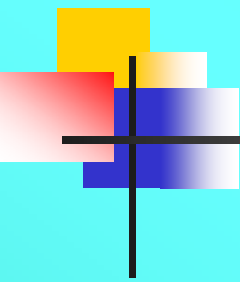


PATH

Uniform Protocol for Energy- Efficient Remodeling of Existing Housing



Project Team

- **IBTS**

- Institute for Building Technology & Safety
- Herndon, VA

- **BKi**

- Bevilacqua-Knight, Inc.
- Oakland, CA

- **PSD**

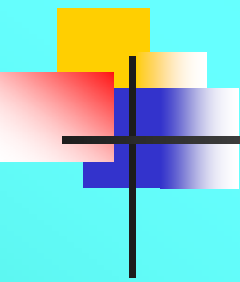
- Performance Systems Development
- Ithaca, NY

Team IBTS

Project Team

- Technical Advisory Panel
 - Remodelers, Trade Contractors
 - Trade Associations
 - Expert Consultants
- HUD
- DOE
- EPA

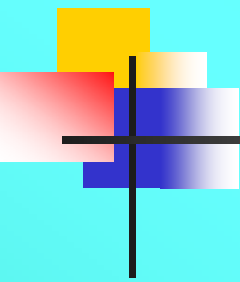




PATH Program

- U.S. Dept. of Housing & Urban Development
- Partnership for Advancing Technology in Housing
- Multi-faceted approach
 - New & Existing Housing
 - Technology & Market Research
 - Identifying & Removing Barriers
 - Information Dissemination

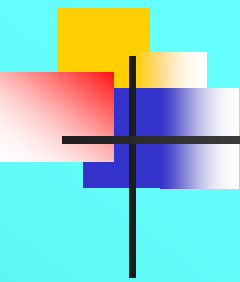




PATH Program

- PATH works to improve housing:
 - Affordability
 - Energy-Efficiency
 - Environmental Impact
 - Quality
 - Durability and Maintenance
 - Hazard Mitigation
 - Safety
- Started in May 1998





PATH Roadmaps

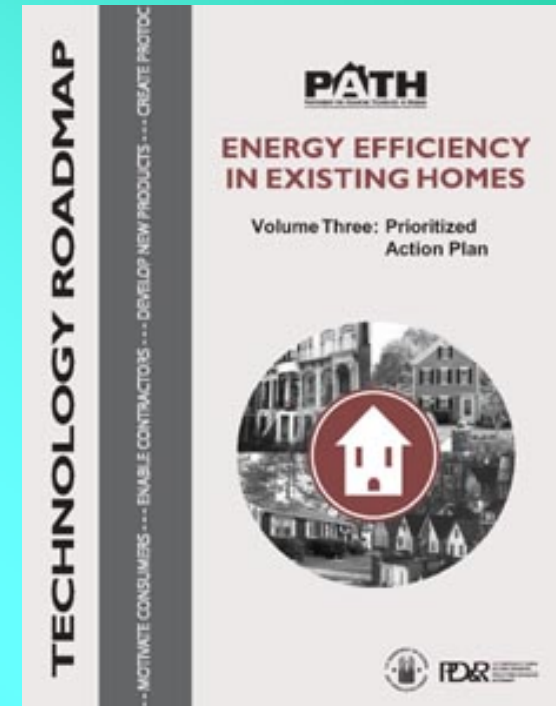
- Priority setting approach
 - Whole House & Building Process
 - Information Technology
 - Manufactured Housing
 - Panelized Construction
 - Energy Efficiency in Existing Homes
- www.pathnet.org

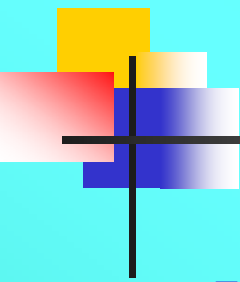


Library
ROADMAPS

PATH Roadmaps

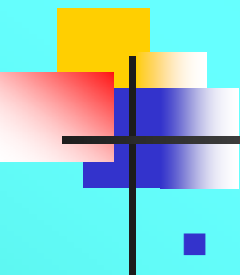
- Energy Efficiency in Existing Homes
 - Enable & motivate practitioners
 - Building envelope technologies
 - Consumer value & incentives
 - Structured industry protocol
 - Build practitioner credibility
 - Performance monitoring





What is a “Protocol”?

