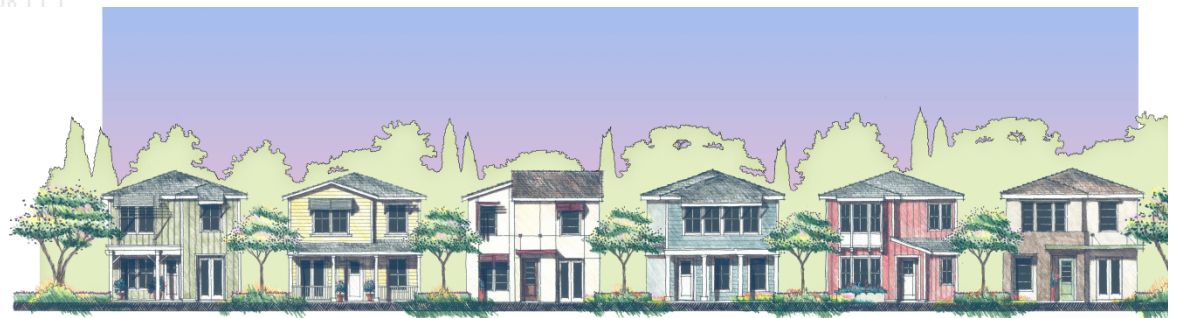
-  Village Square
-  Mixed-Use (45,000 sf retail + apartment units above)
-  Community College (60,000 sf)
-  Student Housing (1,980 beds)



SITE PLAN



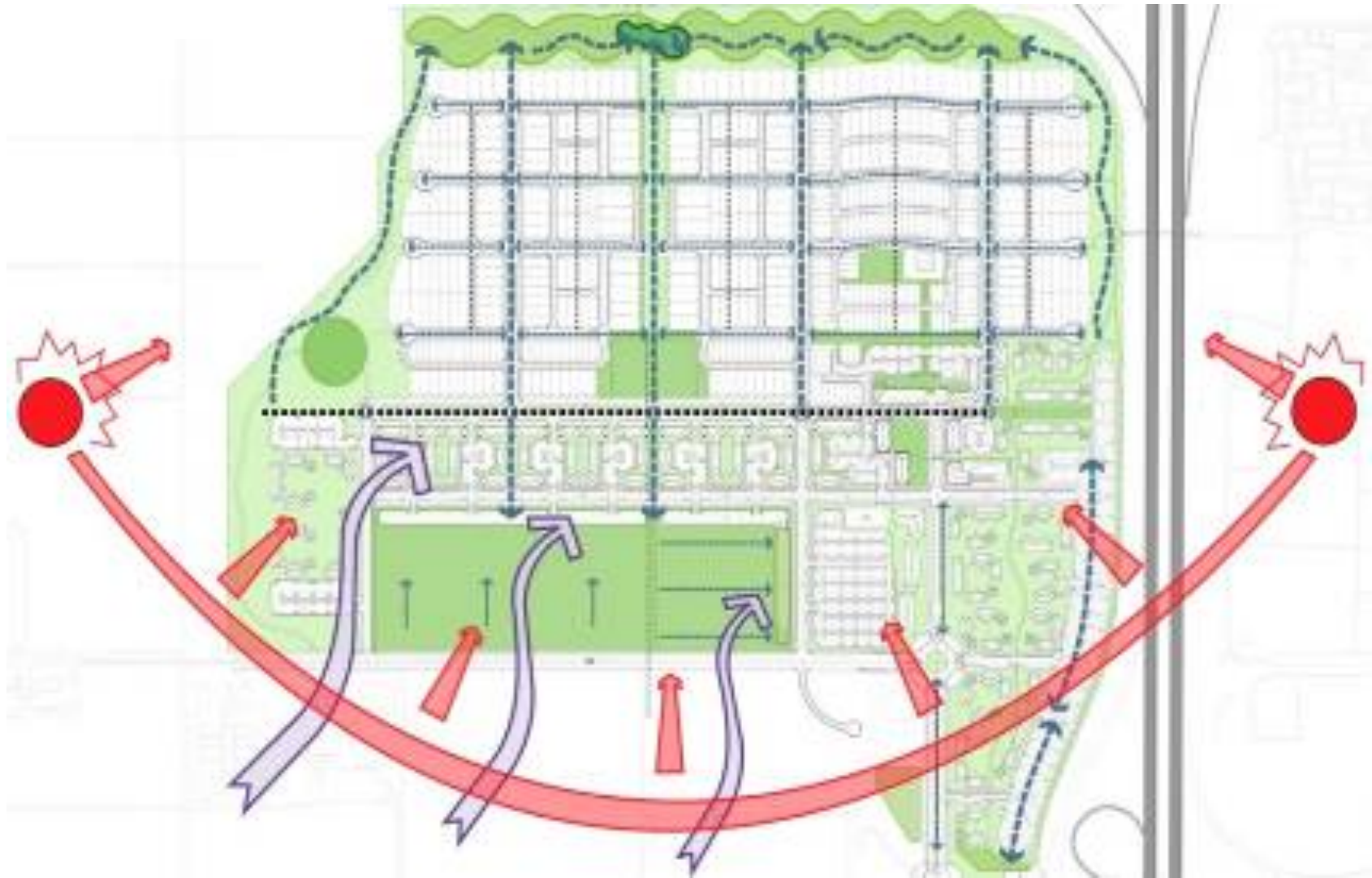
-  Village Square
-  Mixed-Use (45,000 sf retail + apartment units above)
-  Community College (60,000 sf)
-  Student Housing (1,980 beds)
-  For-sale Faculty/Staff Housing (343 homes)
-  Site for Day Care/Preschool



