scout

A Portfolio Impact Analysis Tool for Building Energy Efficiency Technologies

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U.S. Department of Energy

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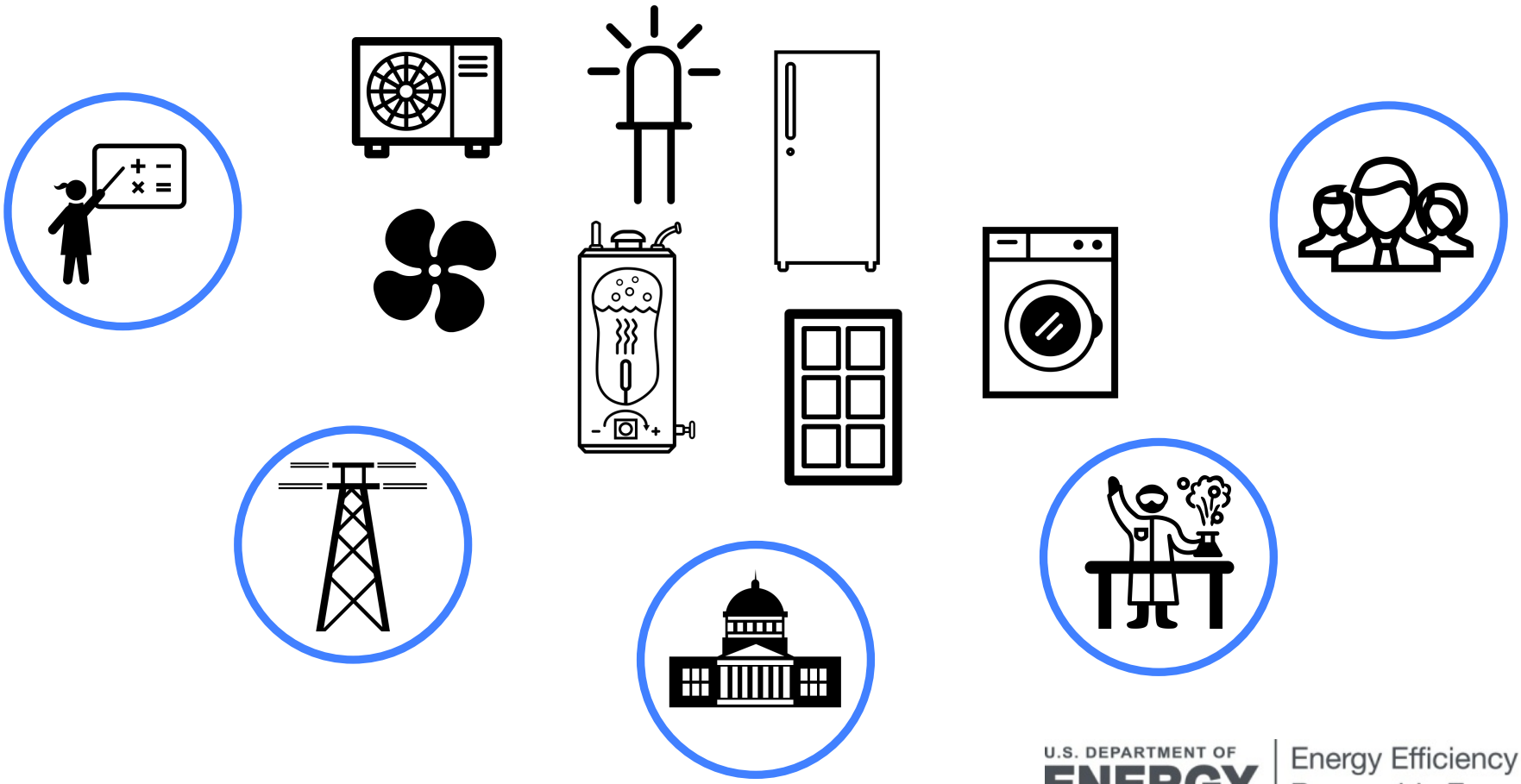
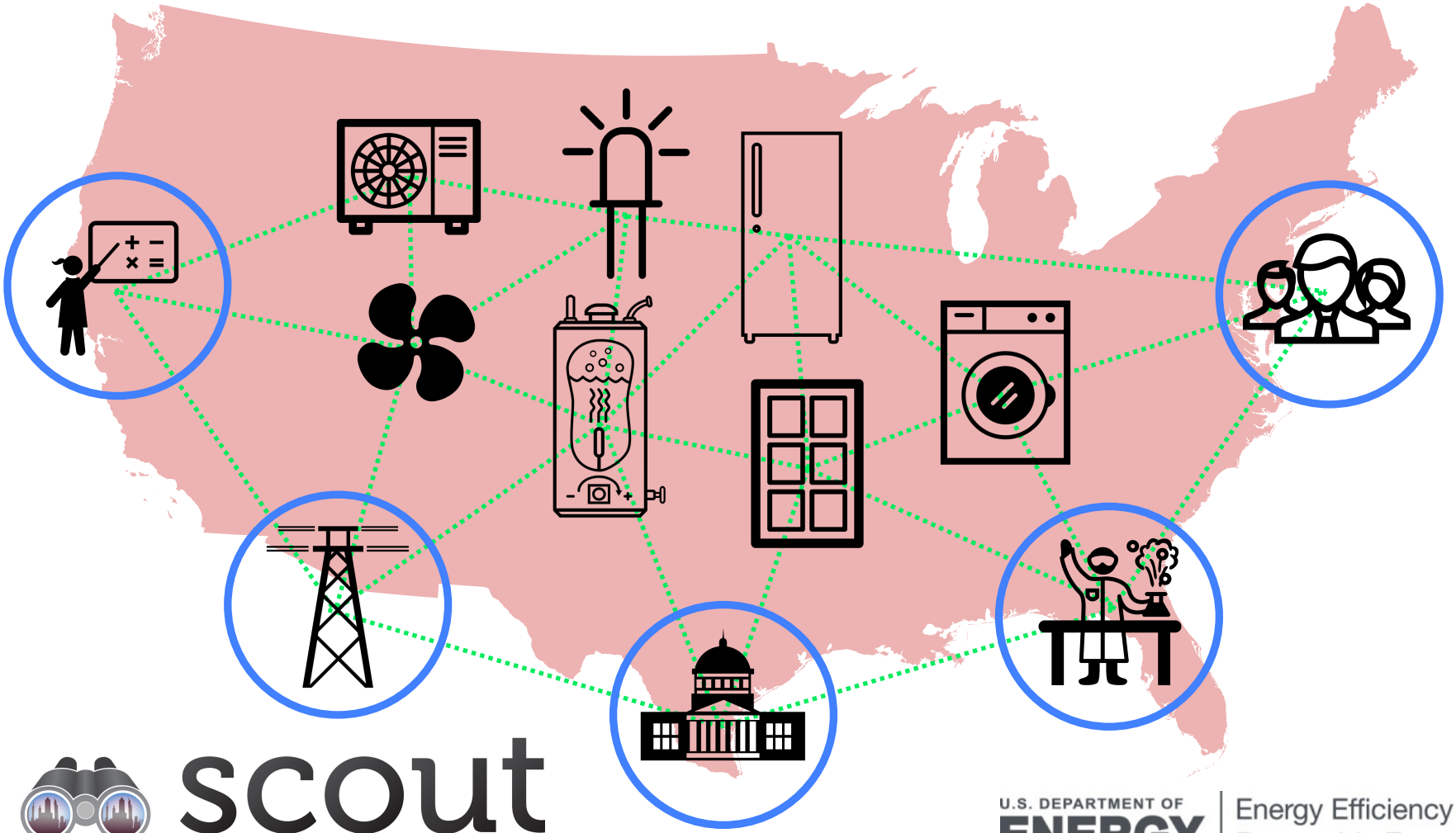
The problem: many efficient technologies, multiple perspectives



