

WEST VILLAGE

Zero-Net Energy Community: Moving Beyond
Political, Financial, and Operational Challenges

October 18, 2011 | 21st Annual UCLA Lake Arrowhead Symposium
Benjamin Finkel

Case Study on 1st US Zero Net Energy Community

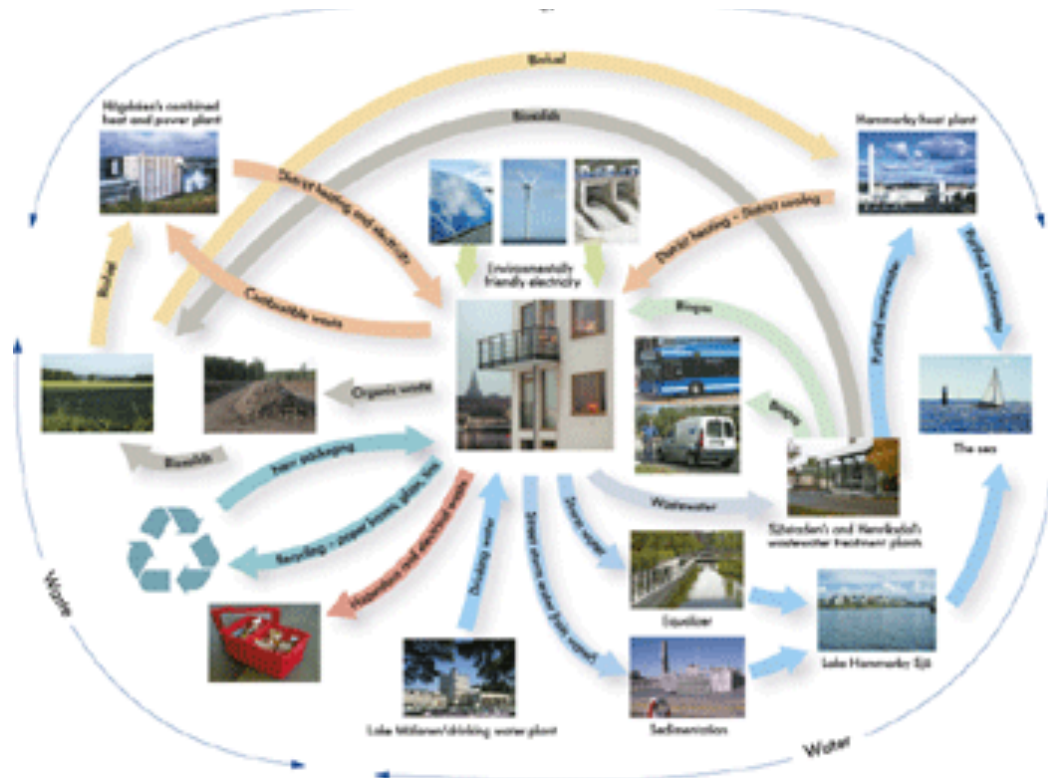
- Zero Net Energy at the Community-Scale
- West Village
 - Large Low Cost Mixed Use Community
 - Learning Laboratory, Striving for ZNE
- Political, Financial, & Organizational Barriers

There are plenty of examples of demonstration ZNE Buildings...

Very few examples of demonstration ZNE Buildings at the Community Scale...

Does this mean ZNE doesn't scale well?