SITE PLAN



- Village Square
- Mixed-Use (45,000 sf retail + apartment units above)
- Community College (60,000 sf)
- For-sale Faculty/Staff Housing (343 homes)
- Site for Day Care/Preschool
- Student Housing (1,980 beds)
- Water management & open space
- Recreation fields and parks



ZERO NET ENERGY IN WEST VILLAGE

CALIFORNIA'S GOAL OF ZERO NET ENERGY

- 🌀 All new residential construction in CA will be ZNE by 2020
- 🌀 All new commercial construction in CA will be ZNE by 2030



CA | Energy Efficiency
Strategic Plan

CHALLENGES TO ACHIEVING ZERO NET ENERGY

- 🌀 No existing large-scale deployments of community-scale projects by traditional developers
- 🌀 Current policies are not structured to encourage community-scale ZNE adoption
- 🌀 Current market conditions have reduced risk-tolerance
 - 🌀 Need for ZNE financing mechanisms
- 🌀 Split-incentives
- 🌀 Cost of up-front capital

UTILIZING STATE AND FEDERAL GRANTS

- 🌀 Supporting design
 - 🌀 California Energy Commission (CEC) RESCO grant
 - 🌀 Department of Energy (DOE) grant
 - 🌀 California Public Utilities Commission (CPUC) grant
- 🌀 Subsidizing both renewable supply and demand reduction

