

### ENERGY AND THE BUILT ENVIRONMENT

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<b>Speakers</b>	Wendell C. Brase UC Irvine, Associate Chancellor for Sustainability Matt Gudorf, UC Irvine, Campus Energy Manager
<b>Moderator</b>	Erik Ring, LPA, Inc.
<b>Notes by</b>	Katia Polster, UCI, MURP

The University of California, Irvine's aggressive energy-management program has been in place for more than two decades and has enabled the campus to reduce its energy use per square foot across the UCI campus by 50%. The campus currently has 14 LEED Platinum and 10 LEED Gold buildings, among the most at any campus in the United States. Join Wendell Brase, UCI's Associate Chancellor for Sustainability, and Campus Energy Manager Matt Gudorf, for an overview of the campus's award-winning Smart Labs™ Initiative and UCI's current practice of incorporating energy efficiency into the design-build process.

<https://betterbuildingssolutioncenter.energy.gov/implementation-models/developing-integrated-%e2%80%9csmart-lab%e2%80%9d-program>

<https://www.youtube.com/watch?v=QGhLZ4hsKa4&feature=youtu.be>

**MATT GUDORF** Matt Gudorf has led UC Irvine's energy management group for the last 5 years. The culmination of his leadership has been record breaking energy efficiency project completion under the UC/CSU/IOU Energy Efficiency Partnership. Matt's work as the Campus Energy Manager has focused on all aspects of energy management including energy procurement, distributed-generation, energy efficiency, and microgrid strategies focusing on business continuity. His commitment to sharing his team's best practices and lessons learned with the greater community has helped raise the profile of professional energy management and challenge peer institutions to follow in UC Irvine's footsteps.

What we've accomplished at UCI

We have been keeping track of what we as a campus would have consumed under business as usual scenario

Curve represents growth of the UCI campus. In the last few years we've doubled in size.  
Started tracking in early 90's.

Chart: 15 Years of Energy Efficiency at UCI. Business as Usual Curve vs. actual. We were down 13%; therefore, saving about 1% per year. Savings started to accumulate per year by doing various things:

Adopting a goal in 1990's

In 2007, Two big things happened: The campus became one of the national campuses with the goal to become carbon neutral.

Prioritized deep energy efficiencies by focusing on projects that saved on average 50% energy.

Heat energy efficiency was thought to be the most cost effective to take the biggest bite out of our carbon footprint.

Smart Buildings- we adopted the idea of making our campus smart.

Just enough energy, at just the right place at just the right time.

By challenging all accepted design practices, using software and sensors to make building systems dynamic and smart, whole building retrofits enable energy savings of 50%.

### ENERGY AND THE BUILT ENVIRONMENT

Many engineers felt there was an abundance of energy  
Margin of safety was added by those in the design field. When adding up the costs, the margins of safety  
2/3 of energy on research building laboratories  
Started challenging all design practices  
Language and labels called best practices and margin of safety language detoured those from challenging the design process.

Skeptical and challenged everything.

Then set some goals for energy efficiency:  
Facility Type and Goal Then Actual Savings Achievement  
Laboratory building systems 50%, 61%  
Classroom and office buildings 50%, 50%  
Data centers 50%, TBD  
Housing 40%, 23%  
Modular buildings 50%, 56%  
Interior illumination 50%, 60%  
Parking lots and structures 50%, 79%  
Other exterior illumination 50%, 60%  
Central plant / energy infrastructure 15%, 25% and rising

First worked on laboratories  
Smart Labs developed here is being adopted by the Department of Energy  
Mechanical cooling only on days over 75 degrees.

Student technology and behavioral problem contributes to energy use

Two Decades of Energy Efficiency at UCI slide:  
We're down 50% since 2007, increased efficiency. Business as usual would have doubled our energy use.

Debt to service ratio  
Contingency built into the project  
On a 15-year bond, we're looking at a 7.5-year payback. (3x as long as the industry would normally accept).  
Because we're a campus environment, 7.5 years is reasonable.  
\$75 million spent in energy projects to achieve these energy efficiencies.

You must have someone who knows your facility to run your energy projects.

Utility project manager, engineers have worked here 25 years, people who know our campus inside and out to put together projects with known variables of functionality  
This sets us apart along with supportive management that champions sustainability.  
The UC System in General does well at this.  
A holistic approach.