Hammarby Sjöstad, City of Stockholm, Sweden



Beddington Zero Energy Development (BedZED), UK



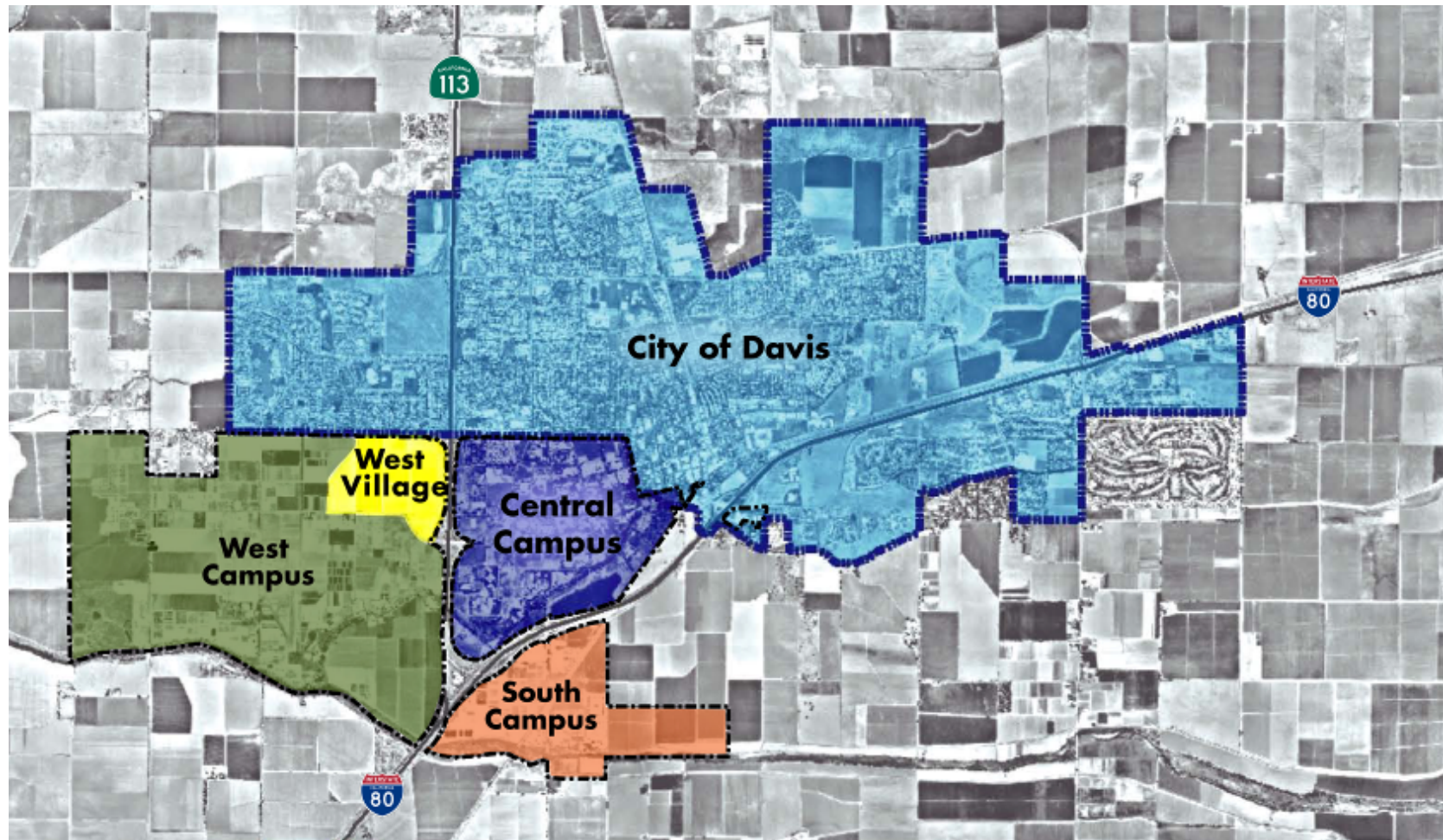
zHome Multifamily Project, Issaquah, Washington



