



Reflections on Achievements: Notes from the Road Trip of SOLARA

Greening Your Roadmap to Succeed in a Changing Landscape

**Breakout
Assuring Economic Return:
Aligning Goals, Standards, and Budgets**

May 6, 2009 1:00 pm

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- **Overview: SOLARA**
- **Mapping for Cost Effective Results**
- **Costs of Green**
- **Summary**



Overview: SOLARA





Overview: SOLARA

Significance of SOLARA:

- First apartment complex in CA to be fully powered by PV
- First apartment complex in CA to be a Zero Energy New Home (ZENH)
- Carbon Footprint– reduced by 95%
 - Equivalent: Planting > 5,400 trees/y
 - Equivalent: Eliminating > 300 cars/yr





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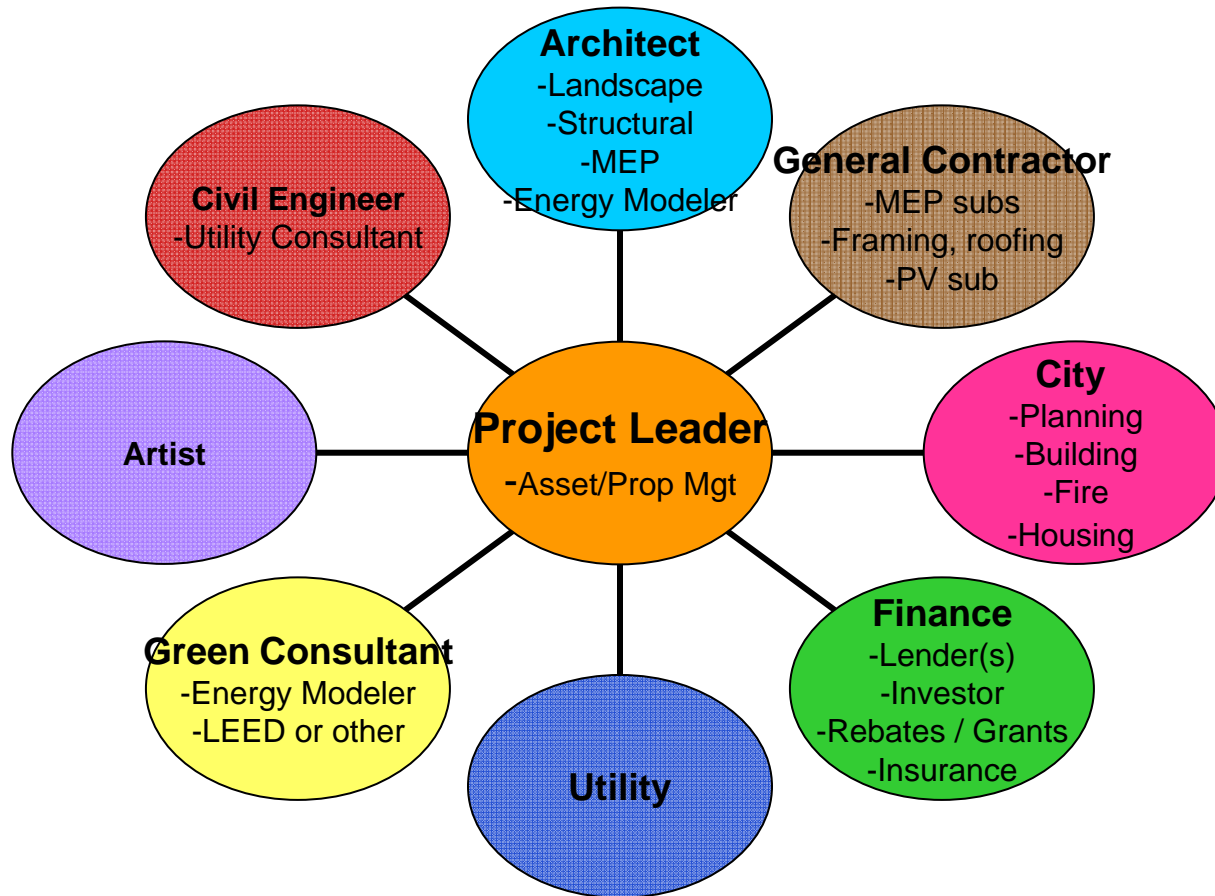


Integrated Green Design

- Look at map and decide where you might be going
- Start early- Look at budget and Proforma, incentives
- Investigate:
 - HUD energy incentives
 - State's QAP tax credit incentives
 - Renewable incentives federal and state
 - Utility programs
 - Other developer experience
 - Read, attend meetings, tour projects



Assemble Team *EARLY*





Choose Guidance

Rating Systems

- LEED for Homes
- Enterprise Green Communities
- New California System:
 - California Green Builder (new, developed by BIA)
 - GreenPoint Rated (Build it Green) - CA system
- Others





Don't Cookie Cutter



Do What's Right for
YOUR project.