Scout provides a common framework for evaluation of energy efficient measures

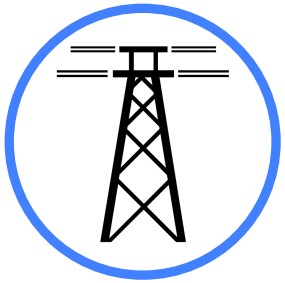


scout

Scout is intended to be adaptable to the analysis needs of BTO and others

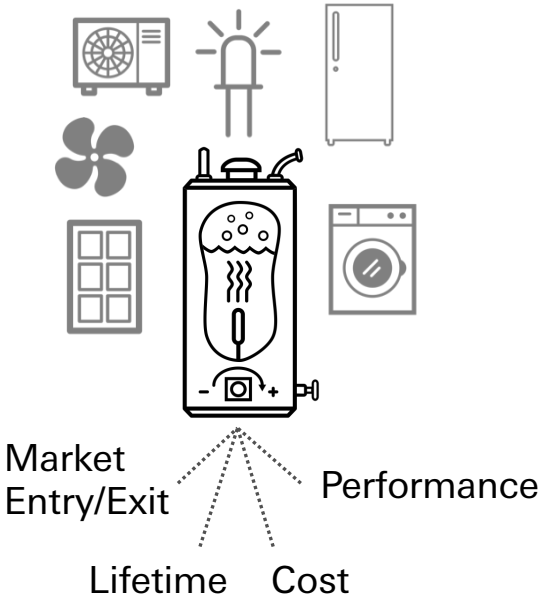
Academics, national labs, and industry partners can use Scout to communicate the larger-scale benefits of R&D breakthroughs

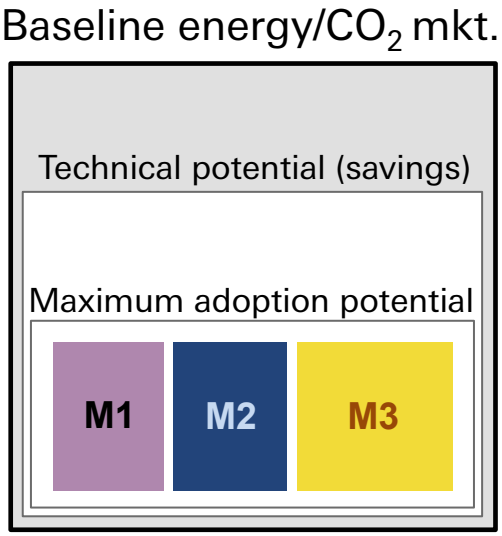
Other federal agencies can use Scout to estimate the potential impacts of funding in achieving energy and CO_2 reduction goals