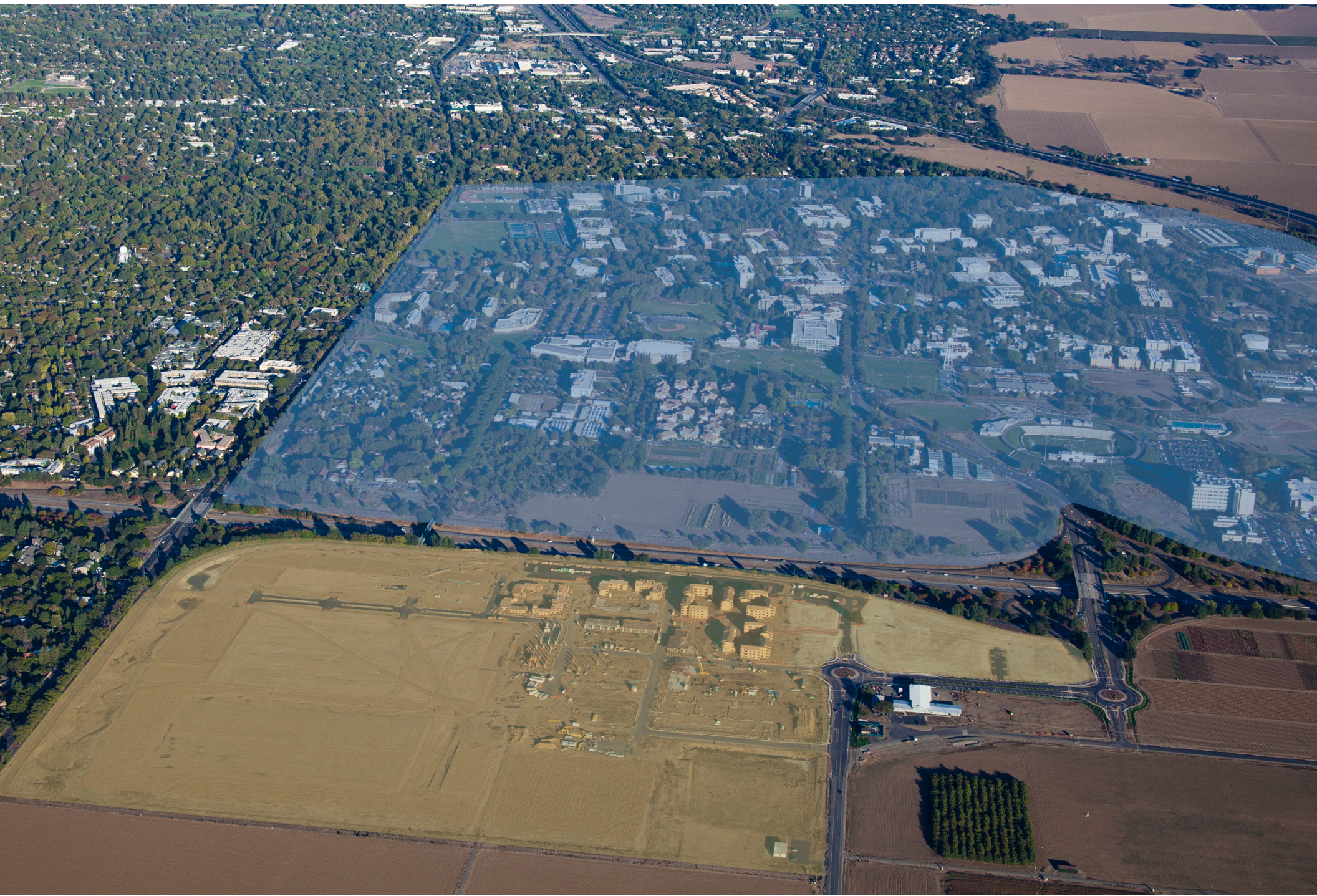
West Village Energy Goals

1. Zero New Additional Cost to the Developer
2. Zero New Annual Utility Cost to the Resident
3. Grid-Connected Zero Net Energy on an Annual Basis
4. Utilize 100% On-Site Renewable Energy

Large Mixed Used Community










CAMPUS PLANNING

Land Use Plan







-  Village Square
-  Community College (60,000 sf)
-  Mixed-Use
(42,500 sf retail and
apartment units above)

CAMPUS PLANNING

Land Use Plan








-  Village Square
-  Community College (60,000 sf)
-  Mixed-Use
(42,500 sf retail and
apartment units above)
-  Student Housing
(1,980 beds, 663 units)

CAMPUS PLANNING

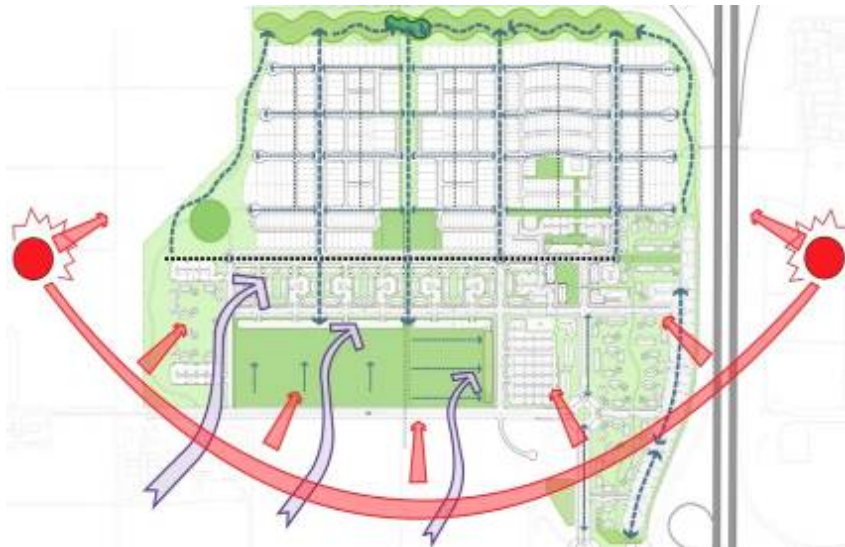
Land Use Plan



-  Village Square
-  Community College (60,000 sf)
-  Mixed-Use (42,500 sf retail and apartment units above)
-  Student Housing (1,980 beds, 663 units)
-  For-sale Faculty/Staff Housing (343 homes)