That project is not
YOUR project!



Design Process

Charrette

- Plan all day
- Entire team
- Green consultant / architect to lead
- Decide on which checklist to follow
- List– Yes, No, Further investigation
- Early– before/during site planning
- Have food, snacks, comfortable room



Question



Most important for last

- Ask the “Dumb Question”
- Again
- And, *again*
- And, *again*
- Explain it in YOUR words



Set Goals

- Use a checklist or rating system to start process
- Site
- Energy
 - What are your milestones? Energy code, AHEARA rating, etc?
 - Passive design- examples (overhang, envelope, etc)
 - System design- examples (gas cooking, etc)
 - How will you verify results in field? HERS rater, etc



Set Goals

- Renewables- plan for it – can be eliminated but not effectively added later
- Water- domestic, landscape irrigation and choices
 - Integrated into design concept, playgrounds, site plans, etc
- Materials and construction waste
- Carbon Footprint
 - CA legislation (SB 375) and CEQA re carbon footprint- transportation impacts of land use



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Goals and Budgets

- LEED and costs
 - Silver and Gold vs Platinum – experience re costs
 - Rethinking of what we “need” vs what we’re used to doing/seeing
- Value Engineering–
 - Saved for emergencies, unexpected
 - What is emergency? e.g. major market disruptions, etc
 - Value of GC or other with good cost data as you design
 - Cost benefit of energy/water with team
 - Expect to pay more soft costs to avoid hard costs, delays, disappointments



SOLARA: Case Study

- Early Decision for “green” and PV
- Team assembly – GC, architect, green advisor/energy modeler
- Energy goal:
 - Zero Energy New Home- 70% reduction in annual electricity costs
 - 1kw/unit demand for electricity during peak demand
 - CA’s Title 24 (Energy Code)- exceed by 15% (exceeded 35-43% of existing Title 24)
 - CTCAC- QAP basis boosts for PV, green
 - Maximum \$5k/unit extra, net of rebates
 - Off shelf technology, “doable” for typical construction industry
 - Ducts and air exchange- costs



SOLARA: Case Study

- Water Goals– not stated
 - Interior– add'l to CA code of low flow w dual flush
 - Landscape– CA natives, no mown grass
 - CA Storm Waste Water Protection Plan (SWWPP) during construction and operations- effectively bioswales
 - No recycled water in City
 - Did not tackle water harvesting
 - Difficulty of grey water in residential
- Materials- construction waste- difficulty
- Materials – healthy air (how to measure)- anecdotal elimination of known chemicals (VOC, lead/asbestos, formaldehyde, arsenic, dust during construction)



425' retaining wall along FEMA floodway





Tankless Gas-Fired Boilers for each building



- Air conditioning- SEER value
 - Puron (R410A) refrigerant (reduces chlorine emissions)
 - Very large casing above 1.5 ton
- Ducts Inside Conditioned Space; tested during construction





