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AESP Brown Bag

Measuring the Impact of Market Transformation

June 23, 2011

Holistic Approaches to Market Transformation: Wisconsin's Homes Market

Monica Curtis

Director, Energy Programs

WECC

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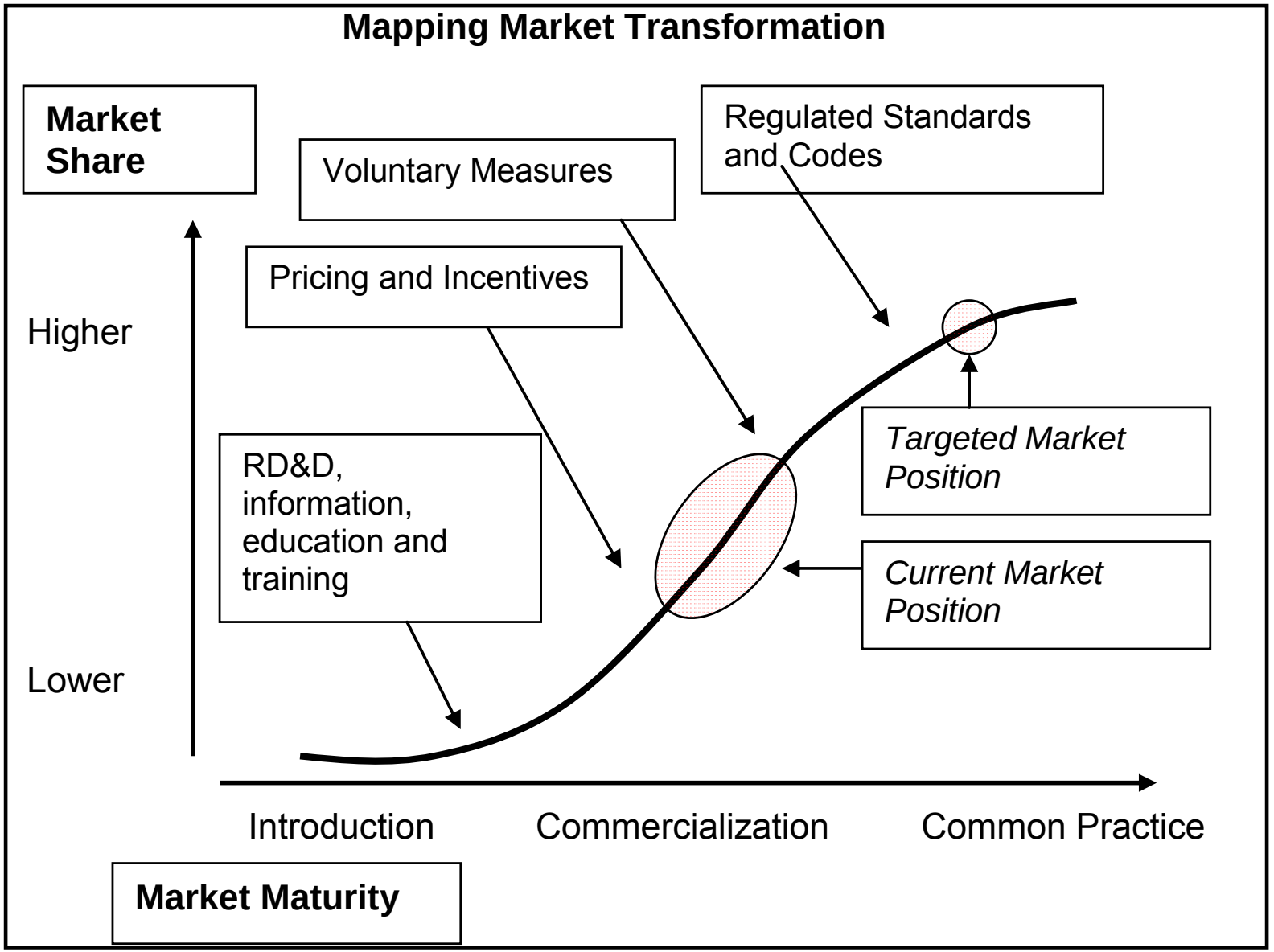
wisconsin energy conservation corporation
proving the value of energy efficiency



2008. Adapted by Andrew Pape-Salmon of the BC Ministry of Energy and Derrick Henriques, Henriques Consulting (formerly BC Hydro) from Natural Resources Canada Office of Energy Efficiency project conducted by Navigant

WECC's Mission

We champion innovative energy initiatives that deliver short- and long-term economic and environmental benefits to consumers, businesses, and policy makers.