Utilities can use Scout to develop 'deemed savings' values and corresponding incentives for Energy Conservation Measures

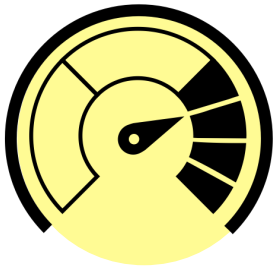
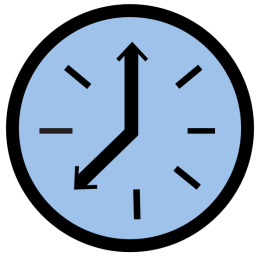
Scout applies individual efficiency measures across the U.S. building stock



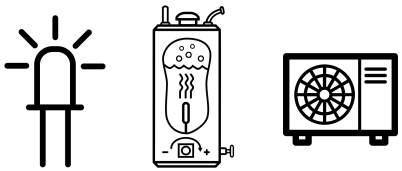


Define energy efficient measures → Apply measures to baseline energy and CO_2 markets under multiple adoption scenarios → Output U.S. energy, CO_2 reductions and measure cost-effectiveness

Scout measures are defined by performance, cost, and lifetime

 Performance	**Definition:** Per unit absolute (e.g., COP) or relative (e.g., savings %) **Sources:** Reports and publications, EnergyPlus
 Cost	**Definition:** Per unit installed cost **Sources:** EIA, RSMeans, public databases (e.g., ENERGY STAR)
 Lifetime	**Definition:** Useful unit life in years **Sources:** EIA, reports and publications

Measures can be packaged and assigned input uncertainty



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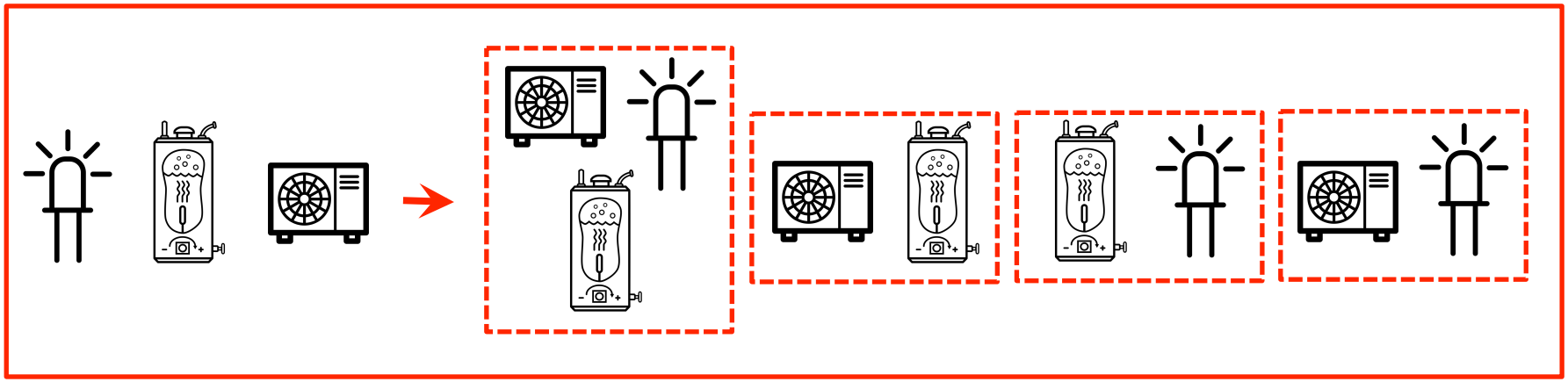
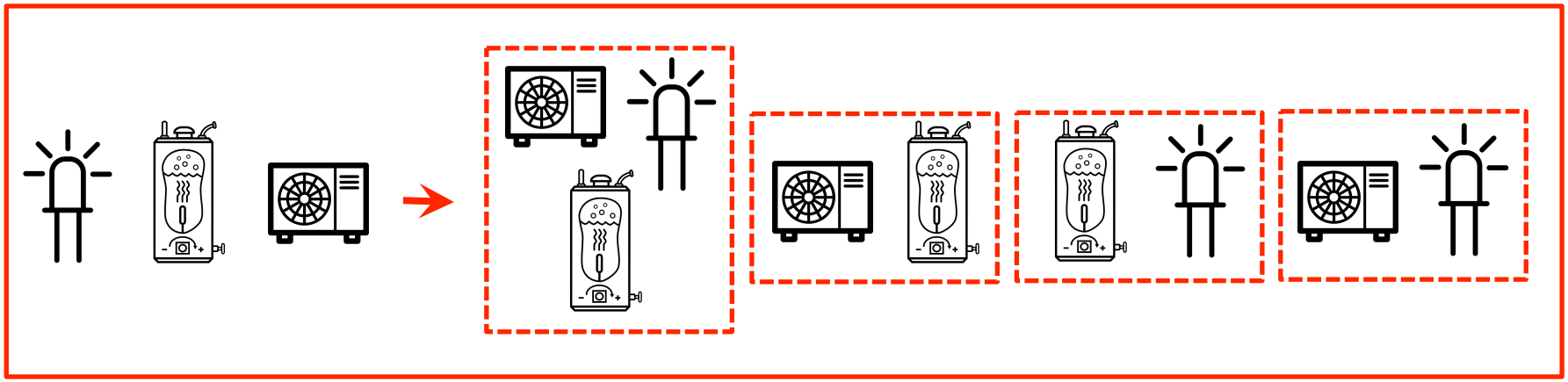