LEVERAGING ECONOMIES OF SCALE

- 🌀 Large project allows for replicable design strategy

ADDRESSING SPLIT INCENTIVES

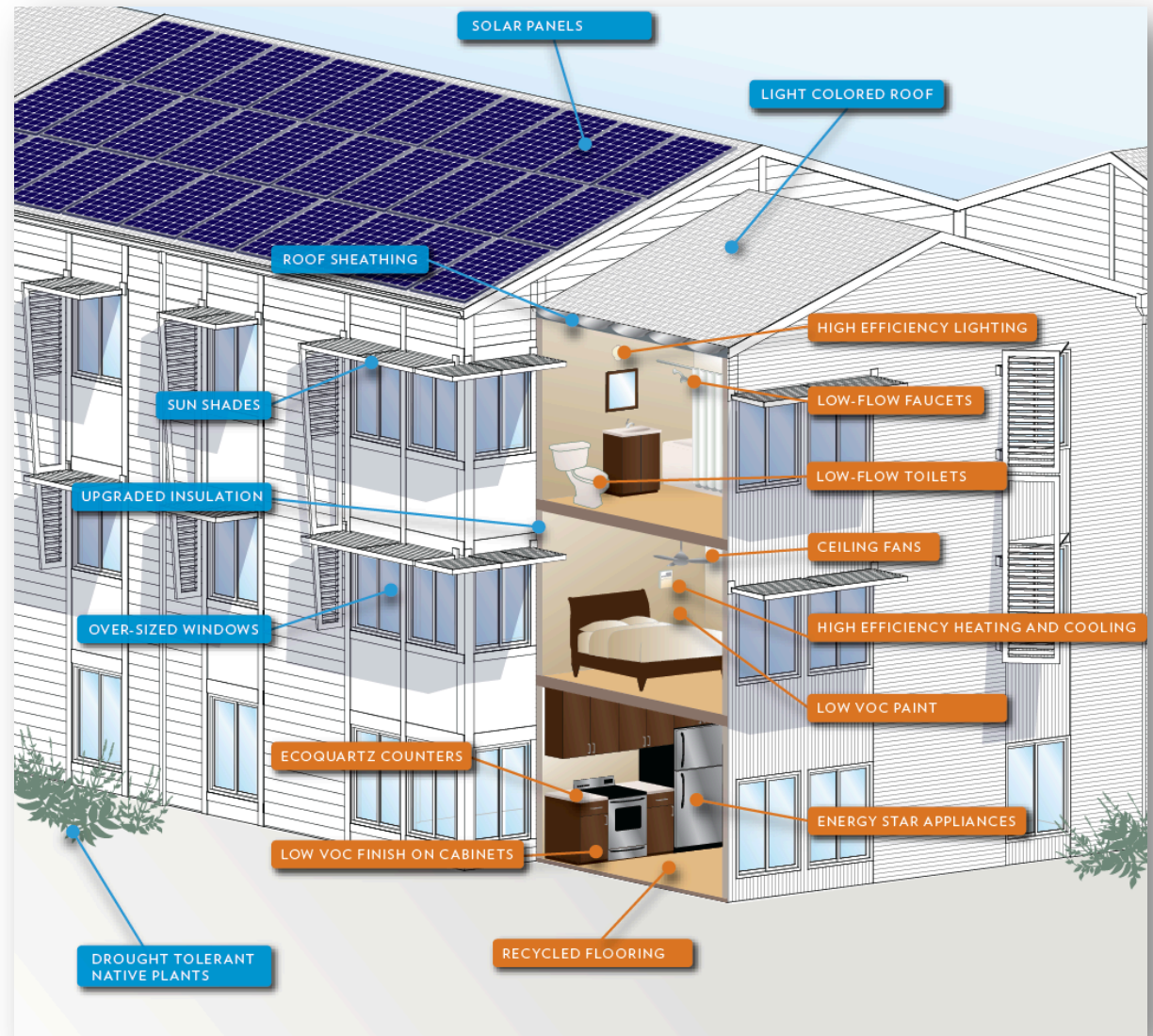
- 🌀 Incorporating energy bill into rent for multi-family housing
 - (Strategy not ideal as there is no price signal to tenant)
 - (Strategy won't work for Single-Family Homes)

ENERGY REDUCTION

Energy efficiency measures designed to reduce energy demand by 50%.

ENERGY PRODUCTION

Solar PV system designed to produce renewable energy to meet community needs.