Wisconsin Focus on Energy Home Performance with Energy Star

What:

- Established in 2001 to foster long-term market transformation:
  - Create a program with self-sustaining, trained, market-based providers.
  - Facilitate whole house improvements.
  - Protect homeowner's interests.

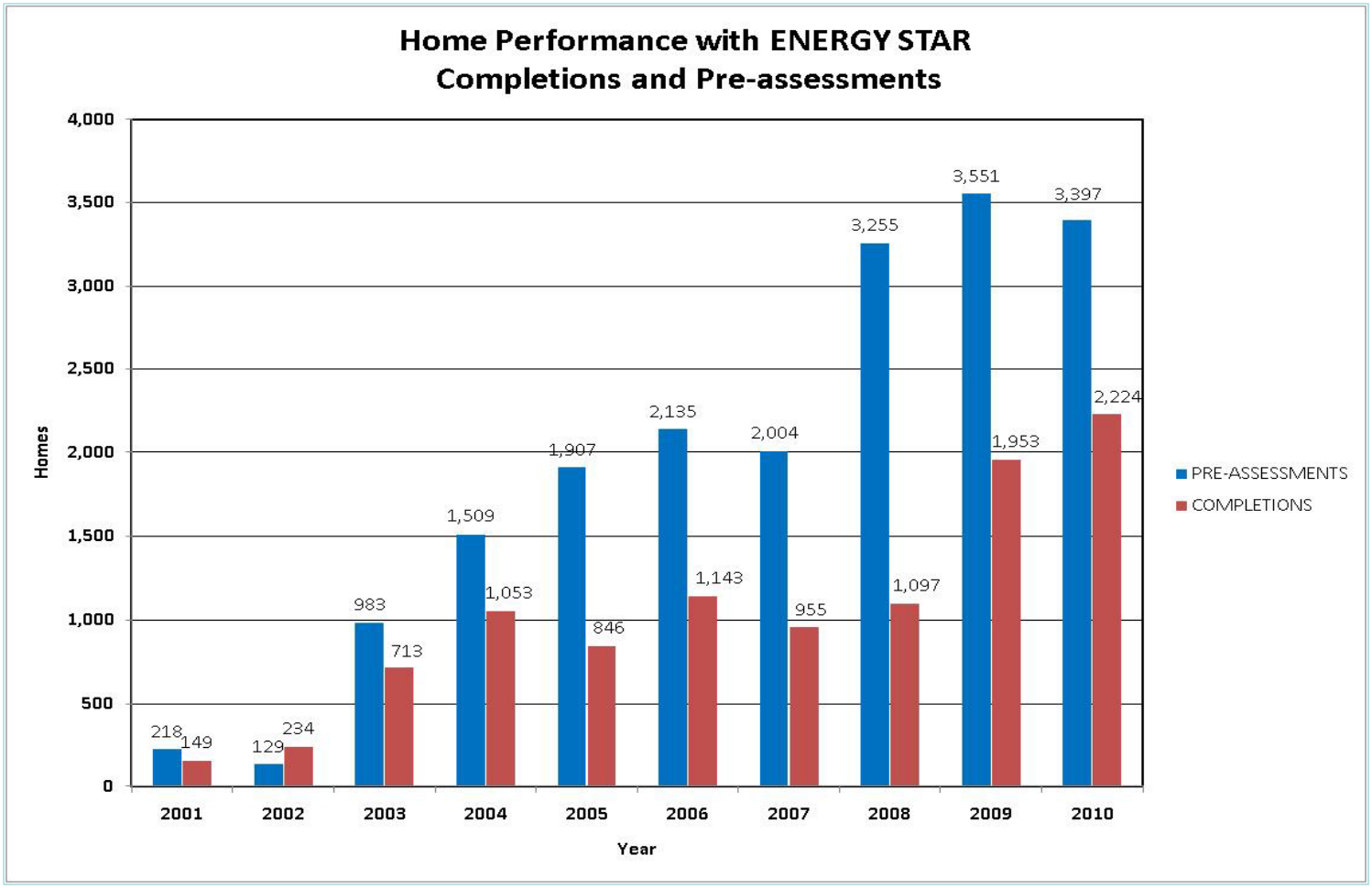
Wisconsin Focus on Energy Home Performance with Energy Star

