U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Residential Buildings Integration (RBI)

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Residential Buildings Integration (RBI) Mission/Vision

The Residential Buildings Integration (RBI) program's mission:
To accelerate energy performance improvements in residential buildings by developing, demonstrating, and deploying a suite of cost-effective technologies, tools, and solutions to achieve peak performance in new and existing homes.

RBI Vision, by 2030:

- Cost-effective whole house solutions will become standard practice markets.
- Most new homes will be Zero Energy Ready, meeting *high performance specifications* that ensure comfort and acceptable IAQ, and use at least 50% less energy than 2010 benchmark.
- There will be robust, competitive markets for home improvements that, if delivered as a whole house retrofit, provide better home comfort, IAQ, and cost-effective energy savings that average 50% or more per house.
- Industry standards and building codes will advance to ensure energy savings at national scale, following voluntary adoption by market leaders.

RBI Mid-term and Long-term Goals

	Goals: Residential Buildings Integration	
Existing Buildings	**Mid-term (2020)**	Demonstrate at scale the reduction of energy use of typical homes by an average of 20%, while improving overall indoor air quality, durability and comfort.
	Long-term (2025)	Demonstrate at scale the reduction of energy use of typical homes by an average of 25%, while improving overall indoor air quality, durability and comfort.
New Buildings	**Mid-term (2020)**	Demonstrate at scale the reduction of energy use of new homes by 30%*, while improving overall indoor air quality, durability and comfort.
	Long-term (2025)	Demonstrate at scale the reduction of energy use of new homes by 50%*, while improving overall indoor air quality, durability and comfort.

***Baseline: 2010 or IECC 2009 (for new)**

RBI Barriers & Strategies

Key Barriers

Home energy use is very complex with multiple technology/system interactions and significant uncertainty about energy drivers.

Fragmented industry under funds research of whole building energy efficiency and performance, and is highly risk averse.

Owners lack feedback on home performance and have limited tools to effectively address high utility bill problems.

Markets have limited capability to deliver cost effective energy efficiency services for high performance new or existing homes.

Strategies

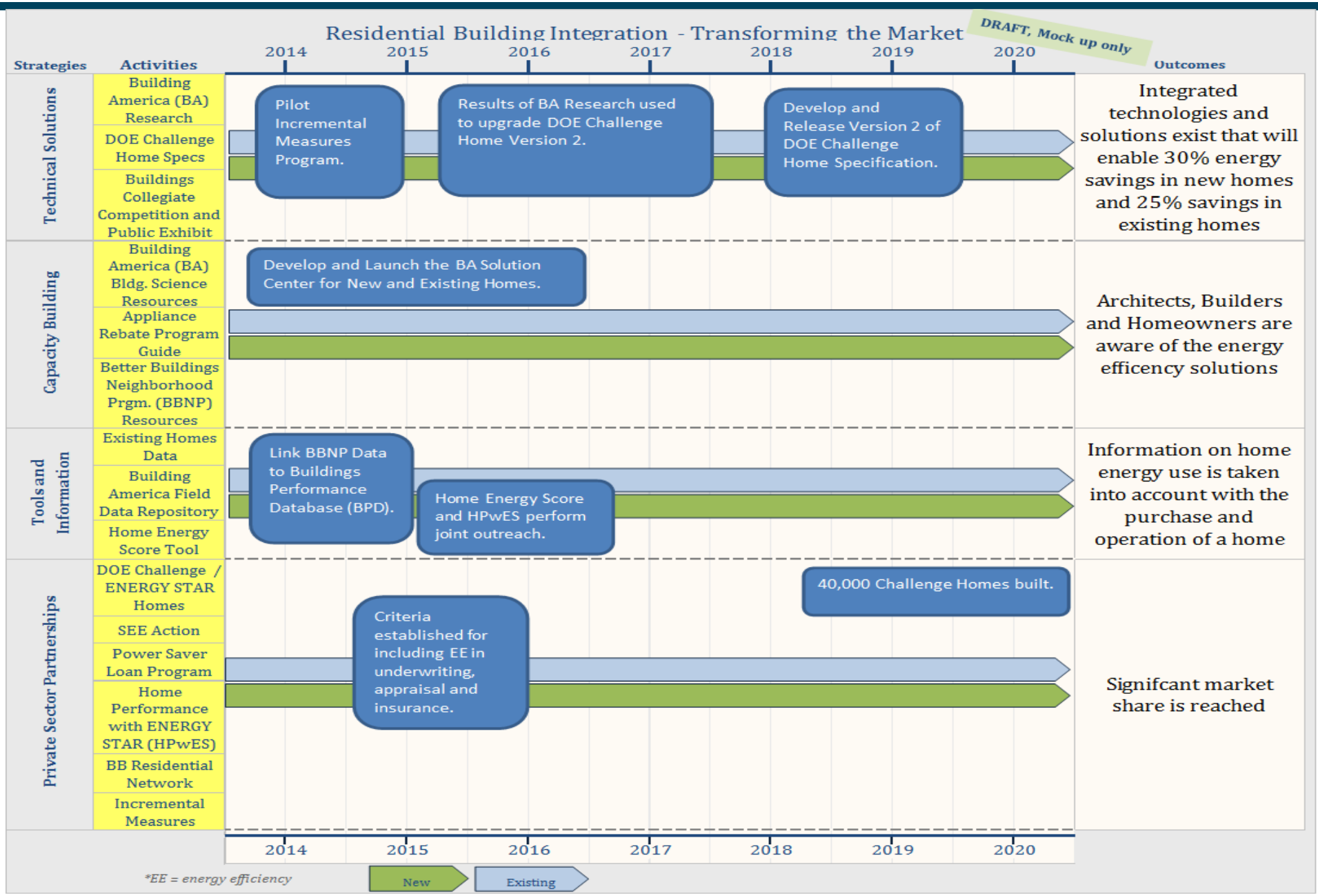
Technical Solutions: Develop and demonstrate advanced technologies & practices that enable profitable Zero Energy Ready new homes and whole house retrofits.