Compete individual and packaged measures

Measures can be packaged and assigned input uncertainty



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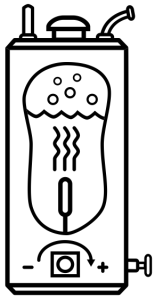
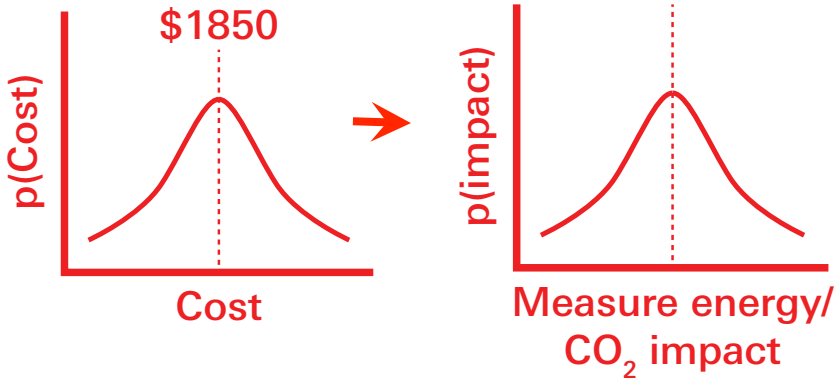


Cost: $1850

Performance: 2 EF

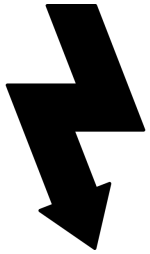
Lifetime: 13 years



Measures apply to baselines drawn from EIA Annual Energy Outlook

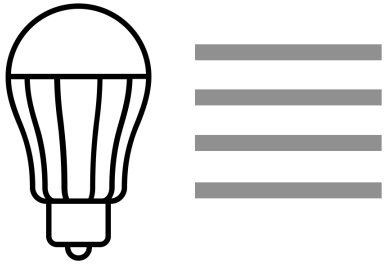
Data reported for each year from 2009 to 2040

Energy Use

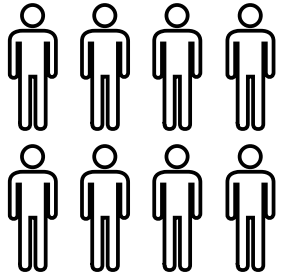


Building Stock

Equipment Characteristics



Adoption Model Parameters



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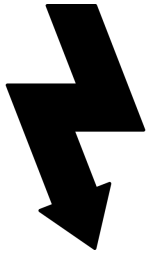

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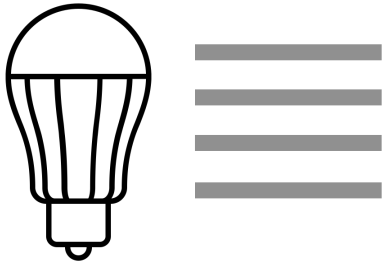

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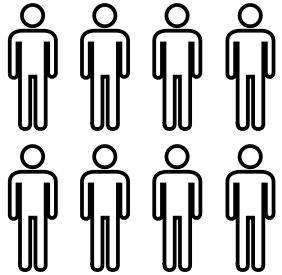
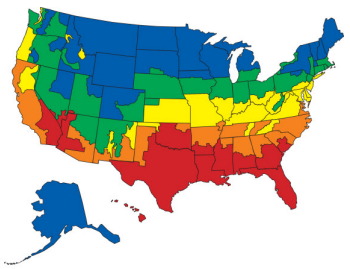
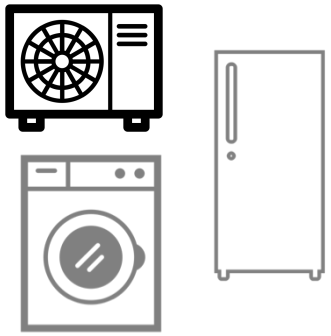