### ENERGY AND THE BUILT ENVIRONMENT

Lesson learned: Information layer. Provide a Dashboard (building management, lighting dashboard etc). 15 Dashboards are a lot of data to look at. Surveyed the market place to pull all the data into one location. Write rules on how buildings are running. Started to take all the data and sensors, wrote the rules around the check engine signs and now they can look at a few things each week to sustain achieved energy savings. (Automated fault detection system or other terminology). Updating every 5 seconds requires lots of servers and RAM. (storage cheap in a cloud etc.) Average cost to monitor \$25,000 per year. Low considering utilities budget \$15 million vs. \$25 million without energy efficiency projects. Good strategic investment. Good in-house engineering, you can separate

Software: Skyspark by Skyfoundry to pull in the data  
UCI tries to take a strategic view of these systems. Using an outside integrator prevents UCI being stuck with a system they don't understand when employees leave. Best way to protect themselves.

Sensors: Thermostat (supply air temperature, current room temperature: heating or cooling mode) points we're trending. Already in the built environment a lot of the times. A new building with dimmer settings, projector on or off? A lot of electrical metering. UCI looked at electrical metering at 24 channels. Every building has 1-5 dead power scouts (Transformers etc). This helps them understand what is going on in their buildings.

Instead of losses to get energy here. Multiply by 3.2 depending on source energy (Grid). A kilowatt hour of solar and multiply by 346 to get BTU. Behind the meter solar. A lot are built on power purchase agreement. We agree to purchase at a predetermined rate contract with 2 percent growth. We don't pay Southern CA Edison which is a financial edge.

We don't pay federal tax.  
Projects for Retrofits (labs). UCI Smart Lab site page  
Heating air and ventilation. Same amount of air went in and out of the building 24 hours a day regardless. We wanted to control the air in and out (Flow) transferred to digital which provides ability to control sensors. ON the intake side of the air coming in is low airdrop pressure filters.  
Labs: 100% outside air from 8x an hour to 2-4 x an hour depending on usage of lab.  
Dropped the amount of air being supplied to buildings which dropped amount of air being extracted. 3,000 ft per minute was being used by everyone which sucked in bypass air at high velocities  
Necessary or massive margin of safety. No one wanted to do the study on exit velocity.  
Millions of kilowatt hours saved by having a wind tunnel model vs. build on rule of thumb engineering.

LED Lighting  
Parking garages and roads are still induction because of cost at time (2008).

UCI is connected to Southern Ca Edison

We own and operate our own grid  
We used to import 140 kw from Edison, last night we imported 7 kw. We're on an import and export contract. Allows us in the event grid interruption. We want to be up and operational. This is a billion-dollar research organization. We have lots of cold storage and labs with chemicals and materials in them and we want to protect those assets.

### ENERGY AND THE BUILT ENVIRONMENT

There is a lot of research taking place on micro grid etc.

Future for UCI: Ten-year vision, strategies

Campus is still growing.

Biggest form of savings is the co-gen plant is way too big. We can grow into it. We are too big on chilling capacity which allows us to avoid capital expenditure by reclaiming what we've saved in energy.

Combustion turbine run same combustion cycle from coal to natural gas therefore, Irvine could use funding to make natural gas viable resource for the country.

Project on campus to scale out that will benefit CA. Taking excess solar and turning it into hydrogen. May work in CA as it goes to higher and higher levels of renewable energy. Air conditioning load in CA as a state is low today, for example. Sun is shining, wind is blowing, so the marginal value of renewable energy being curtailed is zero. Decarbonizing the natural gas system...experiments being run on UCI campus.

Biogas Recovery- landfill gas, pressurize it, put it in the pipeline without the environmental credits. Discovered by scientists on this campus took canister samples on the ground for before and after measurement. Lower methane leaking into the atmospheres because we would have fixed the leaks...

Reused methane emissions credit and offset to combustion air turbines.

Clean burning and economically viable.

Repurposing biogas.

As technology advances, the cost of energy efficiency implementation has gone down.

Color of lighting experienced by people after dark- upcoming UCI experiment on circadian lighting to measure biometrics to see what it does to melatonin levels and sleep patterns, athletes to see if it improves performance and reflexes.