Reduce

Produce

ZERO NET ENERGY

UCDAVIS

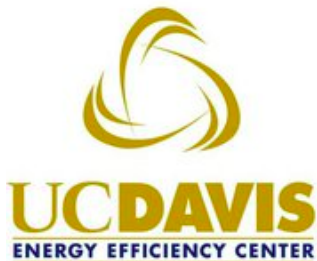
WEST VILLAGE

UCDAVIS

UNIVERSITY OF CALIFORNIA



URBAN VILLAGES

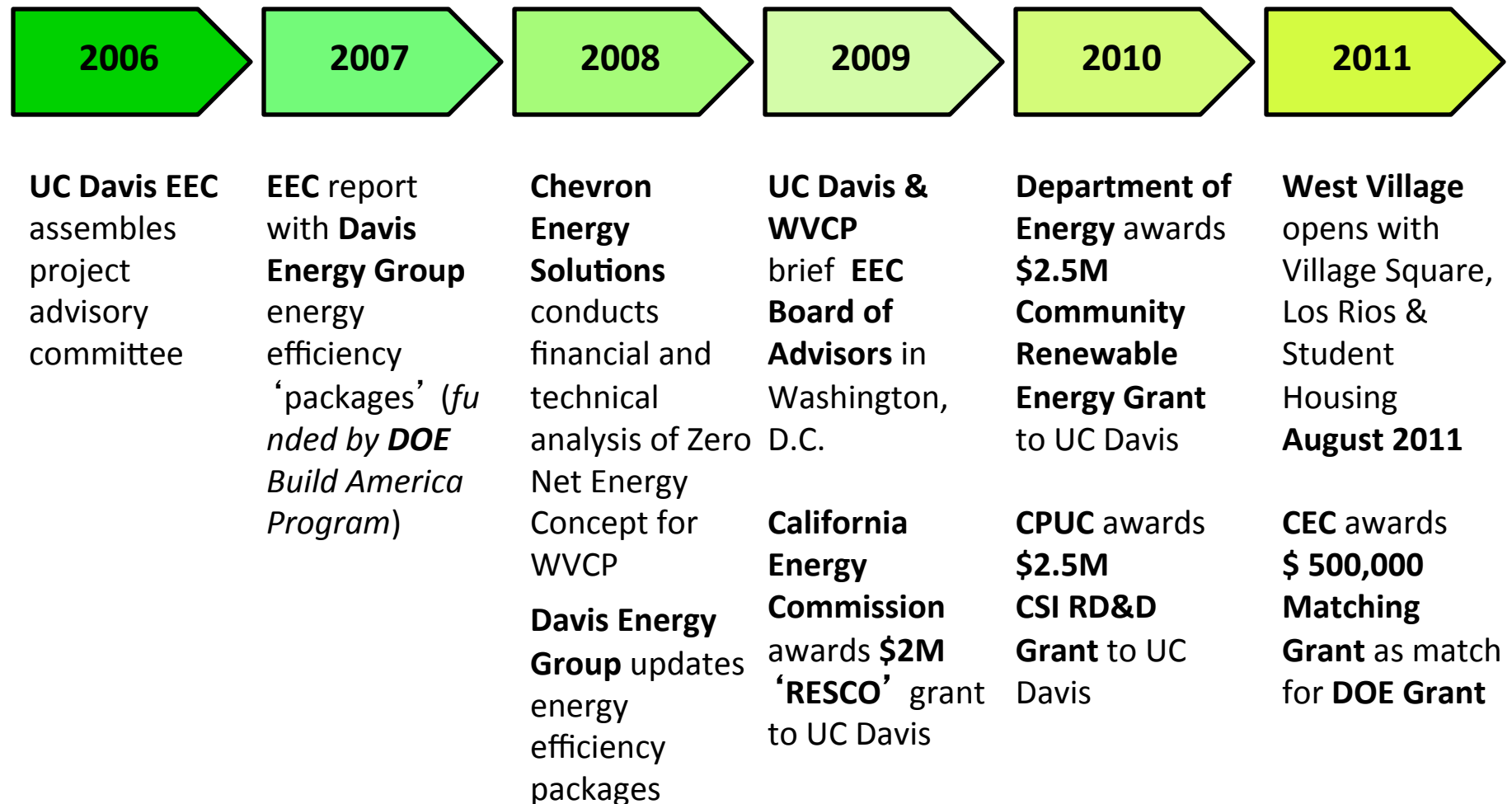


UCDAVIS

WEST VILLAGE



WHY ZERO NET ENERGY?



AGREEMENT ON SHARED GOALS

- 🌀 Zero net impact to developer's pro forma
- 🌀 Zero net additional annual energy spend by end-user
- 🌀 Zero Net Energy
 - 🌀 Maximize cost-effective efficiency measures
 - 🌀 Maximize on-site renewable energy
 - 🌀 Optimize for smart grid



MOTIVATION FOR DEVELOPER

- 🌀 Build and maintain a relationship with the Landowner
- 🌀 Increase marketability of its brand
- 🌀 Access to discounted, cost-effective, and reliable technologies
- 🌀 Opportunity for exposure to advanced and emerging energy-efficient technologies
- 🌀 Gain green building experience
- 🌀 Increase Marketability of Product

MOTIVATION FOR LANDOWNER

- 🌀 Access to industry partners
 - 🌀 Funding support for programs and research projects
 - 🌀 Supporting students
 - 🌀 Executing research contracts
 - 🌀 Acquiring general sponsorship
 - 🌀 Closer to market impacts
- 🌀 Facilitates RDD&D opportunities
 - 🌀 Research projects
 - 🌀 Development of new technologies
 - 🌀 Demonstrations
 - 🌀 Deployment

MOTIVATION FOR COMMUNITY

- 🌀 Increase marketability of the Davis brand
- 🌀 Attract students, staff, and faculty by providing sustainable housing options

