

From Risk to Readiness:

PRACTICAL SOLUTIONS FOR MEETING THE EXISTING BUILDING RETROFIT CHALLENGE

Deep Energy Retrofit Case Study – Implementation on Occupied Residential Buildings

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Project Overview

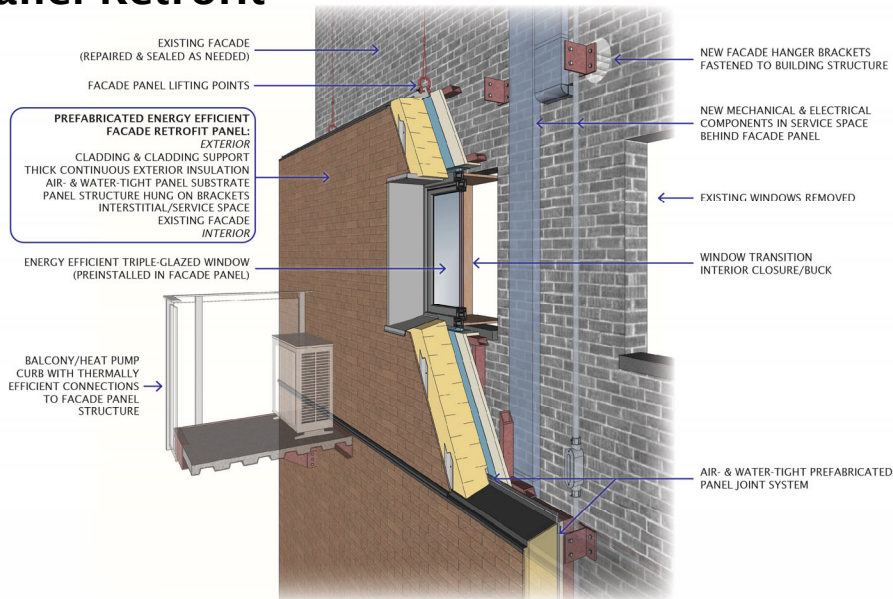
→ REALIZE CA Grant

- Standardize retrofits for "one size fits most"
- Retrofit panelized wall and/or roof panels + mechanical system upgrade
- Minimize disruption to tenants



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Wall Panel Retrofit



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Retrofit Challenges for Existing Buildings

- Occupant disruption
- Structural/seismic capacity (CA)
- Access to funding
- Construction coordination
- Permitting for emerging technologies
- Hazardous waste



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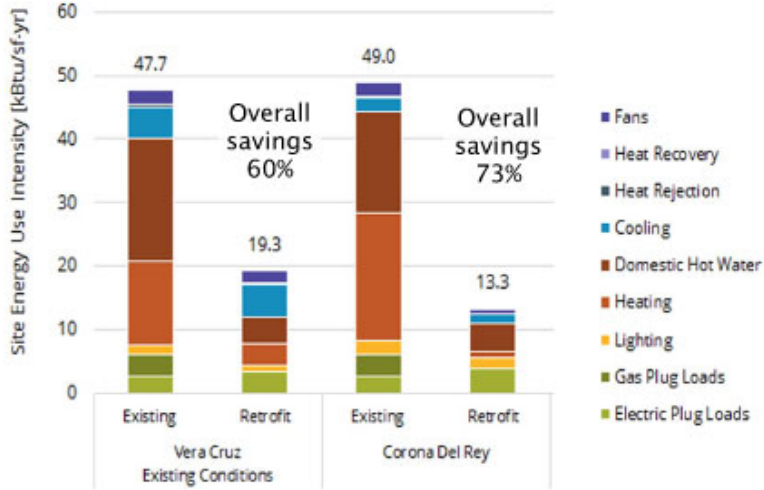
Performance Goals for California Projects

Comparable Attribute	Manufacturers
Installation Time	<1 week for whole building
Tenant Disruption	Tenants do not have to vacate during installation
Cost (\$/sqft façade; materials & installation)	\$30-45
Wall R-value	Up to R-29
Roof R-value	Up to R-49
Air Change (ACH50)	1 ACH50
HVAC Load Reduction	20% reduction from current building usage
Prefabrication Ability	All panel elements are factory-finished and delivered ready to install
Panel Size	Able to design to architect specifications
Thickness	<=6"
Finishing Options	Able to design to owner/architect specifications
Seismic/ Structural	Nonstructural; loads placed on existing structure