### TOWARDS WATER-SUSTAINABLE CITIES RECONCILING THE BUILT AND NATURAL ENVIRONMENTS

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<b>Speakers</b>	David Feldman, UC Irvine, Director of Water UCI
<b>Moderator</b>	Ray Dapp, USGBC Orange County, Project Manager
<b>Notes by</b>	Andrew Dunlap, UCI MURP

- Introduction – California water challenges
  - Water shapes our economy – we’re a “hydraulic society:”
    - Vulnerable to sudden disruptions (e.g. earthquake, floods)
    - Subject to long-term climate variability and over-use
  - Water-sustainable design can remake cities in ways that ensure resilience.
    - Storm-water capture and bio-filtration can (for instance) recharge groundwater.
- Meeting the challenges
  - Water sustainable approaches face financial, political, public acceptability challenges
  - Require cooperation between architects, designers, etc.
- Why a water-sustainable design?
  - Real potential from new water supply sources. The likely future would be in groundwater storage, recycled use in water, and urban use efficiency.
  - Interestingly, desalination has low potential.
    - E.g. high cost.
- Evaluating options
  - Technical feasibility – do science and engineering support it?
  - Economic cost – is it affordable relative to likely alternatives; who pays?
  - Environmental risk and impact – what are adverse effects?
  - Public acceptability and engagement – how does the public perceive options?
- Desalination as an example
  - Carlsbad plant: = \$950 million.
  - Can produce 50 million gallons / day; serve 300,000 people.
  - Highly cost inefficient (approximately \$2,000/acre foot), ecological impact (brine disposal impacts on marine life), and energy intensive (33 Mega-Watts, enough for 80,000 homes).
- Water sustainable alternative – local cases
  - Los Angeles: multiple efforts taking place
    - LA county: LA Flood Control District’s multi-year effort to develop storm water programs
    - City of LA
    - LA Department of Water and Power: capture runoff in centralized spreading grounds.
- LA DWP – storm water capture and reuse
  - Storm water capture master plan: as LA marginally depends less on external sources, this plan would capture water in a groundwater basin for use.
- City of LA – Low Impact Development ordinance
  - (2012) – projects must mitigate runoff by “capturing rainwater at its source utilizing best management

### **TOWARDS WATER-SUSTAINABLE CITIES RECONCILING THE BUILT AND NATURAL ENVIRONMENTS**

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practices such as rain barrels, permeable pavement, storage tanks, infiltration swales..."

- o Encourages drought tolerant landscaping and rainwater irrigation.
- LA – some policy issues
  - o To achieve these goals, "immediate, significant, sustained efforts on behalf of LADWP and its partners, in particular... city agencies, is required."
- Water quality as policy challenge
  - o Urban runoff is leading cause of water pollution in Southern California.
  - o U.S. Supreme Court held that LA county is responsible for untreated storm-water pollution that plagues waterways (2014).
- Orange County – demonstration project
  - o Will manage urban and storm-water runoff, provide treatment, reclaim water for non-potable uses (e.g. irrigation), features a recreation trail.
- Benefits and challenges
  - o Should reduce downstream erosion and sedimentation of Gobernadora Creek, a major tributary of San Juan Creek.
  - o Will enhance local supply by capturing urban flows for outdoor use
  - o Improve water quality in the creek.
- A word about conservation – what works?
  - o Allocation-based rate structures
    - Tiered rate systems reduce residential water use in half.
    - Utilities can apply a property specific water budget to a household.
  - o Water-smart billing systems
    - Showing residents how much water they use compared to the "average" and "efficient" households – we want to be in line with their neighbors (also known as "norming").
  - o Incentives to reduce outdoor uses:
    - Rebates for converting lawns to drought-tolerant landscaping – Las Vegas has reduced outdoor water use by 75%.
- We can learn from other's experiences – Australia
  - o Since the Millennium Drought (around the start of the 21<sup>st</sup> century), local governments use zoning ordinances to encourage use of rainwater tanks for gardens.
- Long-term ideal – water sensitive development
  - o Instead of throwing out old infrastructure, let's re-engineer and rethink ways in which we use the water in a sustainable way.

### **TOWARDS WATER-SUSTAINABLE CITIES RECONCILING THE BUILT AND NATURAL ENVIRONMENTS**

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- Conclusions
  - Water sustainable designs are cost-effective, but requires public willingness.
  - Equity issues are important.
  - Storm-water runoff is a significant pollution source.
  - In California, increasing Storm-water Pollution Abatement Charges could be a revenue source.
- Importantly, the choices we face are not without risk.