Building Type

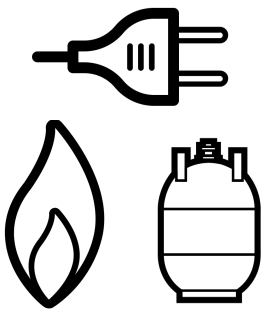
Climate Zone



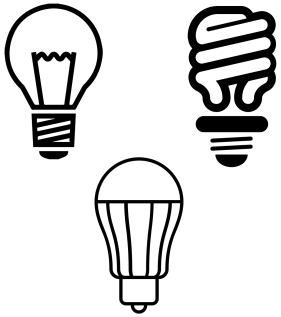
End Use



Fuel Type



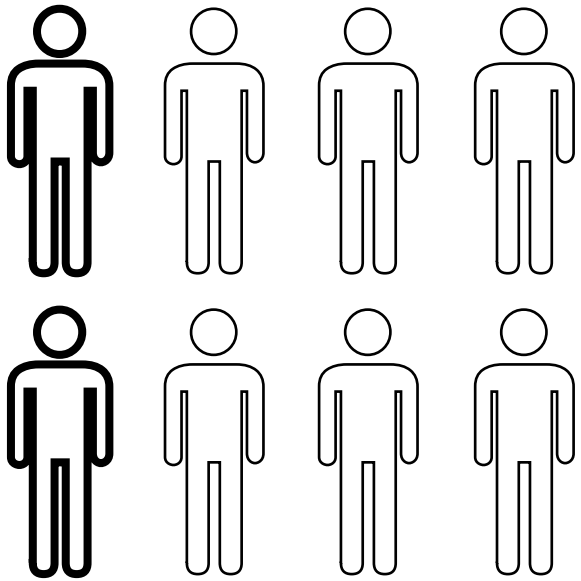
Technology



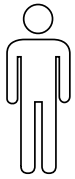
Baseline data define building and equipment stocks and flows

Measures diffuse into markets under two adoption scenarios

Total baseline market (Year Y)



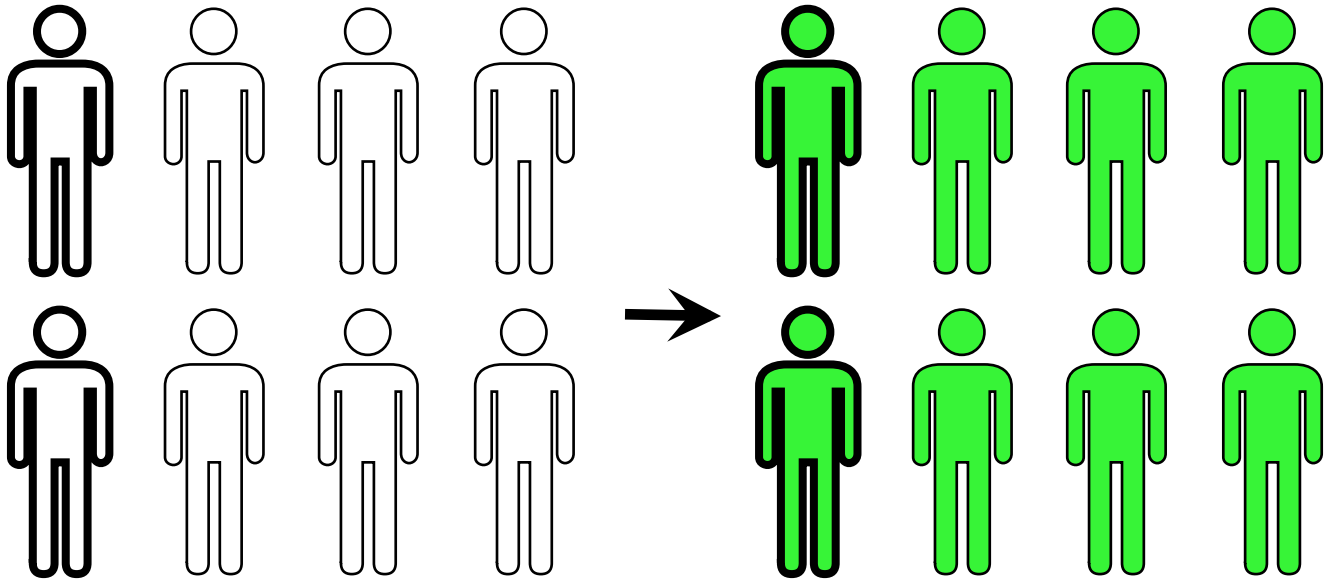
New/replace/ retrofit baseline ('Competed')