Commercialization Achieved:

- Long standing commitment to MT strategy.

- Market development.
  - 74 active consultants (BPI/ ResNet certified).
  - Over 1700 contractors.
  - Continued growth in homeowner participation.

Homeowner Participation



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Success Factors

- Long term commitment to the market.
- Market provider engagement.
- Ongoing training and quality assurance.

Barriers to Full Market Transformation

- Lack of market characterization data.
- Focus on individual measures over market impact.
- Separation between codes and standard development and market development programming.

Observations from the Field

- Successful market transformation starts with **knowing what success is, and how it will be measured**.
- Maintaining momentum requires a consistent investment in **market data**.
- Engaging both **market and efficiency stakeholders** is key to sustainable change.

Questions / Discussion

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Whole Market Transformation –

Residential New Construction (RNC) in California

Douglas Mahone

Heschong Mahone Group, Inc

Gold River, CA

June, 2011

Uses of RNC Study Data

- Multiple studies shared the survey data
  - Baseline Study - characteristics of non-participant houses
  - RNC Program Impacts
  - Codes & Standards Program Impacts
  - RNC Market Effects Study
- Inter-related findings for whole market segment

Residential Baseline Study

- Based on on-site surveys and energy modeling
- Describe characteristics of new homes - compare to trends
- Estimate energy use vs. code for non-participant houses
- Never published as stand-alone - used for other three studies

Baseline Information

- Glazing
  - Glazing % dropped from 17% to 14% since 1995
  - Dual pane vinyl, low-e now in 95% of homes
- Space heating
  - Avg furnace efficiency from 80% to 83%
  - 90%+ AFUE furnaces from 2% to 19% of homes
- Space cooling
  - Avg SEER from 10.5 to 13.3 since 1995
  - SEER >13 increased from 0% to 34%
- Etc. (DHW, ceiling insul, radiant barriers, duct leakage)

RNC Program by Utilities

- Statewide Advanced Homes Program
  - Each utility runs its version
  - Consistent approaches and rebates
- Evaluated 2006-2008 Program Cycle
  - Evaluation work 2007-2009
  - Final report February 2010
- Estimated direct program impacts
  - Savings in energy, demand, gas

RNC Impact Findings

- RNC market activity WAY down
- Actual savings differed from claimed
  - Models seriously underestimated cooling energy, overestimated heating energy
  - Electricity savings higher than expected; gas savings lower
- Baseline (code compliance) varied
  - Most areas homes were better than code

Codes & Standards Program

- Multiple res code enhancements, e.g.:
  - Hardwired lighting
  - Duct sealing
  - Whole home performance enhancements
- Determined savings vs. prior code
- Estimated compliance rates for typical houses (non-participants)
- Used whole house modeling method

C&S Impact Findings (Res)

- Hardwired lighting standards
  - Biggest savers in entire code cycle
  - Compliance rate 113% (savings > code)
- Whole house energy savings
  - Electricity compliance rate 120%
  - Gas compliance rate 235%
- Compared as-built new homes to code homes, vs. prior code

RNC Market Effects

- Pilot study
  - Determine feasibility of measuring market effects
- Major questions
  - Can spillover be measured reliably?
  - What is magnitude of spillover effect?
  - How do RNC interventions affect market?