### HOUSING

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<b>Speakers</b>	Ken Nilmeier, MVE, Principal Victor Van Zandt, Vice President of Planning and Construction Irvine Campus Housing Authority
<b>Moderator</b>	Hye-Jin Sweem, AIA Orange County
<b>Notes by</b>	Tanner Wolverton, UCI MURP

#### Ken Nilmeier

##### Notable Places

Pearl District, Portland OR

- Light rail in mid 80s
- City center
- Walkable

Downtown San Diego

- Used to be run down
- Horton Plaza spearheaded renaissance of downtown
- Walkable/ sustainable
- Advent of residential

Denver, CO

- Invested in light rail
- "Rediscovered" downtown
- Extreme development in 20 years
- Bridging over train tracks

Downtown Los Angeles

Station Park Green San Mateo, CA

- Station Area Plan
- Old Kmart
- Redevelopment with 600 units, open space, and train connectivity
- Office buildings under construction

The Village and Park Irvine, CA

- Large infill project on strawberry fields
- Close to train station, open space
- Critical mass of housing
- Public context of park

River View San Jose, CA

- Near light rail, open space (5 acre)
- Good connectivity

Santa Clara Square

- 2025 general plan ear marked for redevelopment
- Retail, commercial (on freeway), mixed-use residential, public parks
- Live, work, play environment

Irvine Business Complex Irvine, CA

- Infill development in Orange County
- Residential only environment, no parks, no city fabric



### HOUSING

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- Advent of luxury apartment, wood frame construction
- Lacks community
- Strange relationship between land uses

#### Platinum Triangle Anaheim, CA

- Planning Area
- Purposeful streetscape and vision
- Positive role of jurisdiction
- Smoother entitlement process

#### A-Town

- 1,400 units
- Public benefit amenities
- Retail

#### Anaheim

- Downtown becoming “complete city” again

#### Santa Ana

- Starting to emerge again
- Pockets of infill that provide for sustainable, complete developments

#### Fullerton

- Have train station downtown

#### Irvine Station

- A lot of potential
- County of Orange controls a lot of property
- Near a corporate campus
- Developing on suburban model when we know we shouldn't
- Not a lot of connectivity around tracks
- Is there a change to do something special with our train station?
  - Need a bridge over tracks
    - Need to stitch together

#### How to affect land use changes with mixed-use

- Can commute in region around this point

#### QUESTION:

***Everything is pointing to higher development, but how does this reconcile with anti-development sentiments in cities?***

- Each city has its own politics. We're fighting over street capacity, but we should ask ourselves about infrastructure capacity. We should try new things – lower requirements for parking and get people out of cars. We are starting to approach the threshold where we can't function without more connectivity. We aren't capitalizing on locations that could work.

#### Victor Van Zandt

Building planned communities for employees of UCI

ICHA – Irvine Campus Housing Authority

- Helps university recruit world class faculty

### HOUSING

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- Has price restrictions and wait list
- Provides affordable housing to faculty

Keeping housing affordable

- Self-funding, no grants received
- No share-holders to enrich
- Home builders, designers give best deal possible

A new faculty member will make ~60K a year, but would not be able to afford a home without ICHA

Affordable in perpetuity – index applied when resold

No public money, never taken a donation

Manage own assets

Provide public works

- Buy water from UCI
- Deliver water, change meters

Work in collaboration with UCI, but is not UCI

University Hills

- 300 acre planned community
- Largest academic workforce housing community in the nation
- First home built in 1985
- 1016 for sale units and 360 for rent units

Large waitlists

- Low turnover for owner units
- Higher turnover for rental units

How transferable is this model?

- Need to set aside chunk of land – Land trust, to avoid property speculation

Stanford doesn't have resell restrictions, so houses become expensive

University of California set aside land so that they wouldn't have to heavily invest in faculty housing by keeping land value low

Sustainability

Make money from rents, mortgages, and fees

- By design
  - Use Green point rating system. Getting 125 points on newer homes being built
  - 90= LEED Silver (No PV intentionally)
  - Reclaimed water
- Most residents walk to work – max 1 mile
- Take cheaper ac systems and change parts to reach higher energy efficiency
- Reclaimed water to grade site – only 3% more expensive

### DENSITY AND DEMOGRAPHICS

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<b>Speakers</b>	Kevin Kane, UC Irvine, Postdoctoral Fellow
<b>Moderator</b>	Victoria Betancourt, AIA Orange County
<b>Notes by</b>	Jonathan Lightfoot, UCI MURP