- A **Protocol** is a set of best practice instructions and references for each energy efficiency topic and level of improvement
- Identified for both technical and business practices

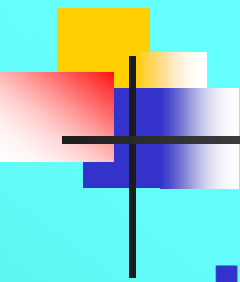


Project Overview – Phase I

- Identify baseline topics
 - Problem areas
 - Better practices & Common practices
- On-going Technical Review Panel guidance
- Design data structure
- Create prototype protocols
- Get market feedback
 - Focus groups
 - Remodelers, Trade contractors, Homeowners
- Computer modeling specifications
- Quality assurance

Underway

Upcoming



Project Overview -Multi-Phase

- Phase I

- Current effort

- Phase II

Subject to funding availability ...



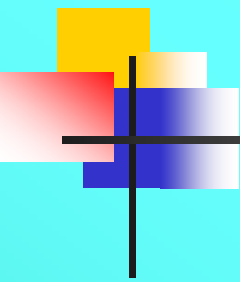
- Final protocol design
 - Test/pilot protocols

- Phase III

- Complete final protocols
 - Cross-industry agreements
 - Consumer outreach

- Phase IV

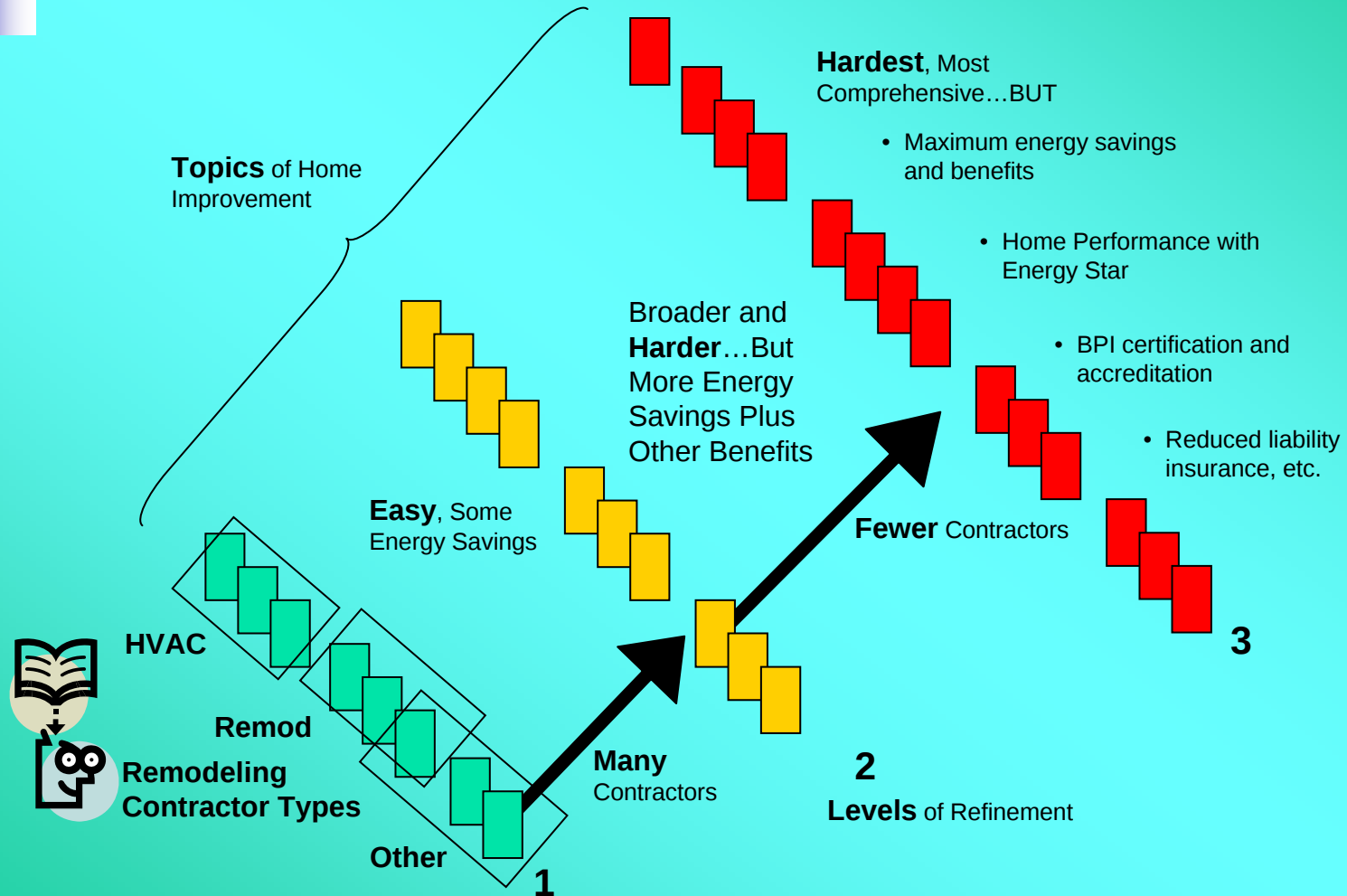
- Monitoring & Evaluation

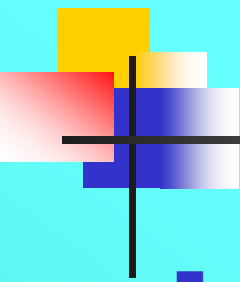


What is “Remodeling”?

- **Residential remodeling** includes:
 - Interior Renovations
 - Building Additions
- Targeted contractors include:
 - Full-service remodelers/general contractors
 - Mechanical Trades
 - HVAC
 - Water heating
 - Specialty Trades
 - Windows, doors
 - Insulation, Shell sealing
 - Painting, roofing, siding
 - Solar, PV

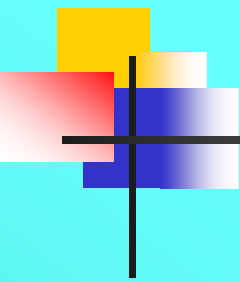
Project Vision





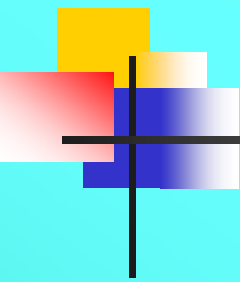
What are “levels”?

- Must have progression or path
- Multiple entry points
- Capabilities and interest vary
 - **Level 1** = narrow, easy, some energy savings, appropriate for all contractors, “cherry picking”
 - **Level 2** = broader, more difficult, more savings, appropriate for fewer contractors
 - **Level 3** = Comprehensive, difficult, maximum energy savings, appropriate for HPwEs, BPI



Establish Baseline

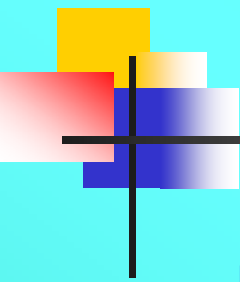
- Scope & Purpose
 - Establish **topics** for improvement in practices
 - Focus on **energy-saving** topics
 - Identify current remodeling **common practices**
 - Suggest **priorities** for protocol development