RNC Market Effects Findings

- There is spillover from RNC program
  - Improved code compliance
  - Greater above-code construction
- Overall RNC compliance margins
  - 58% of homes better than code
  - 13% of homes below code
  - Avg RNC 7.4% less energy than code - RNC baseline is better than code

RNC Market Effects Findings

- Total Savings
  - Above code homes saved 39,225 MWh
  - Below code homes wasted 5,471 MWh
- Net Savings (Delphi process)
  - Nearly 50% credited to utility programs
  - Training of builders, code consultants, building officials
  - Split between 2006-08 and prior cycles

RNC Market Effects Findings

- If utility programs ended
  - More non-compliance, worse margins
  - Similar effect if non-utility progs ended
  - Savings effects would not persist
- Good/bad news for RNC program:
  - Spillover is significant due to program
  - Higher baseline diminishes prog savings
  - Spillover captured by C&S program eval
  - …but portfolio got the credit anyway

Discussion

- Spillover - it's clearly not zero
  - It can be measured (but complex)
  - Is it wise to neglect it?
- Given multiple influences on market…
  - Can we parse out different, overlapping market intervention effects?
  - Does it make more sense to measure at market level?
- How to define "program" and "intervention" for evaluation purposes?

Studies Cited

- Residential New Construction (RNC) Programs Impact Evaluation
  - http://www.energydataweb.com/cpucFiles/topics/7/RNC_Volume_I_FinalReport_02082010.pdf
- Codes & Standards (C&S) Programs Impact Evaluation
  - http://www.energydataweb.com/cpucFiles/topics/7/Codes_Standards_Vol_III_FinalEvaluationReport_02042010.pdf
- RNC Market Effects Study (Phase II)
  - http://www.energydataweb.com/cpucFiles/14/RNCMarketEffectsPhaseIIFinalReport_1.pdf

Questions / Discussion

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Energy Trust of Oregon's High Performance T8 Market Transformation Study

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EnergyTrust of Oregon

Framework Tenets of ETO Market Transformation Models

1. Savings are counted over baseline market trends
2. Avoid double-counting
3. If ETO was part of a collective effort by CEE or others that had critical influence over a Federal standard, we can claim the impact in our service territory

- If ETO actions and those of our peers were critical to the outcome, we claim all the savings-
  - We are not saying we did it all ourselves.
  - We are saying our investment, in proportion to our service territory, served the outcome.
- If not, we do not claim MT savings.

How ET Uses Market Transformation Study Results

- ET forecasts of savings are used in utility IRP to defer generation
- Savings are “trued up” over time based on market sales data

Major Changes in Federal Standards

- Linear fluorescent lamp minimum standard 89 lm/w July 2012:
  - No more “standard” T-8 or T-12 bulbs.
  - Allowed: High Performance T-8 or T-12 lamps
  - No impact on ballast efficiency
- Pending linear fluorescent ballast standard in 2014 not included in study

Influence Piece of the Puzzle- Standard Decision

- Were Energy Trust and its peers highly influential on decisions regarding efficiency and/or timing of the Federal standard?
  - 8 of 9 experts involved in the federal standard change felt that incentive programs *were* influential on decisions regarding the federal standard and *when* it would be implemented
  - Modal response to when the standard would have changed without program efforts was 2017

EnergyTrust of Oregon

Influence Piece of the Puzzle: History of Engagement

Energy Trust :

- Participated in the development of CEE specificaton,
- Pressed against manufacturer recommendation for inclusion of less efficient products
- First in the Northwest region to support the specification and promoted, trained, and incented heavily
- Stopped incenting less efficient ballasts once supply and price were “ripe”

These factors influenced availability, competition, and thus price- pre-conditions for the standard

EnergyTrust of Oregon

Regional Influence

- Lighting distributors: all 5 felt that ETO influenced market through incentives
- Market experts: 5 of 6 felt that ETO influenced the market though education and training and 4 of 6 felt it was through incentives
- Supported by a 2009 survey of 60 Lighting trade allies:
  - Over 80 % said ETO was a “major” or the “most important” influence in the adoption of HPT8’s