#### What is Density?

- Comparison of top cities for density: LA is the most dense (7k+ per sq. mile)
  - Followed by SF (#2) and NY (#3)
  - Based off of the “urban core” and adjacent urban census tracts
  - But Manhattan is more dense than DTLA
- LA County is less dense than OC -- but only because of Angeles National Forest/desert areas included in county boundary

#### Orange County Rankings (compared to US)

- Households: #6/3142
- Median Income: #89/3142
- Median Home Value: #15/3142
- OC residents earn 1.4x the Natl. average; but it is 3x more expensive to live here
  - Referenced OC Forum report for indicators
  - 43% OC residents can afford an entry-level home
- Questions/Comments:
  - Median cost of housing has grown -- \$660k or so
  - Aging population + housing shortage = more dense & smaller housing

#### Southern CA Trends

- Socioeconomic Mixing
  - Mixed Use developments (via city planning)
  - Mixing based on educational attainment, Age, Race, Etc.
  - Entropy Index -- represents level of mixing in a census tract
  - MFI Webmap: <http://mfi.socceco.uci.edu/category/quarterly-report/mixing-economic-dynamism/>
    - Age mixing: low mixing may be retirement or university communities
    - Racial mixing: skewed toward newer communities
      - Low mixing near the coast
    - Based on census tract clusters (3-5k people)
- Mixing → Neighborhood Well Being Correlations?
  - Mixing → positive association for job growth and home value growth
  - Racial mixing: home values improve when incomes are low, unemployment is high
    - Neighborhood in transition → gentrification
- Jobs-Housing Balance
  - Map of 2010 J-H ratio: high jobs ratio in Irvine, Burbank, Santa Monica, etc.

### DENSITY AND DEMOGRAPHICS

- o **Question 1: If Irvine keeps an imbalance with not enough housing for jobs, will jobs leave?**  
(Employer decision...)
- o **Question 2: How can you use statistics to fight against NIMBYism?** (example Museum House in Newport Beach that was opposed by 14k residents on a petition)
- o Comment: Millennial kids don't care about mixing in that they get groceries and clothes delivered by online companies; they'd rather travel to the Spectrum than for their job
- o **Question 3: Is there a preferred mixing level for quality of life?**
- o EPA -- smart location database - good source of information

### TRANSPORTATION

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<b>Speakers</b>	Doug Houston UC Irvine, Professor in the School of Social Ecology
<b>Moderator</b>	Ryan Rigsbee, AIA Orange County
<b>Notes by</b>	Mark Newman, UCI MURP

#### Moving Towards Sustainable Transportation

Sustainable transportation research deals with:

- neighborhood livability
- environmental quality
- TOD (Transit-Oriented Development) Impacts
- Urban Inequality
- Geographical/Analytical Methods
- Transportation and the Environment (environmental impacts and public health)

#### Decentralization: The Cure for Urban Congestion

- o In the early 1900's, congestion is the most important planning problem and is what caused planners to come together to host annual conferences. The first of these conferences began in 1909.
- o The streets were chaotic and dirty, immigrants were crowded into tenements, living conditions were poor. (How the Other Half Lives by Jacob Riis)
- o The main mode of transportation was walking.
- o The life expectancy for the average city dweller was ten years less than someone living in a more rural setting.
- o Planners in this era believed the cure was to spread cities out to cure social ills.
- o This did work and led to higher-quality housing and quality-of-life.

#### Sprawl: A by-product of suburbia

- o However, large-scale freeway building in the 1950s and 1960s led to suburban sprawl.
- o Freeways account for only 2% of road surface, but 33% of vehicle travel.
- o They are derided as ugly, expensive, polluting, disruptive, obesogenic, and disproportionately harmful to low-income neighborhoods (environmental justice factor).
- o They are unsustainable, lead to long commutes and increased vehicle miles traveled (VMT) and greenhouse gas emissions.

#### Environmental Concerns & Success

- o In the 1940s in LA, smog and haze were a major health concern.
- o Dr. Haagen-Schmidt of Caltech was the first propose that smog was a by-product of automobile emissions and factory pollution.
- o He understood that NO<sub>x</sub> and volatile organic compounds (VOC's) reacted from cars and factories photochemically to produce smog.

### TRANSPORTATION

- o In the 1970s, a slew of legislation aimed at curbing these problems. The Clean Air Act aimed to curb automobile emissions by providing air quality standards. This environmentalism is an outgrowth of the anti-war movement.
- o As a result, smog levels trend have gone down steadily over the last 30 years, despite a doubling in population and a tripling in VMT.
- o Some technologies include higher gasoline refining standards and catalytic converters in cars.