Capacity Building: Develop and disseminate effective guidance & training for building sector professionals and other service providers.

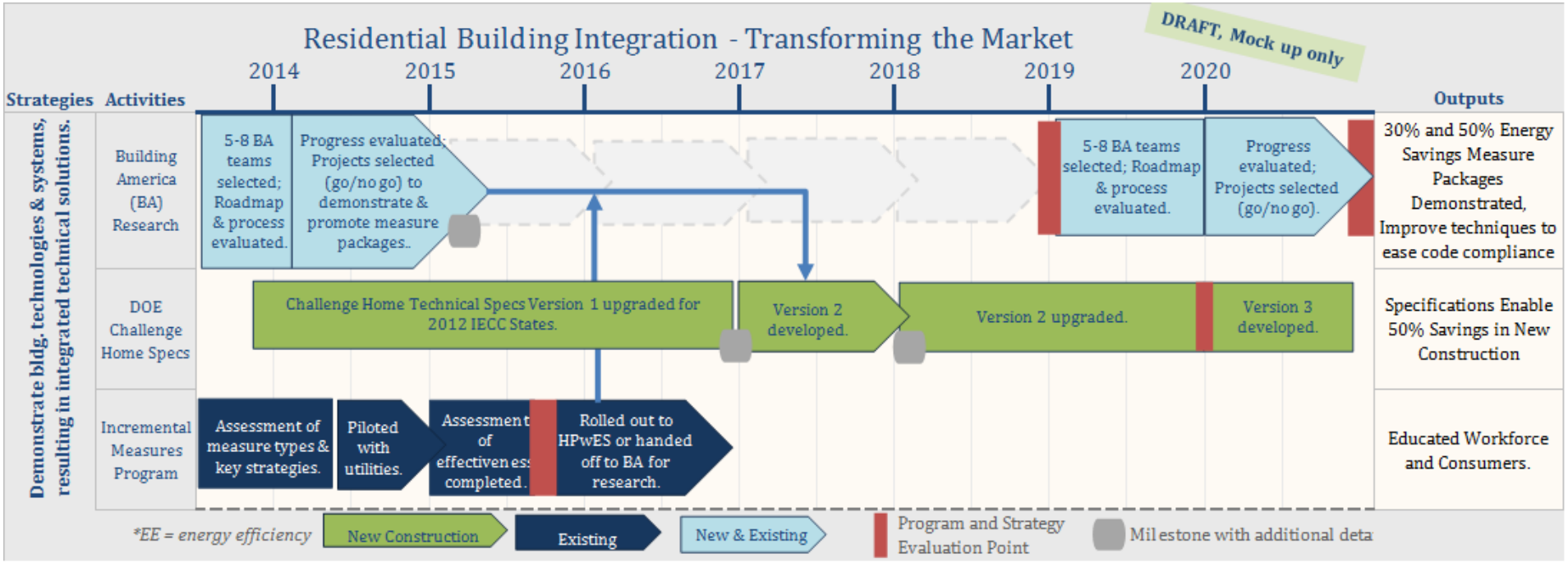
Tools and Information: Develop and deploy tools and data that help stakeholders measure and value energy efficiency.

Private Sector Partnerships: Promote solutions and business models through market based voluntary programs.

RBI Multi-Year Program Plan with Selected Milestones



RBI: System Integration and Demonstration



Building America Logic Model - Example of One Strategy

Strategy	Key Activities	Outputs	Short Term Outcomes	Long Term Outcomes
1. Advanced Technologies & Practices	Lab R&D to advance building science & technical support to BA Team efforts	Published research on: • Indoor Air Quality • Building Envelope • HVAC	Building Science Professionals undertake new more ambitious energy savings projects	Home building professionals understand and incorporate Building America solutions in Indoor Air Quality, Building Envelop and HVAC into their standard practices by 2020 enabling more efficient model code development
	10 Building America industry partnership Teams conduct RBI R&D projects	Published: • Technical Reports • Guides • Case Studies	Technical reports and guidance influence voluntary program specifications like Energy Star & Challenge Home	Model building code improvements enabled by solutions developed and validated by Building America teams, leading to 40-50% savings in new and existing homes by 2030
		Published: • Research, • Guides • Case Studies On Zero Energy Ready focused R&D	Building America teams demonstrate Zero Energy Ready homes	Zero Energy Ready homes become standard practice in new construction and retrofit applications, leading to at least 50% savings in housing sector by 2030

RBI Priorities for FY15 and Beyond

Integrating Advanced Technologies for Homes:

- Building integrated renewables
- IAQ/Ventilation solutions
- Integrated high performance envelope and HVAC systems
- Controls/Sensors

Guidance & Tools:

- Building America Solution Center
- Better Building Solution Center
- Tools that enhance market value of high performance homes
- Modeling tools w/empirical validation & calibration
- Empirical database expansion for program/policy support
- Program templates for Zero Energy Ready Homes
- Program templates for existing homes

Infrastructure Development:

- Research to DOE building codes and standards
- Grow contractor certification and builder participation
- Education Outreach