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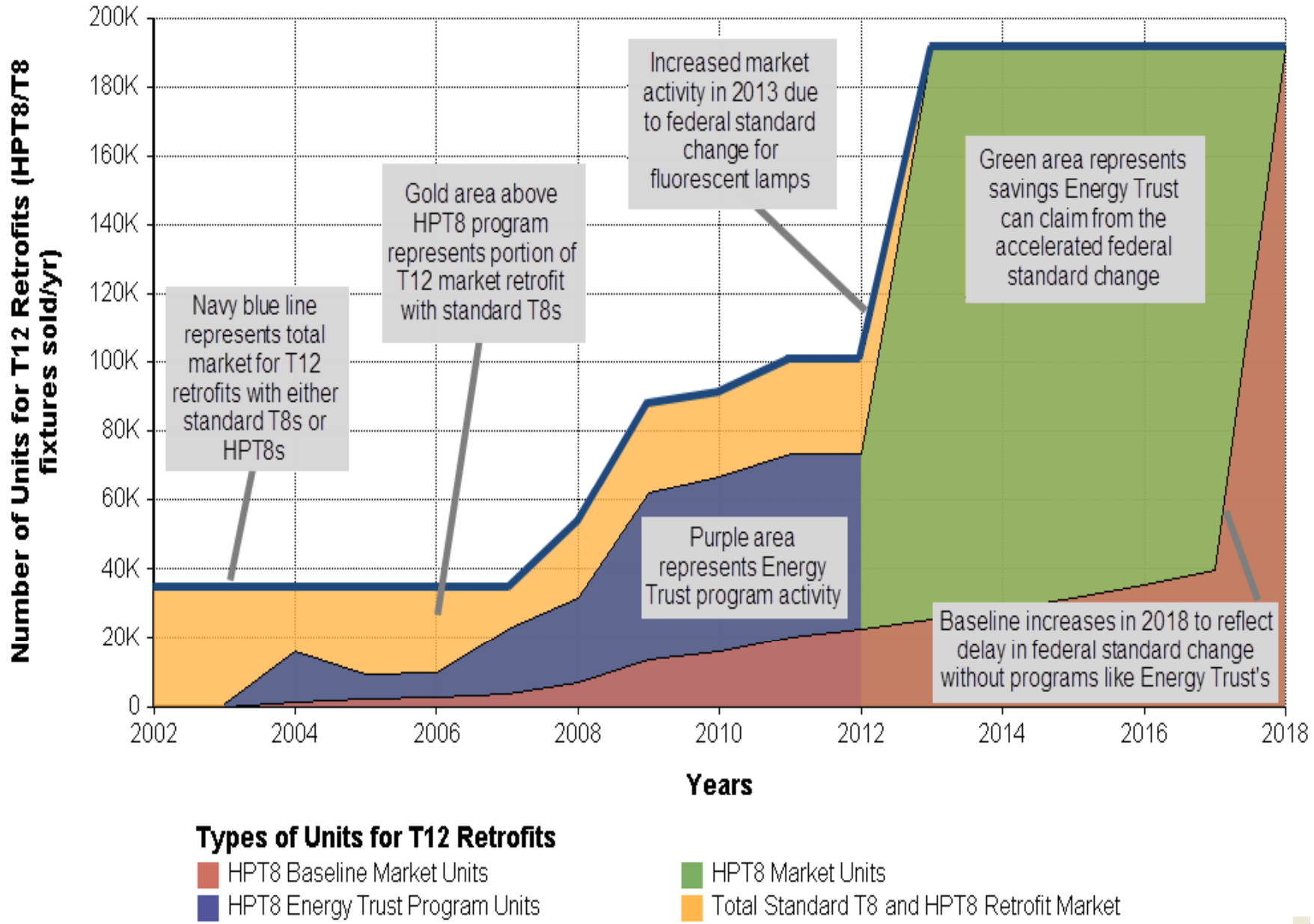
HPT8 MT Model