#### Future Concerns

- o The Trump Administration is challenging the Obama-era CAFE standards which demand more fuel efficient vehicles.
- o This is currently under review and California could lose its waiver to set their own higher standards and federal standards could be weakened.
- o The California Air Resources Board feels that standards should be even more aggressive to stop climate change.

#### Sustainable Transportation Planning Matters:

- o SB 375 and Sustainable Communities Strategy/Regional Transportation Plan (SCS/RTPs) are meant to integrate transportation planning with land use to reduce greenhouse gases and vehicle miles traveled.
- o This framework is used to meet 2040 GHG reduction standards and to apply for FTIP transportation funds from the federal government.
- o Attempts to tame sprawl are being made to create compact corridors of growth. Sprawl is very expensive because of the additional infrastructure requirements (land, water, resources).
- o The goal is to push for less driving and commuting and to take transit and make things more walkable, i.e. work, shop, live locally.
- o The RTP goal is that 46% of new households and 50% of new jobs in Orange County will be within ½ mile of a transit stop.
- o This is not always so easy because SCAG doesn't control a city's land use - that is a local matter for cities to deal with.
- o One obvious inhibitor to taking transit in Orange County is the low density of housing and jobs.

#### Transit-Oriented Development and Transit Corridors

- o The California Household Survey results showed that denser areas with greater transit had lower vehicle ownership and usage, plus more walking and transit patterns.
- o Not all transit corridors are created equally and some have more success than others.
- o Planners should consider the social and development context of corridors and effects when creating TOD.
- o More evaluation of the investments is needed. Is it working? Are people actually using transit more?
- o In a study on this issue, the control group involved houses in a normal neighborhood versus those in a TOD zone. Gas prices were used as a variable and isolated before and after the line appeared.

### TRANSPORTATION

- o TOD neighborhoods showed 10 miles less driving per day, but no big jump in transit usage.
- o One other problem is trying to change mentality and behavior. Can it be done?
- o New residents in TOD zones are younger, rent, and have higher incomes. Those living near a station drove 8-10 miles more a day versus longer-term households, but also used transit more.

#### More TOD issues:

- o Attitudes & perceptions matter: Women had greater environmental concerns than men, but were less likely than men to take transit due to safety concerns.
- o Long-term residents near rail transit face displacement, being priced out, and gentrification.

#### Main Take-Aways:

- o What strategies will be the most effective for sustainable transportation?
- o Will cleaner technologies and emissions controls work?
- o Will more compact development shift behavior?
- o Can we avoid displacement as we pursue regional sustainable transportation goals?

#### Questions:

- o ***What role will autonomous vehicles play in the future?***
- o ***How will Uber and Lyft create change in driving patterns?***
- o ***Will millennials eventually become more like Boomers (have children, move to the suburbs, drive more)?***
- o ***Do boomers and empty-nesters want to age in place and want TOD as well?***
- o ***What is the future of ZEV's? (Toyota Tundra and Prius mentioned as case studies)***
- o ***How do we reduce range anxiety for electric cars?***

### ZERO WASTE: PROGRAMS AND PRACTICES

<b>Speakers</b>	Nadereh Afsharmanesh, Earth Friendly Products Vice President of Sustainability and Education Emily DeCremer, Green Business Certification, Inc. Certification Program Lead, Zero Waste
<b>Moderator</b>	LaDan Omidvar, AIA Orange County
<b>Notes by</b>	Noemi Wyss, UCI MURP

#### **Emily DeCremer**

GBCI vision: to create a solid foundation that advances the integrity and credibility of Zero Waste

- businesses wanted third-party verification of their waste efforts
- Fight for what true Zero Waste is/definition

#### Zero Waste Programs @USGBC

- Zero Waste Business Associate (ZWBA) professional training
- Member Zero Waste resources
- Events
- Facility certification

[www.ecocycle.org](http://www.ecocycle.org)

#### Entire full-cycle

- Consumer buying power
- Jobs: landfill produces much fewer jobs than composing and reusing
- Clean production
- Designing for the environment: building and spaces to appropriately set up for waste

#### Benefits to businesses

- not sexy but very simple
- Saves money: haulers usually don't cost for recycling
- Reduces liability: more trash you have the more problems
- Increases efficiency
- Reduces GHG emissions
- Marketing edge
- Clean energy/saves energy
- "Right thing to do"