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Modeled Site Energy Savings



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Retrofit Challenges for Existing Buildings

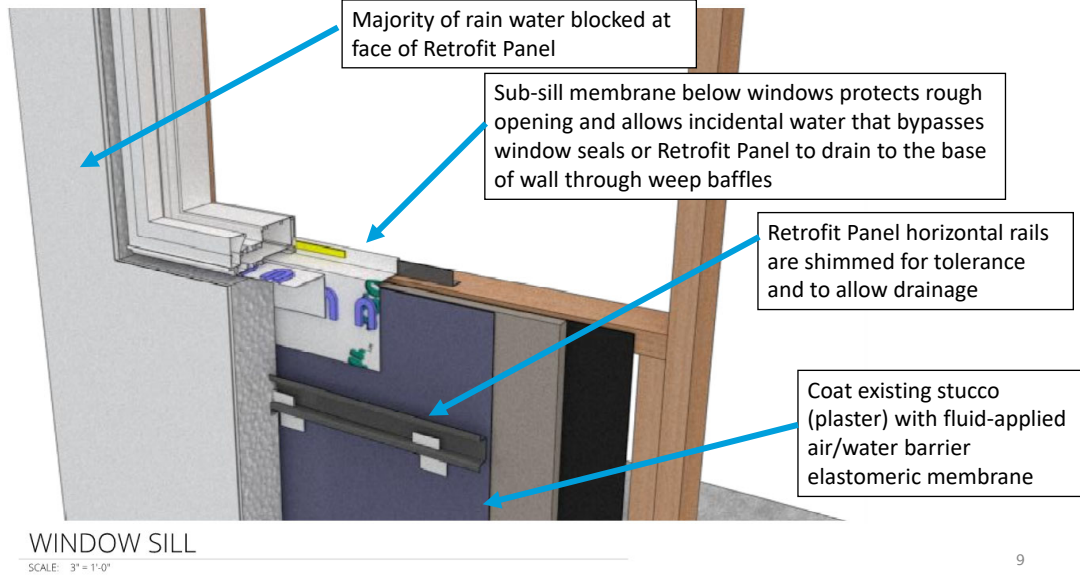


Rendering by David Baker Architects

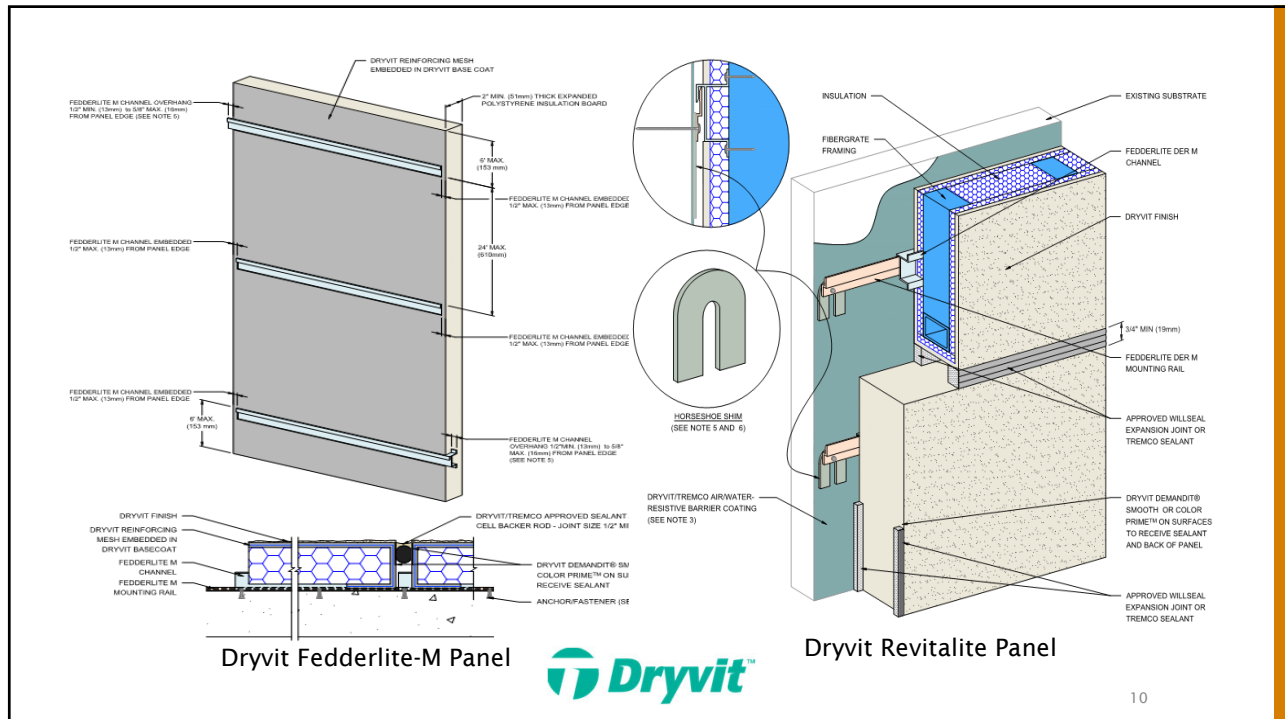


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Panel Installation Over Existing Cladding