Core Principles

- Housing Affordability
- Environmental Responsiveness
- Quality of Place



ZNE Model

Incorporate energy efficient building design and technologies to decrease community energy consumption.

REDUCE

Radiant Barrier Roof Sheathing
Passive Solar Design
Exterior Building Shades Tight Building Envelope
Solar Water Heating **Upgraded Insulation**
DUCTS IN CONDITIONED SPACES High Efficacy Lighting
Energy Efficient Appliances
Fresh Air Mechanical Ventilation
LIGHTING CONTROL VACANCY SENSORS
Distributed Thermal Mass

Induction Cooktops One Switch Technology Natural Light and Ventilation
Thick Exterior Walls with Extra Insulation **Cool Roofing Materials** Upgraded Insulation
Increased Thermal Mass **COMPACT FLUORESCENT LAMPS** **Low U-factor Windows**

Operable Windows Capture Delta Breeze
Light Colored Roof and Walls **LED Lighting**
Efficient Heating and Cooling Systems

EXTERIOR FOAM SHEATHING

High Performance Low-E Glass

Solar Thermal Water Heating

WHOLE HOUSE FAN

Cross Ventilation

Shade Devices

CFLs

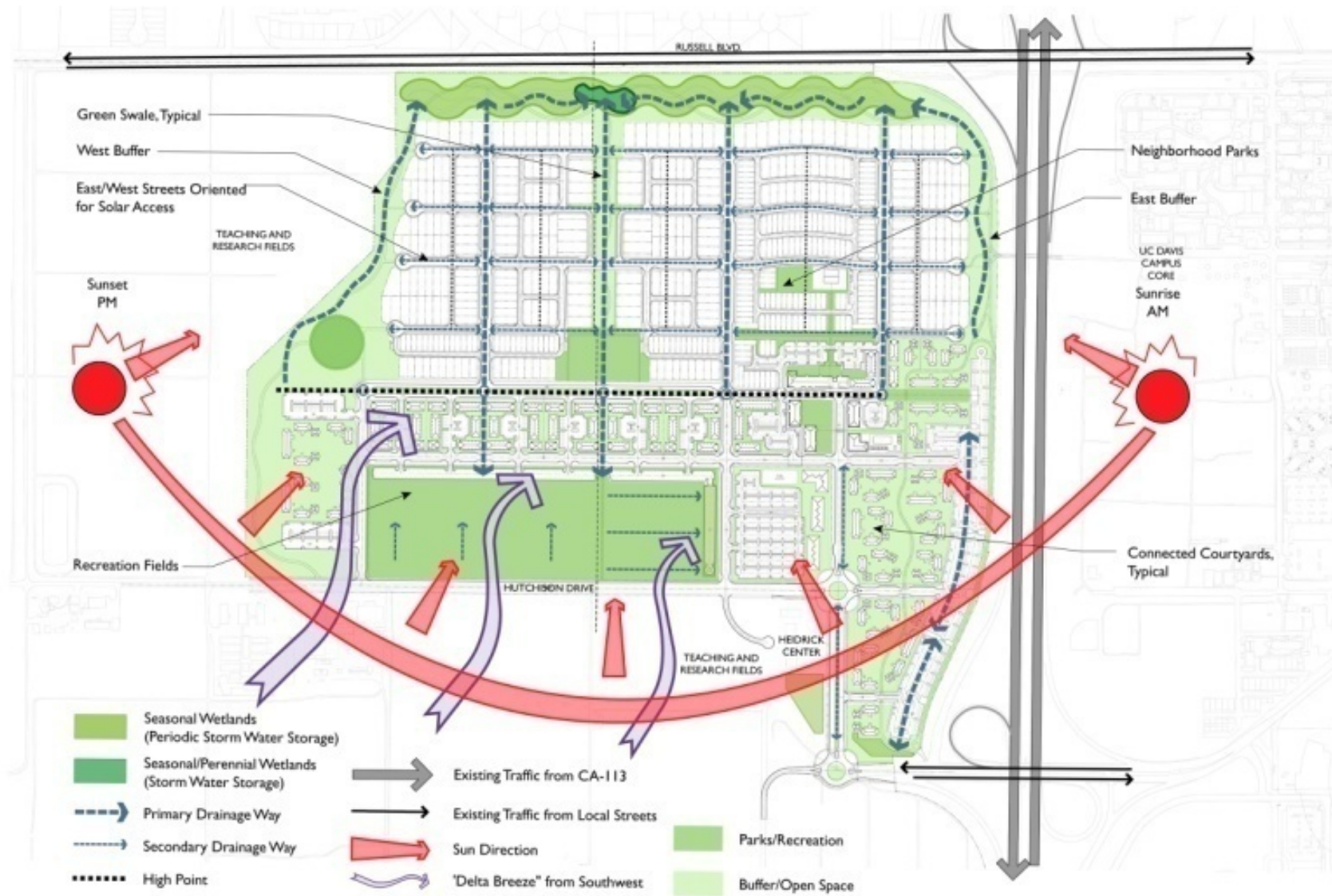
PRODUCE

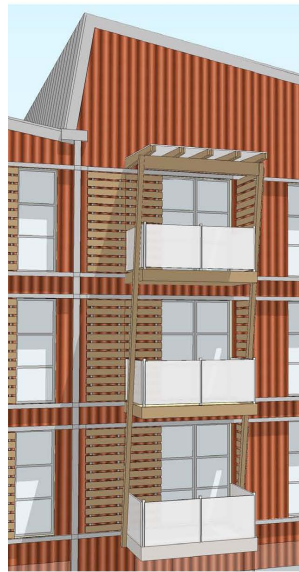
Convert locally-available renewable resources from sun and food waste into energy to power the community.



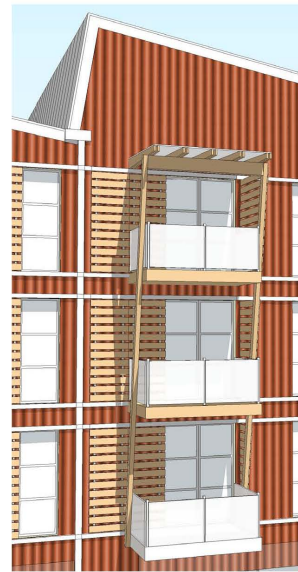
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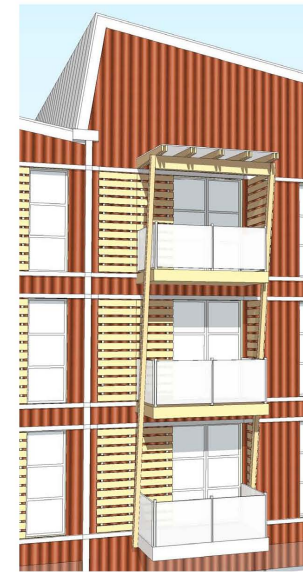




1:00 PM

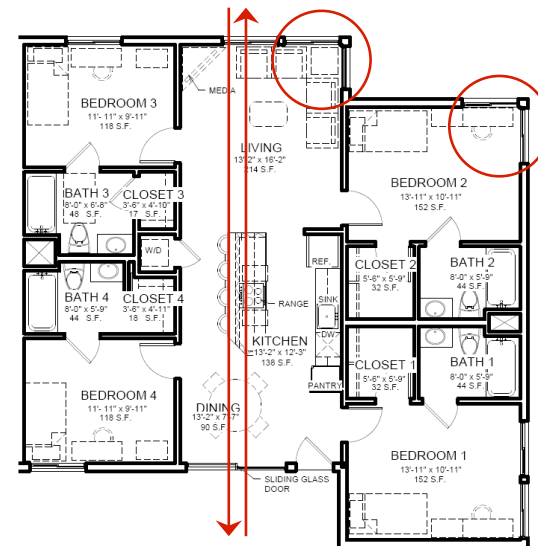


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Passive Environmental Responsiveness