Scorecard with 15 categories to get certified

#### ARC program

- for any building
- Tracks data to get credit for Certification

#### **Nadereh Afsharmanesh**



### ZERO WASTE: PROGRAMS AND PRACTICES

- o eco-friendly, plant based cleaning products
- o “not only product, but also waste end”
- o 2010 at 10% diversion, by 2016 at 95% diversion

#### Common Challenges in Sustainability

- o Implementing guidelines and practices
- o Sustainable procurement, manufacturing practices, office practices
- o Give reminders and protocols
- o Psychology is very important, “tell them when they are ready to hear it”. Remind them everyday for ten minutes once in a while instead of hour long meetings
  - 10-15 minutes, let them know successes
  - Sustainable gifts: juicers for all employees
  - Recognition of employees that make effort

#### Employee Engagement

1. Need a team designated every few months to figure out problems and challenges

#### Cost

1. Showing dollar amounts is important
2. Sold recyclables to recycling center for money

#### Senior Management Support

1. For everyone, not just bottom of the ladder include CEO buy-in
2. Psychology: rules apply to everyone
3. To make it work everyone needs to be included

#### Environmental Assessments

- o Identify problems
- o Monitor on regular basis: everyday
- o Rethink/redesign/restructure

#### Talk to vendors

- o If you don't ask you won't get
  - Silicone on labels so make not recyclable and asked for recyclable version
  - Made vendor pick up non-recyclable labels when dropped off labels every time

#### Questions

***Is the zero waste program generalized that you can take into any company or do you have to assess company first and come up with the plan?***

*Emily:* such a broad array of businesses we've certified so we write it in such a way to make applicable to all. We find ways to adapt to all, but some items are not applicable to all.  
You have to earn 61 out of 81 points to be certified, so you can leave out a certain ones

***Do companies get back to you on economic benefits from the program?***

*Emily:* We ask on scorecard the savings, but since we're changing under GCBI we might be getting rid of

### ZERO WASTE: PROGRAMS AND PRACTICES

it. On the scorecard you can get points for keeping track of certain indicators.  
We ask them to highlight case studies

#### ***Are you looking at supply chain?***

*Nadereh:* We are coming up with a scorecard for all the vendors and an internal scorecard for options. Sometimes there are no choices and if there is one we want the businesses that has a higher score. From the beginning they know what we are expecting and they have changed significantly. But you have to ask them.  
We also have a questionnaire on sustainability for them

*Emily:* that's why we include upstream vendors

#### ***How do you answer cost question for certification?***

*Emily:* depends on size of facility, amount of people, operations. Not as expensive as LEED. We have people fill out questionnaire and come up with an estimate.

#### ***How can we push to go paperless for architecture firms and for plan sets?***

*Emily:* we haven't reached out to that sector. We're new to this group but they brought us in to bring everyone to a higher level and zero waste. USGBC has worked on energy and water but now we're focusing on waste. There is a design component but we also need to reduce paper wastes.

*Nadereh:* You also need to speak up so that people know and notice it.

### **PANEL DISCUSSION: ORANGE COUNTY CITIES: GOALS AND ACHIEVEMENTS FOR SUSTAINABILITY**

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<b>Speakers</b>	Patrick Alford, City of Newport Beach, Planning Program Manager Antonia Graham, City of Huntington Beach Assistant to the City Manager and the Energy and Sustainability Manager Alex Turek, GRID Alternatives, Multifamily Development Manager Case Study in the City of Santa Ana
<b>Moderator</b>	Diane McLean, AIA Orange County, Director of Sustainability
<b>Notes by</b>	UCI students, MURP (Master of Urban and Regional Planning)

#### **City of Newport Beach**

- Green Building Plan
- Energy Action Plan
  - Conserve energy & reduce carbon footprint & raise awareness
  - Oasis Senior Center: LEED Silver
  - Newport Beach Civic Center: LEED Gold, but criticism of cost
  - Marina Park: LEED Silver Standards, but not certified
- Water
  - Focus of city
  - Quality of life
  - Harbor area management plan: sustainable Newport Bay
    - Restoration projects, upper Newport Bay
- Newport Beach Sustainability Plan
  - Prepared by a citizen's committee (chaired by former council members)
  - "Declaration of Principles" to promote sustainability
    - Incentives, advocacy, partnerships, city infrastructure / services, etc.
  - Plan Elements: education, development, waste reduction, transportation, energy, urban outdoors, etc.
  - Plan Review: through city committees and commissions
  - Reaction: positive, but concerns about additional costs and other unintended consequences
    - Preference that it be voluntary, not regulated
    - Sustainability element to be included in next General Plan
  - FRAMING: open space → protection of scenery; conservation → efficiency; sea-level rise → threat to way of life