Uncompeted baseline

Measures diffuse into markets under two adoption scenarios

Technical Potential Scenario: Total market fully captured



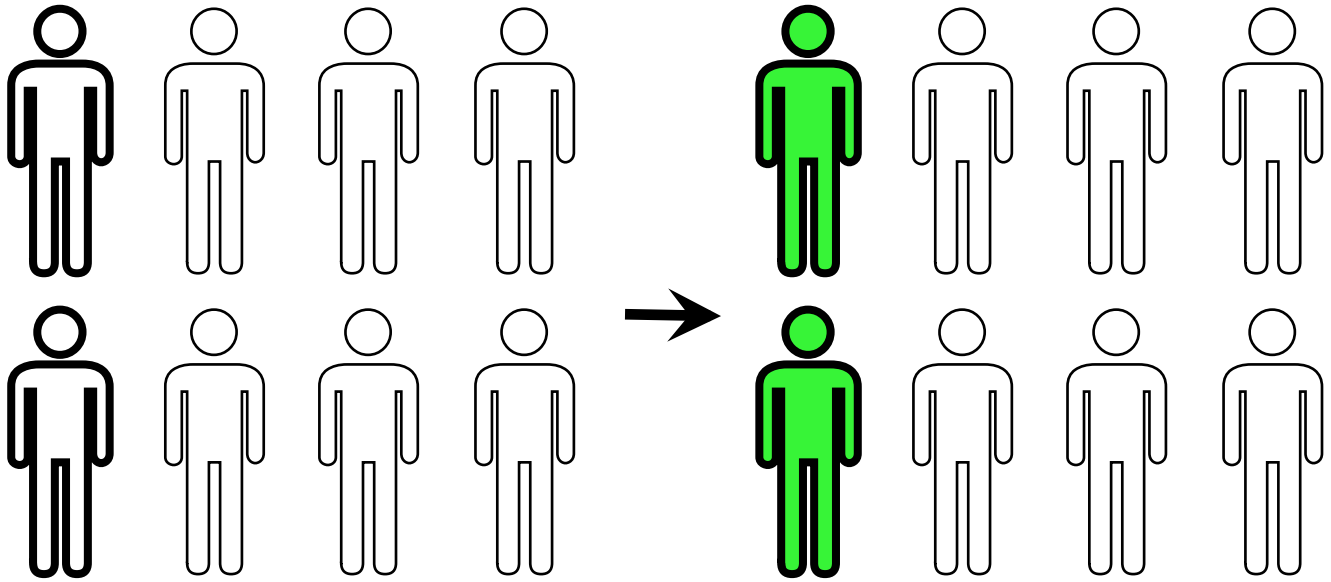
New/replace/ retrofit baseline ('Competed')

Uncompeted baseline

Captured by an efficient measure

Measures diffuse into markets under two adoption scenarios

Maximum Adoption Scenario: Competed market fully captured

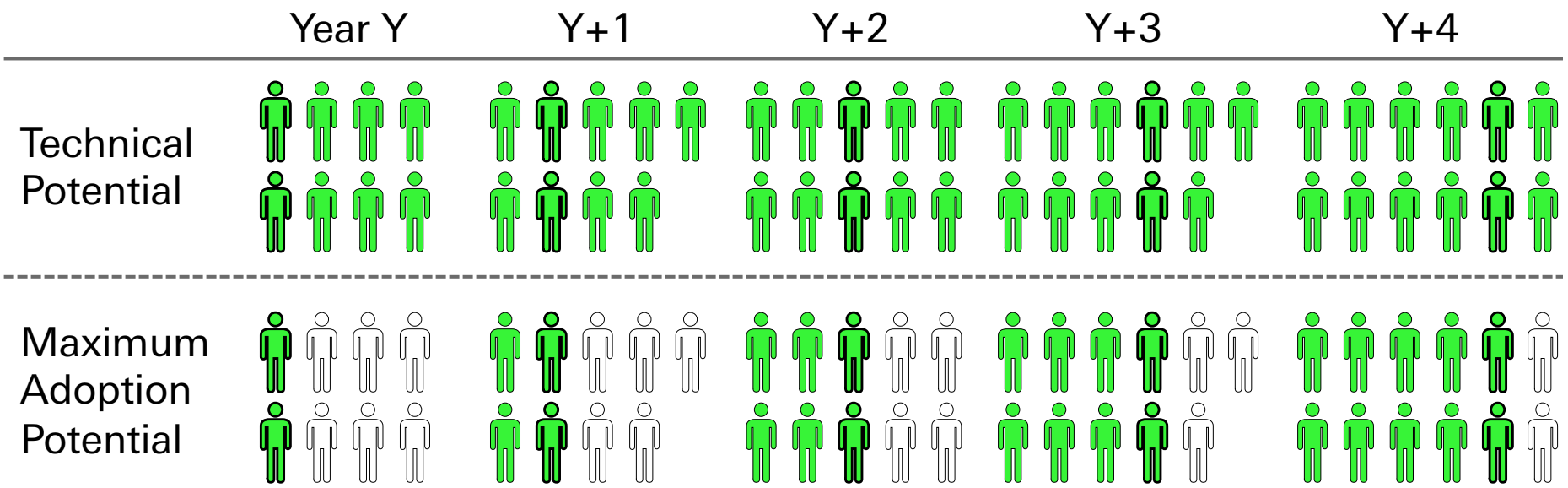


New/replace/ retrofit baseline ('Competed')