ZNE Model: Reducing Energy Demand at the Building Scale

Community-Wide Consumption Estimates

Total Site Energy

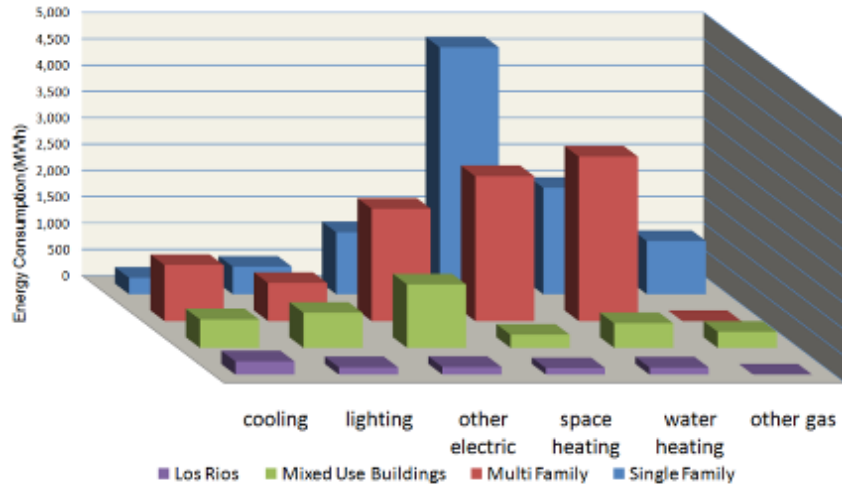
Building Type	2008 T24 (kWh/yr _{equiv}) ¹	Proposed Package (kWh/yr _{equiv}) ¹
Single Family	9,863,104	3,484,461
Multifamily (Ramble/Townhouse)	9,781,505	4,067,899
Commercial / Mixed Use	1,818,964	1,188,483
Community College	785,423	785,423
Common Area Lighting	299,500	149,750
Total	22,548,496	9,676,017

1. Natural Gas use conversion of 29.3 kwh/therm

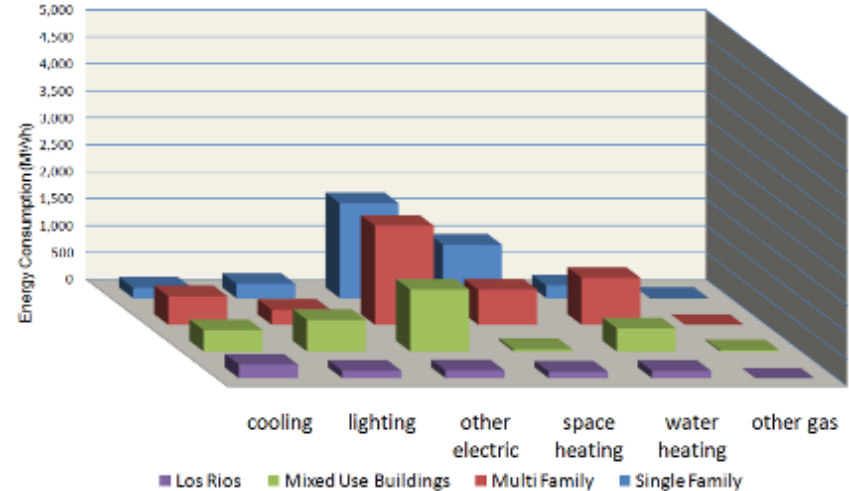
ZNE Model: Reducing Energy Demand at the Building Scale