SOLARA's recycled glass path, winding through Meyer lemon grove

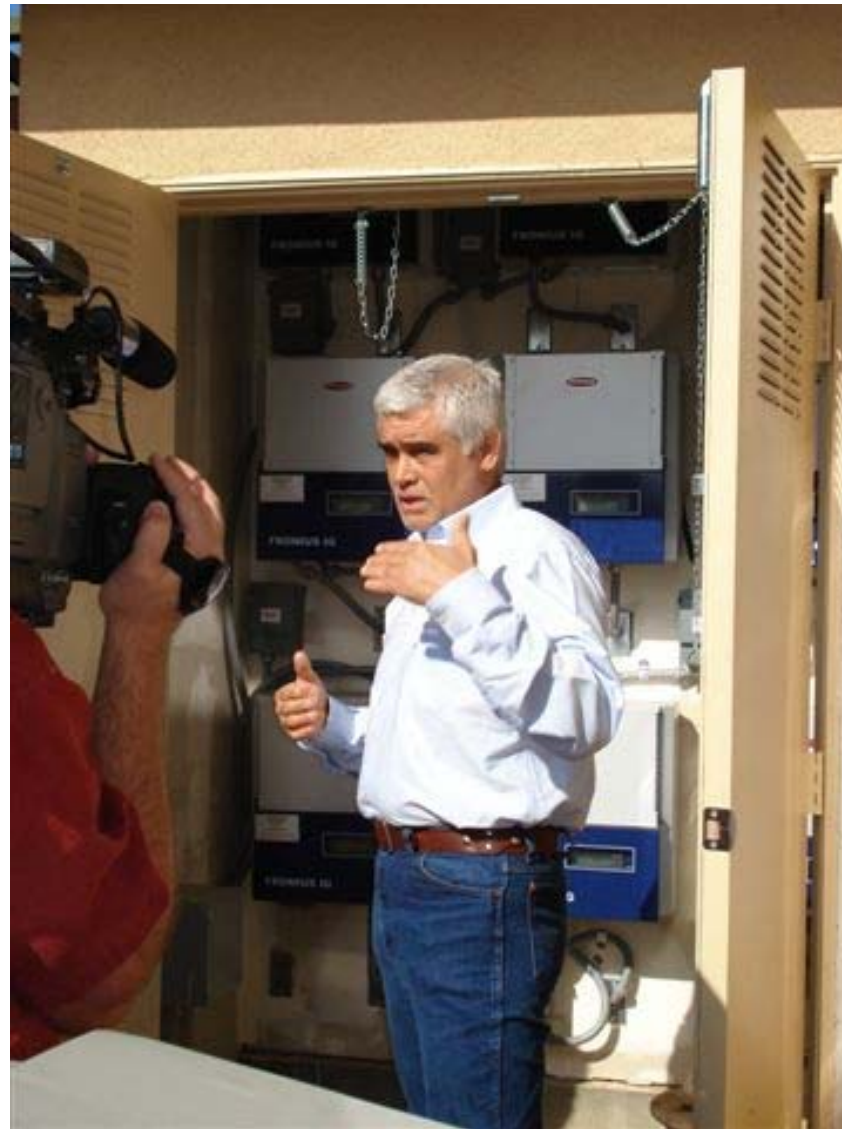


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- **Recycled and Recyclable**
No “New Home” Smell
- **Difficulty**
- **Echoed in Public Art**











Green Costs

- Costs of Green? Myths, rumor
- Studies – 1%, 2%, 5%, 10%
- Depends.....
 - Comparisons with what?
 - SOLARA and CHW's developments– all above Title 24– so compare to ??
 - Actual ***First*** Costs-- \$230k (Approx \$4k/unit, or approx \$4/sf) – 1.5% of final TPC (project completed early and under budget by approx \$350k)
 - Extension of EUL? Health of residents? Environment?



SOLARA: PV Costs

How much did PV cost?

- Approx \$7.75/watt (total 142kw)
- Approx 2 kw/unit for 90%

SOLARA finance of PV:

Cost (approx)	\$1,103,000
Sources (approx)	
CA Energy Com Rebates	\$409,000
Tax Credit Basis Boost (9%, \$1.05)	405,000
Fed Invest. Tax Credit (30%, \$1.00)	208,000
Perm Mortgage	<u>81,000</u>
Total Sources	\$1,103,000



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Summary

- **Green and PV – Costs**
 - 1-2% more for green
 - Sources for PV
 - First Costs vs Triple Bottom Line
 - Why defensive about subsidies?
- **VE after Construction– failure except for market or unavoidable**
- **Commitment - Design and Construction**
 - New Paradigm
- **Keeping it Green**
 - Management / Maintenance
 - Green Curriculum





SOLARA Team

<i>Owner/Developer</i>	Community HousingWorks
<i>Architect</i>	Rodriguez Associates Architects & Planners, Inc <i>Landscape:</i> Ivy Landscape Architects & Planners
<i>General Contractor</i>	Sun Country Builders <i>PV Subcontractor (design/build):</i> Solar Power Inc.
<i>Green Advisor</i>	Global Green USA
<i>Lenders/Investor</i>	City of Poway (lender and landowner) County of San Diego (lender) Union Bank of California (construction/perm) National Equity Fund (tax credit investor)

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