Uncompeted baseline

Captured by an efficient measure

Adoption scenarios determine measure diffusion rates over time

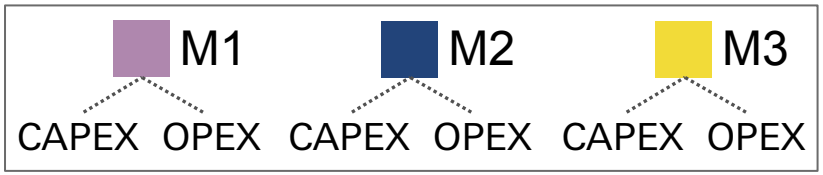


Competed baseline

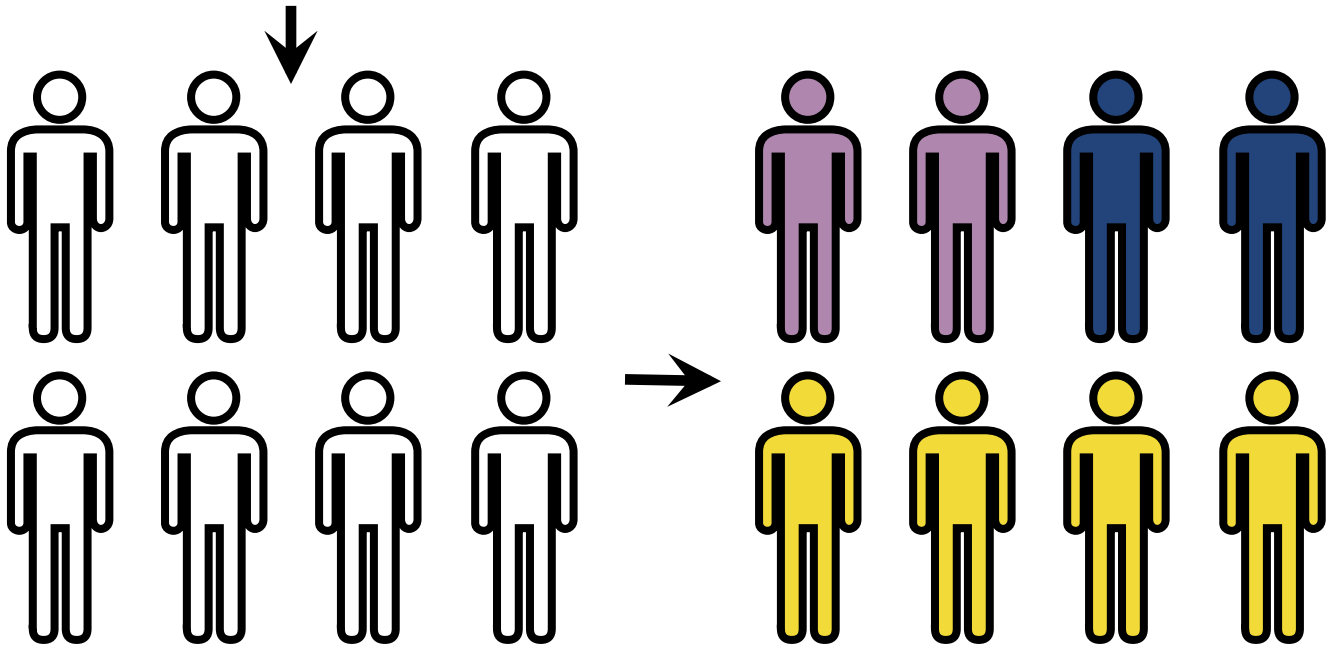
Uncompeted baseline

Captured by an efficient measure

Competing measures are attributed shares of the competed baseline



Measure market shares determined by per unit capital/operating costs
*(based on NEMS adoption models)




Competed baseline


Captured (M1)


Captured (M2)

Captured (M3)

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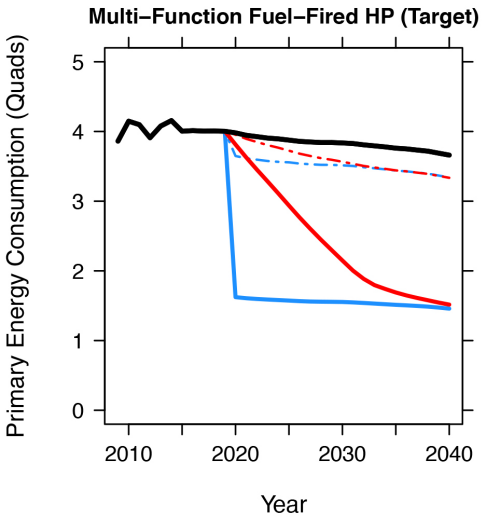
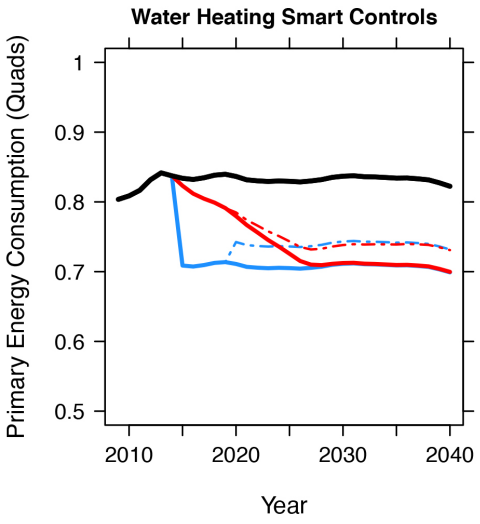
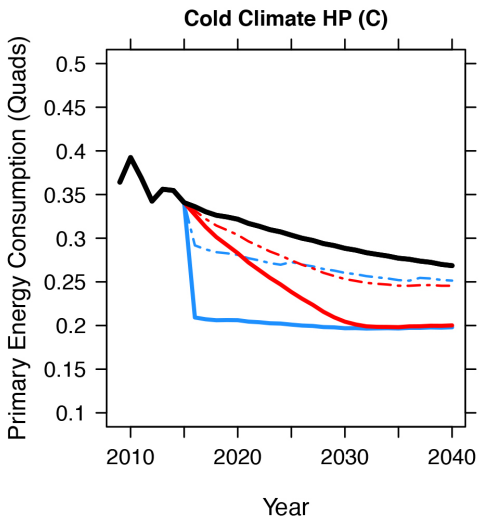
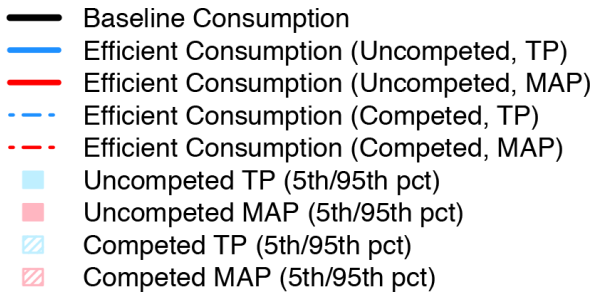
Results can show the effect of competition, uncertainty