#### **City of Huntington Beach (Antonia Graham)**

- Assistant to the City Manager: Energy and Sustainability
- Energy Efficiency Projects
  - 2012-2013 Energy Mgmt System

### **PANEL DISCUSSION: ORANGE COUNTY CITIES: GOALS AND ACHIEVEMENTS FOR SUSTAINABILITY**

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- Retro-Commissioning city facilities
- Streetlight retrofit: 13,000+
- Partnerships with UCI, CSUF, and CSU Chancellor's Office
- SELLING SUSTAINABILITY THROUGH ECONOMIC EFFICIENCY
  - Streetlight cost comparison
- Recycling Market Development Zone
  - State funding for certain SIC codes: already 250+ businesses that could qualify
  - Commodity marketplace in local zone to reuse recycled materials
  - Economic development tool
- Sustainable Business Certification Program
  - Fully funded by utilities, EPA, etc.
- Disadvantaged Business Certification Program: Oakview Neighborhood
  - CIELO: with Golden West College
- EPIC Challenge
  - Average Household Size -- 7 persons/household
  - Advanced Energy Community

Grid Alternatives (Alex Turek): Multifamily and Emerging Technologies Program Manager

- Grid Alt: largest nonprofit solar company, works with underserved communities
  - Triple Bottom Line → People, Planet, Employment
    - Work force development → 30,000 volunteers trained
  - Only 0.12% of solar is installed by poor
- CA Leadership in Solar
  - 18GW of solar
  - Solar industry grew more faster than oil, natural gas, coal combined
  - Over 100k workers in CA
  - Orange County with more than 278 MW of solar (#4 in CA counties)
- Barriers
  - Up-front capital to financing
  - Quality of rooftop
  - Renters deal with short term, shared buildings, etc.
  - But CA subsidies (multifamily solar roofs program, etc.)
- Case Study: City Gardens, Santa Ana
  - Could cut energy costs in half
  - Job training: 10 students, 40 hours of classroom education + hands on installation on roofs + post-training education and employer networking

### **PANEL DISCUSSION: ORANGE COUNTY CITIES: GOALS AND ACHIEVEMENTS FOR SUSTAINABILITY**

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#### **Panel Discussion**

Huntington Beach received a 2% loan from CA Energy Commission  
Found low-interest financing, it made it more palatable for Huntington Beach city council  
Benefit to the city is the decrease in the monthly cost for some of these electricity bills

What incentives are there available to landlords to install solar?  
Deep-controlled housing or leverage of low-income housing tax credit.  
There is a higher rebate for a portion of the system that is

Commodity Market Place  
Is that something that can be adopted by other cities?  
Ripoff and Duplicate R&D  
City of Austin model  
The business producing polyurethane plastics would rather give away waste to other businesses  
Circular economy is regenerative in nature  
Reduce waste, toxins, reducing GHG emissions from the economy  
If you're a business, you're able to log in

Government does not like to take risk  
Some cities did not want to take on more duties, and the risk of what if it doesn't work?  
Public employees have been so demoralized, and we take on more and more as councils cut and cut.  
Now cities want to join on as businesses are attracted to Huntington Beach  
Zone Administrations

R&D is the way to go.

Closing thought about vision over the next 5 years.

- Newport Beach takes great pride in the community. It's reflected in the projects.
- Sustainability = Economy, Environment, Equity. Not just trees. If you talk about it in terms of quality of life, that's how you move the needle faster. Our residents care about their quality of life. Agenda 21. We need to talk about it in terms of "what does this look like?" We're not trying to take away anything from you. We're just trying to make it easier to do business. This is a business-centered county. Move from the Age of sustainababble, and move to a better way of life.
- We've reached a point of adoption of solar, and the priority has been the speed of the adoption. As we enter the second phase of clean energy adoption, a stronger focus should be made for the equitable distribution of these technologies and benefits. The low and middle income households stand the most to gain with solar adoptions, and they bear the brunt of the environmental impact.