Projected Energy Load

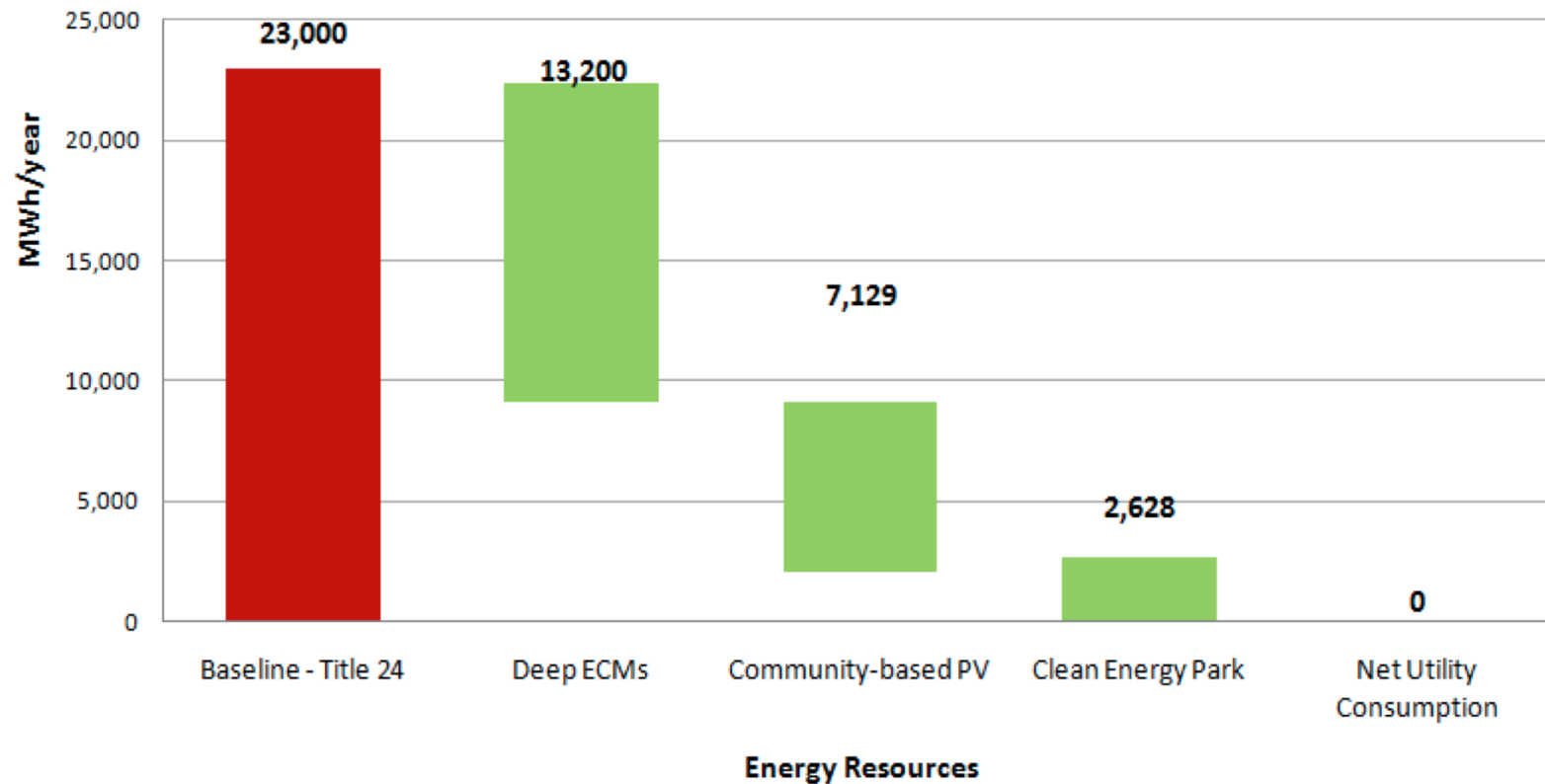
Title 24 2008 Baseline



Energy Conservation Measures



Path to Achieving ZNE Model includes Addressing Supply



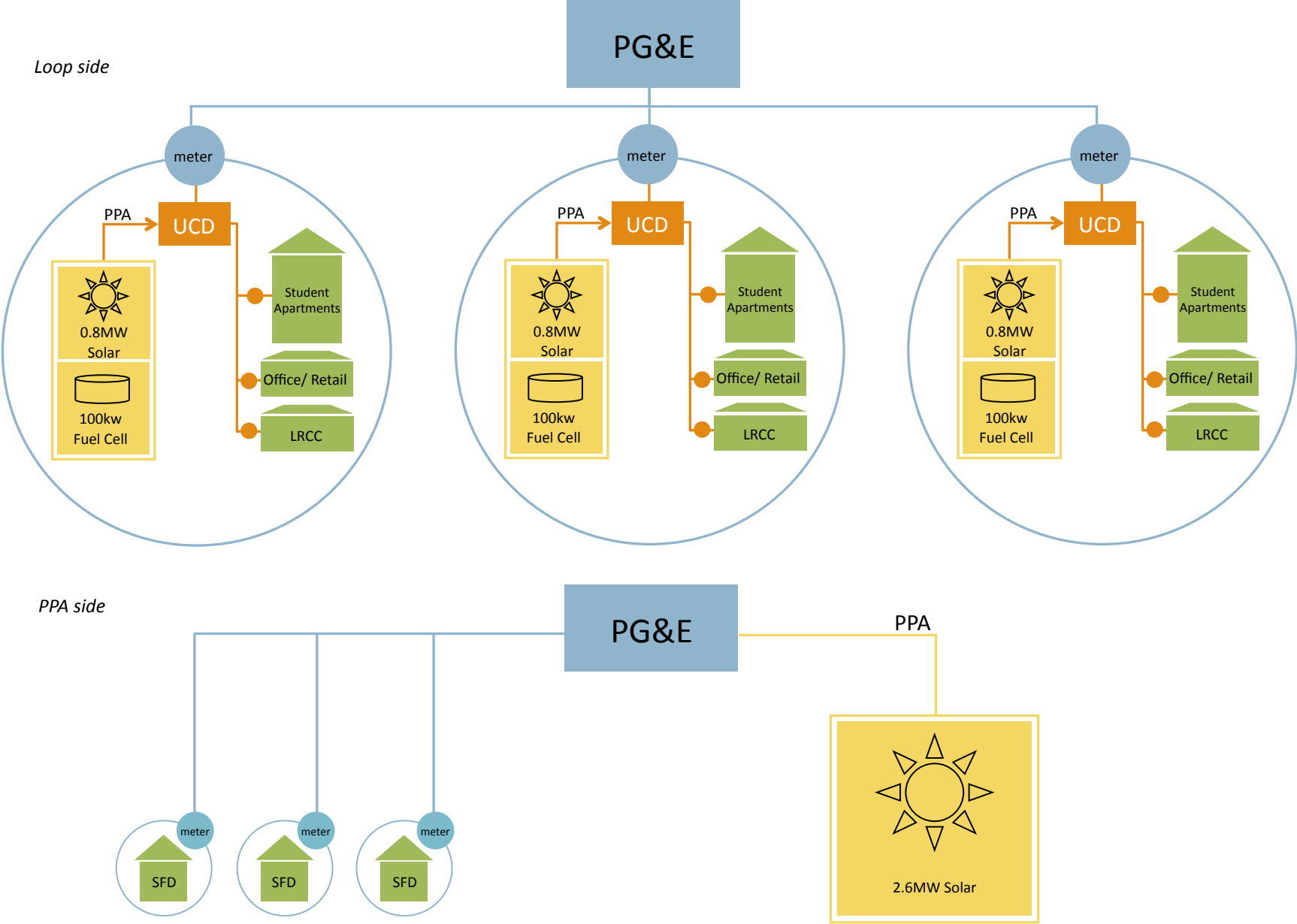