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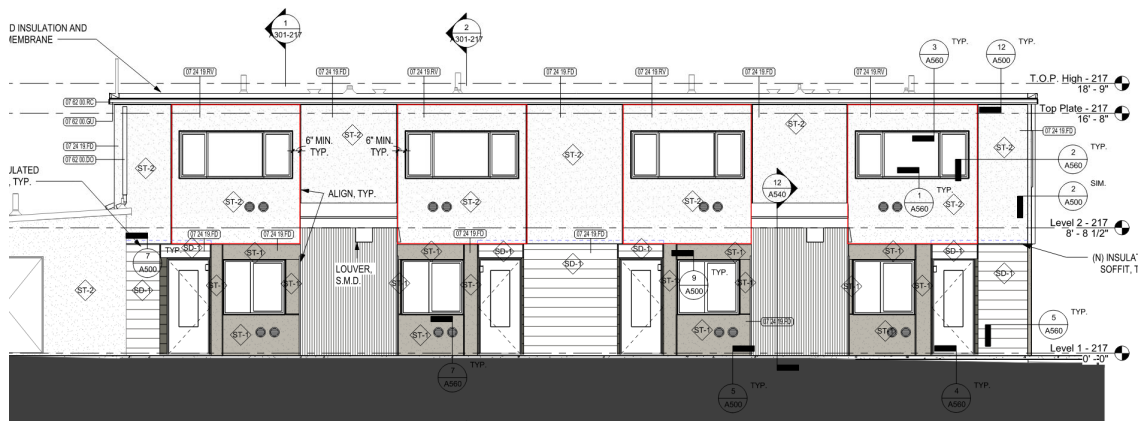
Revitalite Panel



First prototype panels being fabricated

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Structural/Seismic Allowance



Drawing by David Baker Architects



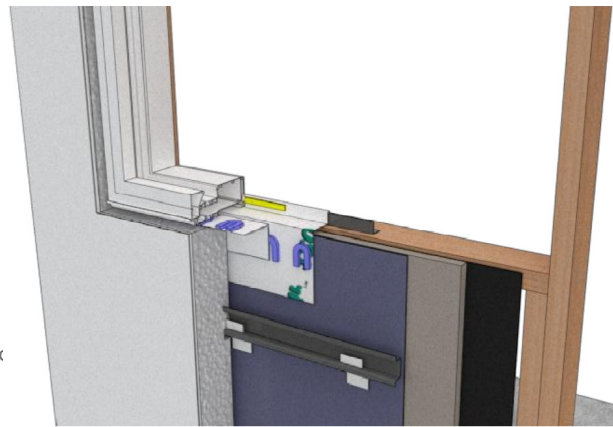
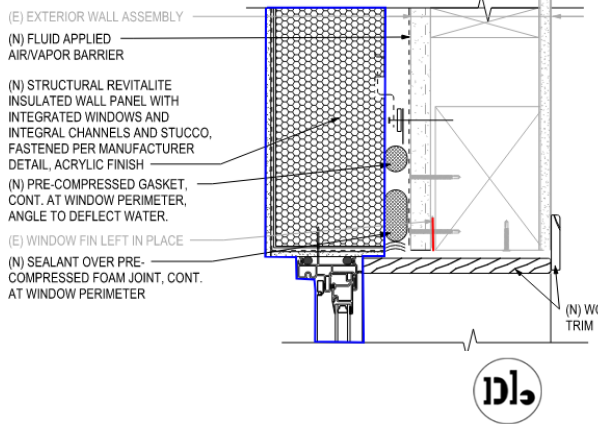
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Minimizing occupant Disruption