Pieces of the Puzzle- Data Sources

- HPT8 sales and fixtures replaced
  - ETO lighting retrofit data and distributor interviews
- T12 installed stock and replacement rates
  - Comprehensive Commercial Building Stock studies 2002 and 2007
- Oregon specific lighting sales and installed base of T12's
  - Lighting Market Assessment 2009
- HPT8 baseline
  - Department of Energy (DOE) Technical Support Document for General Service Fluorescent Lamp Federal Standard 2009

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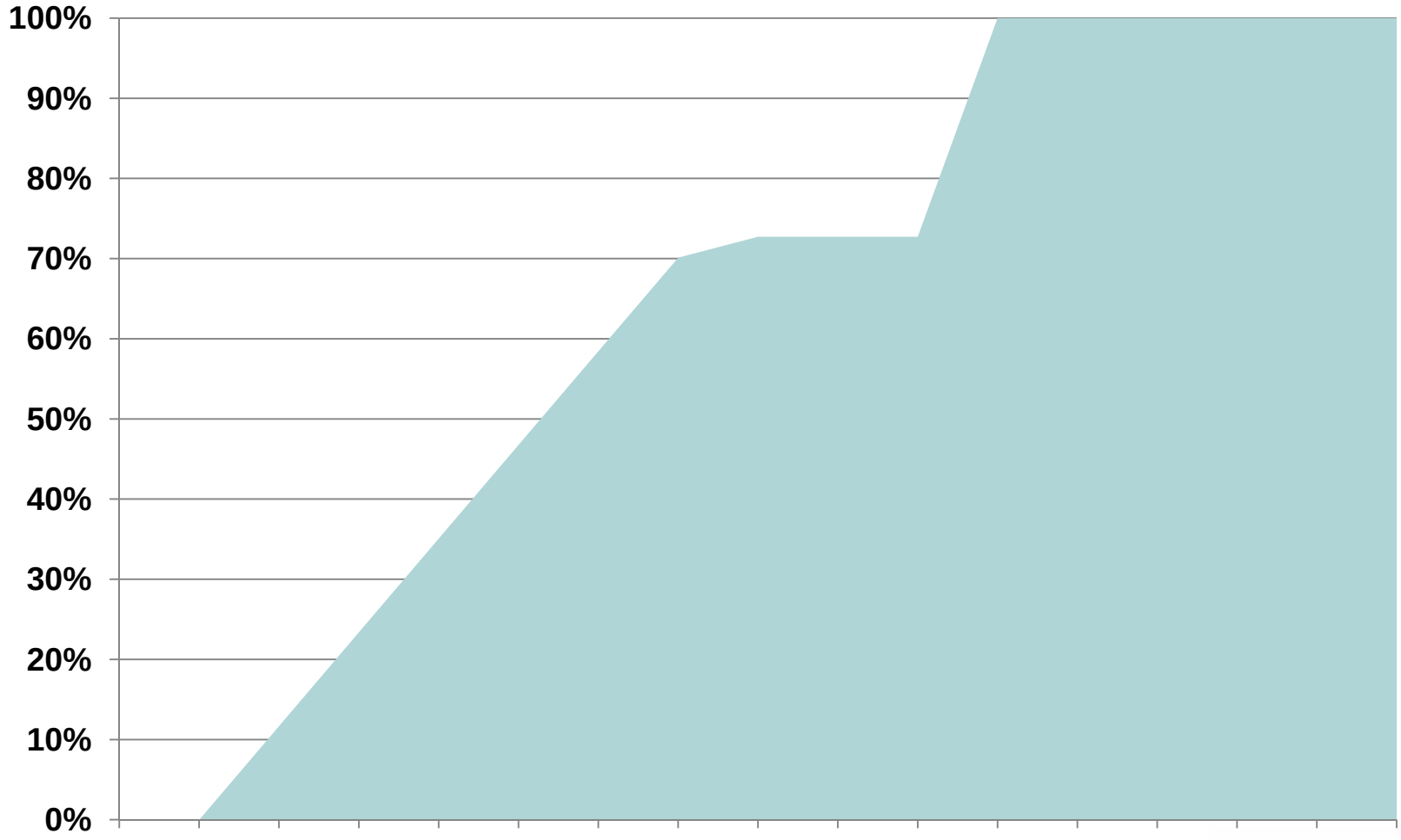
HPT8 Oregon Market Share
(% of T12 retrofits/year)