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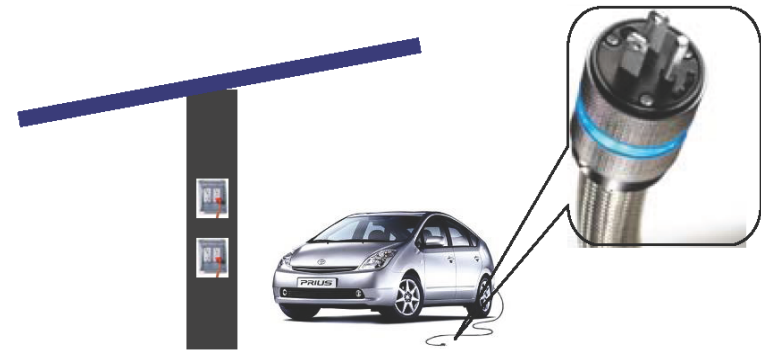




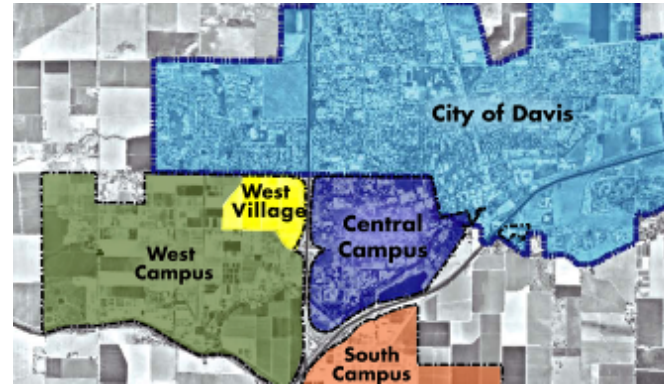
Regulatory Environment Not Designed for Community Scale



A Future Living Laboratory



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