

RESNET 2018

Measure Twice, Cut Once: Design Charrettes Lead to Better Buildings

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TRC Energy Efficiency Services

- Residential program design and implementation
- Codes and standards
- Market characterization and program evaluation
- Zero Net Energy and emerging technology





Agenda

- Why build better?
- Design Charrettes within an integrated design process
- Anatomy of a Design Charrette
- Process comparisons
- Case studies and real examples of value
- Questions



Why Build Better?

- Keep up with code advancements "Fail while its voluntary"
- Differentiate your product for quality and comfort
- Certified-efficient homes sell*:
 - 2% to 6% premium
 - \$2.99 to \$13.82 per square foot premium
 - \$3,416 to \$8,882 per home
 - 18 to 89 days faster than a comparable home
- Receive utility incentives or tax credits
- Hedge against future energy cost fluctuations
- Reduce liability and call-backs





Good News! Residential Zero Net Energy is:

Technically Feasible

For simple single family building types

Financially Cost Effective

 With integrated design efforts and an experienced design-build team

Politically Viable

Up to a point with natural-gas complications galore



The Integrated Design Process

Due define	Design Charrette			
Pre-define preliminary goals, or goal options, with the executive team – ZNE, incentive program eligibility, a HERS target, ducts in conditioned space	Consult with the entire design/procurement team on designing the building(s) to achieve those goals	Value Engineering	g Meeting	
		Consult with the construction team on the sequencing, coordination, and construction methods that achieve the design	Field Verifications Confirm in-field if measures are being met, or if course corrections are needed.	
Adjustments a	l s you go	goals		

- Open communication
- Save money, save time, save materials, save labor
- Open the value (*aka-\$\$*) of better design to the builder
- Many green or incentive programs reward integrated design



Integrated Design -

- "...recognizes that each aspect of building design influences the others. The collaboration among contributors is critical...." – Ann V. Edminster, Energy Free Homes for a Small Planet
- "...the entire project delivery team must be committed to understanding, and remain engaged and involved in the process from project inception through operations and maintenance." – ASHRAE
- "...whole building design...viewed as an interdependent system....The goal ...is to make sure they work in harmony..." – Wikipedia
- "...a means to explore and implement sustainable design principles effectively on a project while staying within budgetary and scheduling constraints....a multi-disciplinary and collaborative team whose members make decisions together based on a shared vision and a holistic understating of the project." – Cascadia



Anatomy of a Design Charrette

Prepare

- Prepare know the current status of the design, or project description. If intended EE measures or siting are knowable, know them.
- Build an agenda inclusive of efficiency
 - EE is only one aspect
 - Waste management, sequencing, aesthetics, HOA rules,
- Develop an attendee list mandatory vs. preferred/scheduling
- Assign a facilitator for energy efficiency



Anatomy of a Design Charrette

Agenda Basics – ½ day to multi-day depending on size and scope of the project

- Reaffirm/confirm project goals
- Discuss perceived challenges, anticipate issues
- Brainstorm potential solutions
- Recognize and plan for construction training needs
- Review in-field verification items
- Take notes
- Distribute and follow up on action items



Anatomy of a Design Charrette

Attendees

- Mandatory builder exec, architect or designer, energy consultant/HERS rater, marketing staff, HVAC/MEP contactor, engineers (structural), procurement/purchasing
- If possible/applicable: utility incentive program rep, building official, specific subcontractors (framing, plumbing, roofing, electrical,



Design Impact



Docs

coordination



Traditional vs. Integrated Processes

	Traditional Project Delivery	Integrated Design Process
Project Team	Fragmented	Integrated
Timing	Assembled on "just-as-needed" basis	Assembled early in the process
Chain of command	Strongly hierarchical	Open
Communications	Informal	Structured
Process	Controlled	Collaborative
Decisions	Linear, distinct, segregated	Concurrent, multi-level
Knowledge	Siloed, hoarded	Shared, collaborative,



Good intentions are not enough...

Detailed instructions...



...get ignored



You need to explain the "what", the "how" and the "why"



The Case of the ZNE Ducts

Not enough room for chaseway ducts?...



No problem, we have an empty attic!



Trades need to be apprised of design and intentions early



New measures need new methods



Getting everyone in the same room...



... can prevent extra labor costs later



New Measures – New opportunities

Moving the envelope...

... eliminates a cost



Find opportunities for cost and labor reductions inherent with a major change



Energy Model Live and In-Person

Pre-built preliminary models...

... allow for live feedback



Scenario analysis and optimization can demonstrate cost reductions and incentive boosts



Advanced measures require advanced planning

Repetitive processes... ... multiply the benefit



Installation strategies for new high performance applications need to be developed





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