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Planning Approvals	█									
Final Bid and Construction Set		█								
Building Permit		█	█	█						
Panel Mock-up		█								
Electrification and re-plumb				█						
Demolition & Site Preparation							█			
Structural Repairs							█			
Envelope Retrofit								█		
Panel Installation 205 (Fedderlite)								█		
Panel Installation 217 (Revitalite)								█		
MEP Retrofit								█	█	
PV Installation and Finish Work										█

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Minimizing Disruption at Windows



WINDOW SILL
 SCALE: 3" = 1'-0"



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Expected Performance

Comparable Attribute	SOW Requirement	Fedderlite-M	Revitalite Panel
Installation Time	<1 week for whole building	Predicted to be met	Predicted to be met
Tenant Disruption	Tenants do not have to vacate during installation	Predicted to be met	Predicted to be met
Cost (\$/sqft façade; materials & installation)	\$30-45	\$42	\$125
Wall R-value	Up to R-29	R-16 & R-24	R-24 (estimated)
Roof R-value	Up to R-49	R-30	R-30
Air Change (ACH50)	1-2 ACH50	Predicted to be met	Predicted to be met
HVAC Load Reduction	20% reduction from current building usage	Predicted to be met	Predicted to be met
Prefabrication Ability	All panel elements are factory-finished and delivered ready to install	Predicted to be met	Predicted to be met
Panel Size	Able to design to architect specifications	Predicted to be met	Predicted to be met
Thickness	<=6"	6"	6"
Finishing Options	Able to design to owner/architect specifications	Predicted to be met	Predicted to be met
Seismic/ Structural	Nonstructural; loads placed on existing structure	Predicted to be met	Predicted to be met

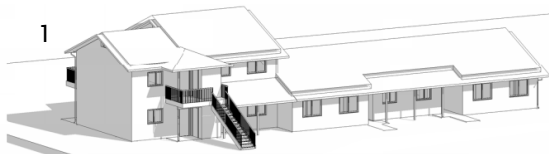
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Demonstration Site - Insulated Metal Panel Roof



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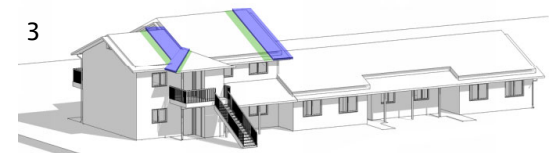
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EXISTING BUILDING WITH ASPHALT SHINGLE ROOFING

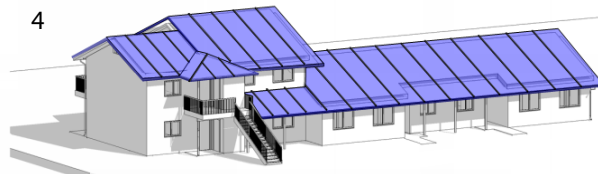


REMOVE EXISTING ROOF SHINGLES DOWN TO SHEATHING

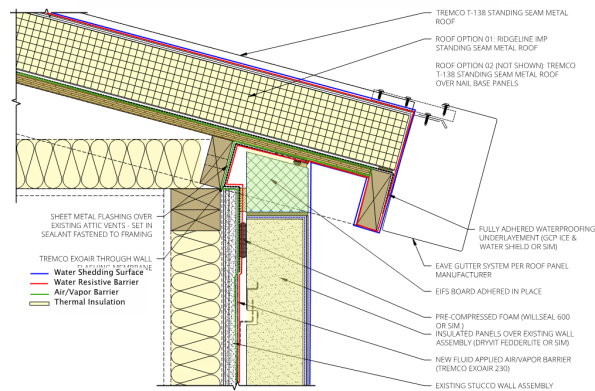


INSTALL WATERPROOFING MEMBRANE AND INSULATED METAL PANELS OVER EXISTING ROOF

Rendering by David Baker Architects



INSULATED METAL PANEL RETROFIT



SOFFIT AT STEEP SLOPE ROOF

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Discussion + Questions

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