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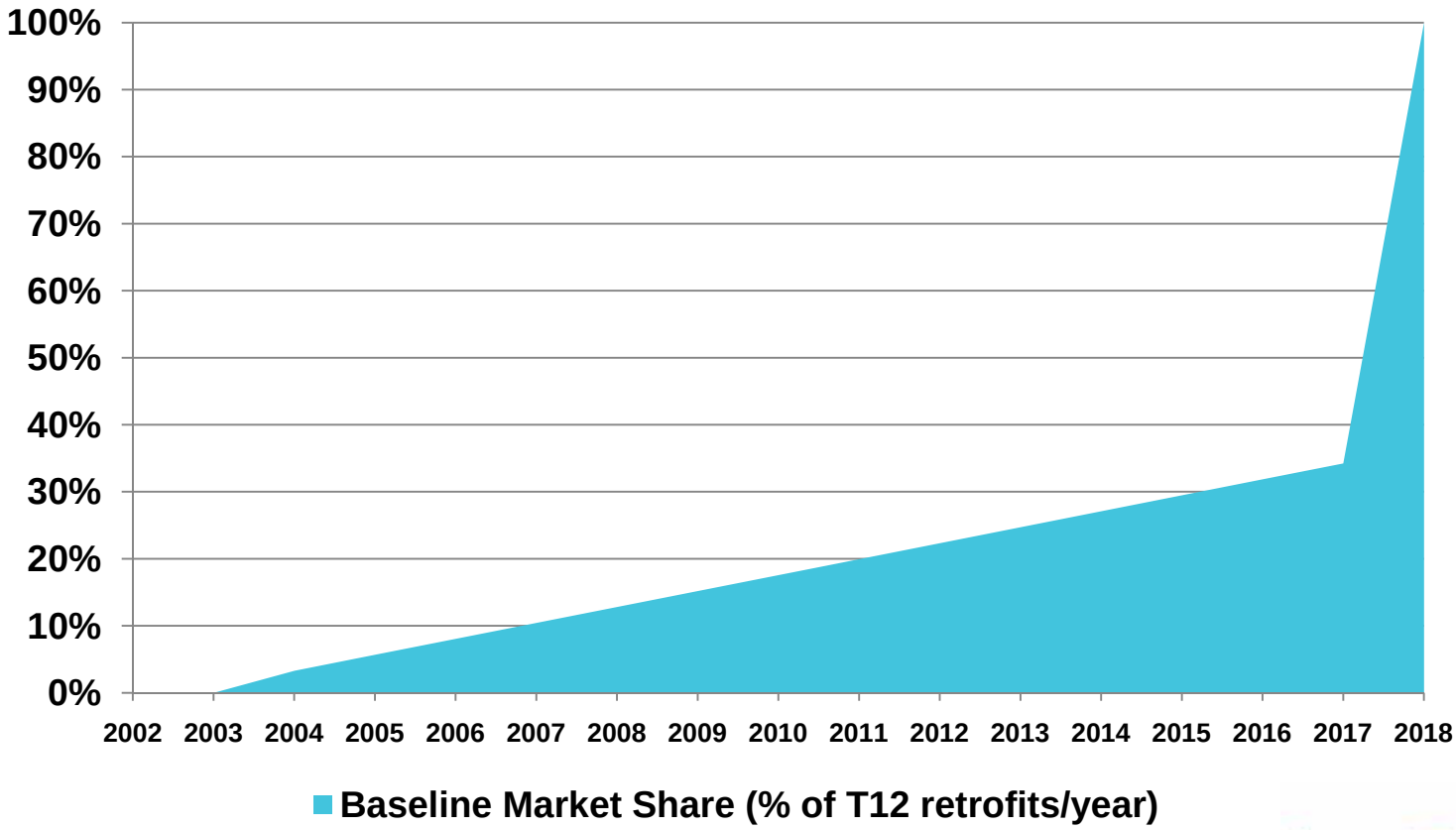
Baseline HPT8 Market Share
(% of T12 retrofits/year)