Establish Baseline

■ Approach

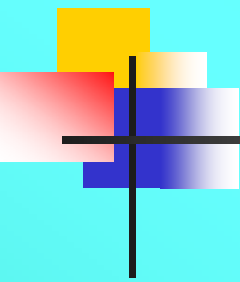
- Telephone & in-person interviews with 60 industry representatives
 - Focus on remodelers & trade contractors
- Literature review of standards, guides, databases
- Technical Advisory Panel input
- Confirmation with multiple sources



Many “Better Practices”

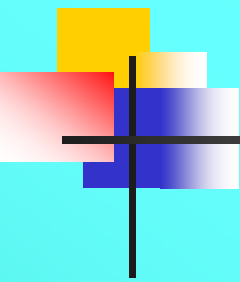
- NAHB, NARI
- ACCA, NATE, SMACNA
- BPI for whole house
- Home Performance with Energy Star
- Other specific Energy Star programs
- Weatherization
- Building America
- PATH
- System benefit funds & utilities
- Green building initiatives
- Many more...

*...but we needed **COMMON** practices*



Baseline Topics

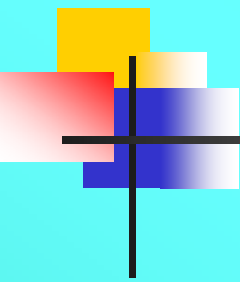
- General Business Practices **12**
 - Inspection & Testing **13**
 - Finding/Selling solutions **9**
 - Installation practices **5**
 - QA & QC practices **3**
- # of topics = 43**
- Three contractor categories
 - Building renovations & additions
 - Mechanical
 - Specialty



Findings

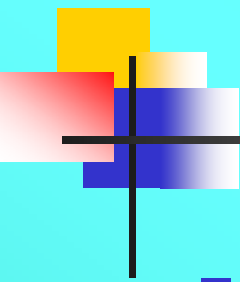
- General Business Practices
 - Need more assistance than currently available
 - Need a stepwise path

- Home Inspection and Testing
 - Virtually no diagnostic testing or quality verification being done
 - Almost always to qualify for EnergyStar rather than to improve home performance



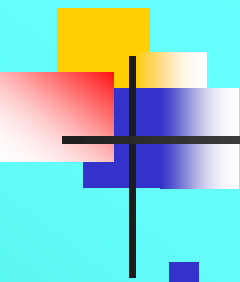
Findings

- Finding/Selling solutions
 - Little knowledge or attention to energy savings measures
 - Once trained to do home inspection & testing, recommending correct solutions is easy; but very few contractors are trained
 - Selling energy-related home improvements requires:
 - Significant effort
 - Consumer education
 - Upgraded contractor sales skills



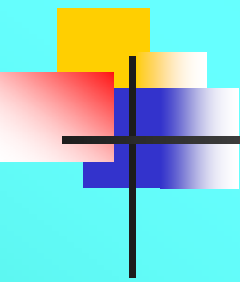
Findings

- Installation practices
 - Widespread performance, comfort, safety, durability problems related to installation
 - Vast majority of contractors have **no easy access** to knowledge needed
 - Relevant
 - Organized



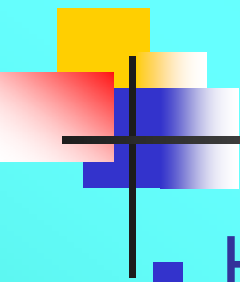
Findings

- Quality Assurance
 - Internal test-based QA reduces liability risk, callback costs, customer disputes
 - Providing homeowner instructions rarely done
 - Annual service contracts rarely include safety testing



Findings

- Home Energy Efficiency Programs for Contractors
 - Many trade association, utility, government programs out there
 - Focus on **single disciplines**
 - Whole house programs few in number
 - Not widely known



WIFM

- How will this be useful for Raters?
 - Ready source of information
 - Don't reinvent the wheel
 - Credible
 - Training **tools** for staff & clients
 - Fits various expanded Rater **business models**
 - Rater as consultant – contractors need help
 - Rater as home performance contractor