The screenshot shows a Forbes article from October 14, 2011, at 6:08 PM, with 11,209 views. The article is titled "Largest U.S. 'Zero Net Energy' Community Operates At UC Davis" and is written by Kerry A. Dolan, a Forbes Staff member. The article text begins with "Davis, Calif. – The country's largest 'zero net energy' community – designed to generate as much energy as it consumes – officially opens Saturday on the campus of the University of California, Davis." The article has 2 comments and 2 call-outs. To the right of the article is a sidebar with the "Los Angeles Times" logo and a "BUSINESS" section. The sidebar includes a search bar, a navigation menu with links to LOCAL, U.S., WORLD, BUSINESS, SPORTS, ENTERTAINMENT, HEALTH, LIVING, and TRAVEL, and a "MONEY & COMPANY" section. The "MONEY & COMPANY" section features a banner for "EXELIS ITT xylem" with the text "SOON, ITT WILL ENTER A NEW ERA OF VALUE CREATION." Below the banner is a "Money & Company" section with the text "TRACKING THE MARKET AND ECONOMIC TRENDS THAT SHAPE YOUR FINANCES." and links to "Previous Post", "Money & Company Home", and "Next Post".

Forbes | Search news, business leaders, and stock quotes

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LOCAL | U.S. | WORLD | **BUSINESS** | SPORTS | ENTERTAINMENT | HEALTH | LIVING | TRAVEL

MONEY & COMPANY | TECHNOLOGY | PERSONAL FINANCE | SMALL BUSINESS | COMPANY TOWN

IN THE NEWS: DAYLIGHT SAVINGS | USC-STANFORD | GAZA STRIP | UFC 137 | NFL | OCCUPY

SOON, ITT WILL ENTER A NEW ERA OF VALUE CREATION. | **EXELIS** | **ITT** | **xylem**

Money & Company
TRACKING THE MARKET AND ECONOMIC TRENDS THAT SHAPE YOUR FINANCES.

« Previous Post | Money & Company Home | Next Post »

MOTIVATION FOR REGULATORS

- 🌀 Better understand and address barriers to wide-scale ZNE adoption
 - 🌀 Structuring incentives that work at a community-scale level versus current options (single-family home and buildings)
- 🌀 Partner with University researchers
- 🌀 Gain insight into innovative energy pricing structures

MOTIVATION FOR ENERGY CONSULTANTS & ADVOCACY GROUPS

- 🌀 Partner with industry leaders
- 🌀 Gain insight into barriers to adoption and best practices
- 🌀 Increase marketability of brand
- 🌀 Utilize West Village as a case study

MOTIVATION FOR INDUSTRY PARTNERS

- 🌀 Unique access

- 🌀 University/West Village brand and related PR
- 🌀 Academic R&D capabilities

- 🌀 Opportunity to conduct RDD&D

- 🌀 Product/IP development
- 🌀 Product demonstration to policymakers and influential stakeholders
- 🌀 Product deployment opportunities at West Village

UC DAVIS

WEST VILLAGE





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**IS CALIFORNIA' S GOAL
APPROPRIATE?**

CLEAR THAT THE CONCEPT OF ZNE HAS AN APPEALING NATURE

- 🌀 Simplistic objective is easy to communicate and is compelling
- 🌀 Resonates with communities and customers that want to have local ownership of their energy/carbon footprint
- 🌀 Shared goals are powerful drivers for innovation

NOT CLEAR THAT ZNE COMMUNITIES DESIGNED LIKE WEST VILLAGE WOULD BE COST-EFFECTIVE AND EQUITABLE

- 🌀 Broadly subsidized grid currently serves several important functions:
 - 🌀 Storage
 - 🌀 Peak power provision
 - 🌀 Reliability
- 🌀 Net-metering communities (e.g. West Village) take advantage of resources
 - 🌀 BUT, current business models don't pay for these services

NOT CLEAR THAT ZNE IS TECHNICALLY FEASIBLE FOR MANY LOCATIONS/PROJECTS

- 🌀 High-rise buildings and locations where resources constrained will have a harder time (e.g. land, solar, wind, biomass availability)
- 🌀 Retrofits
 - 🌀 Larger and much more costly that will need to be addressed over time

MAY NEED TO RE-EVALUATE THE ZNE GOAL

- 🌀 Utilities are currently working to restrict net-metering
- 🌀 May want to require ZNE communities to also be Zero Net Peak with on-site reliability
- 🌀 This could ultimately localize energy tariffs in the future