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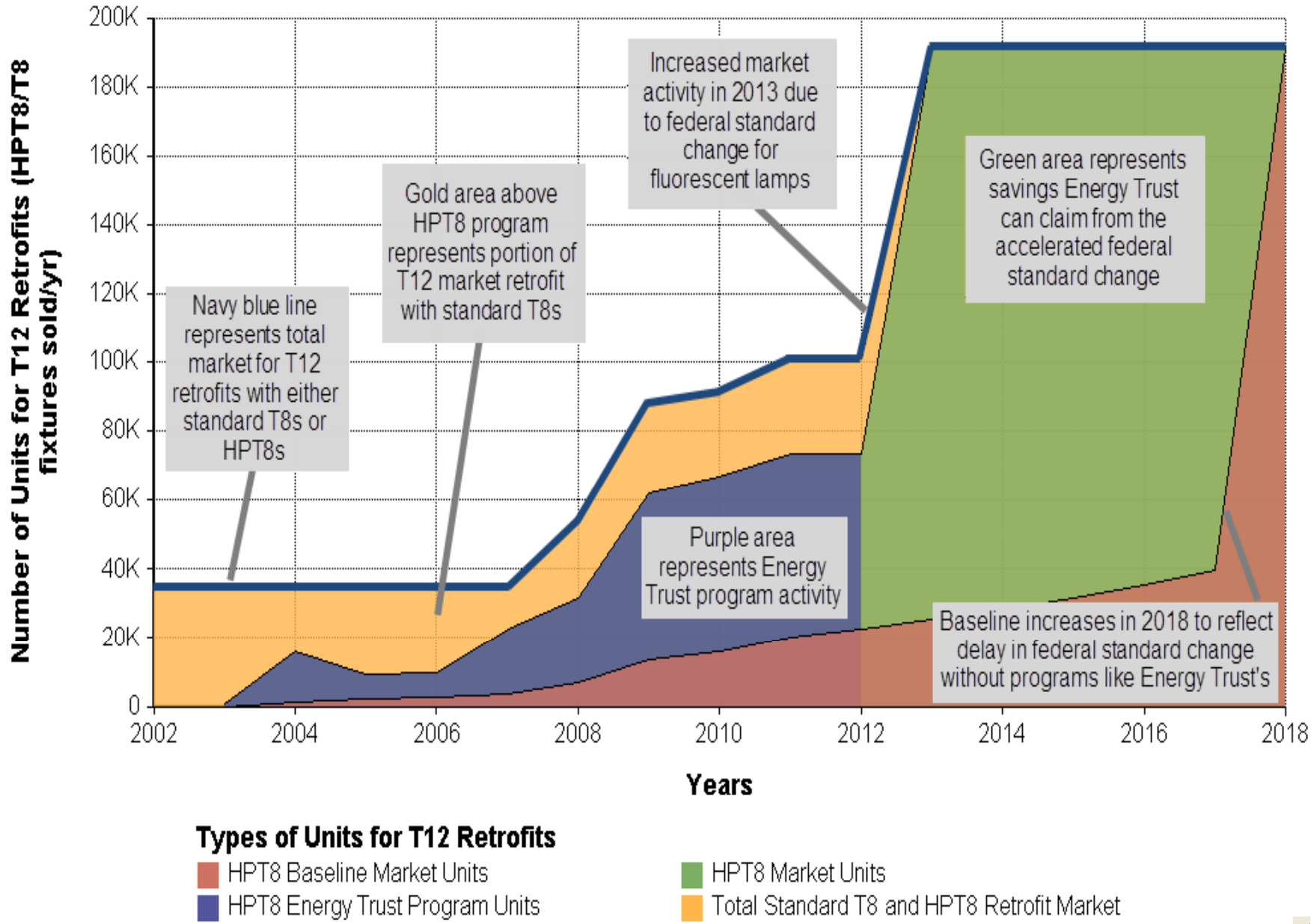
HPT8 MT Model



Questions

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QUESTIONS

Press *1 to ask a question