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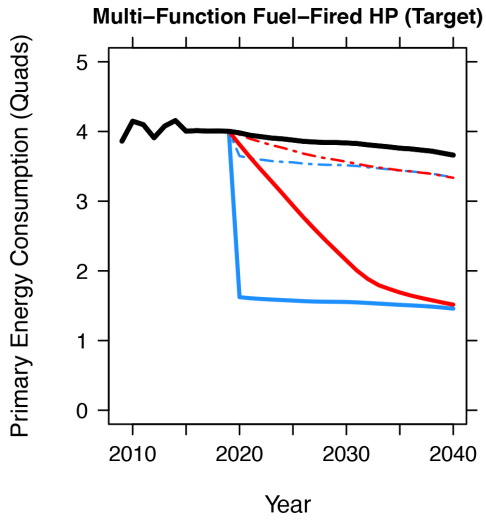
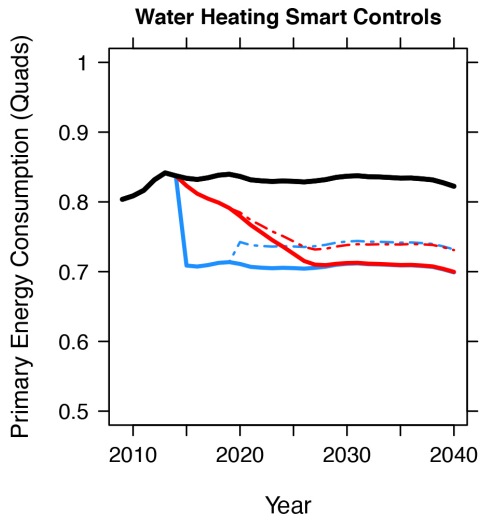
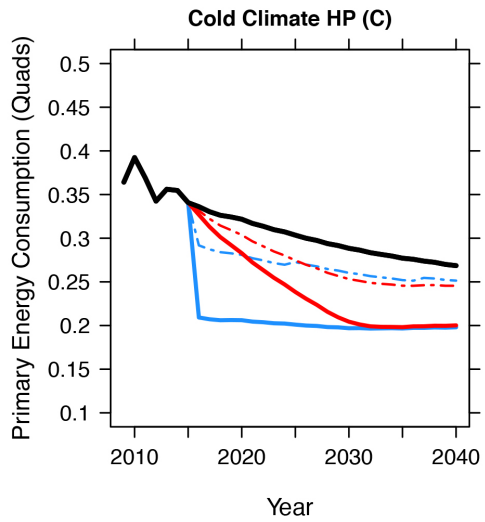
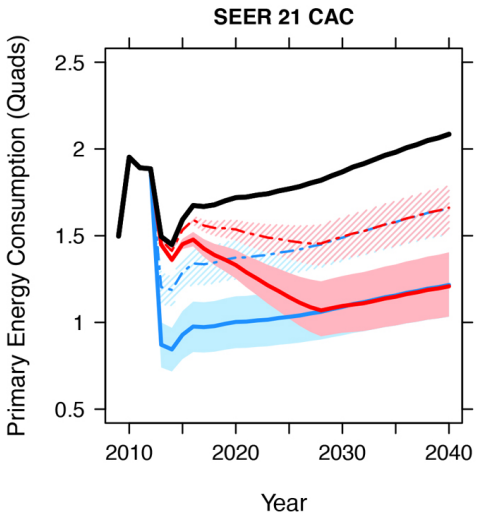
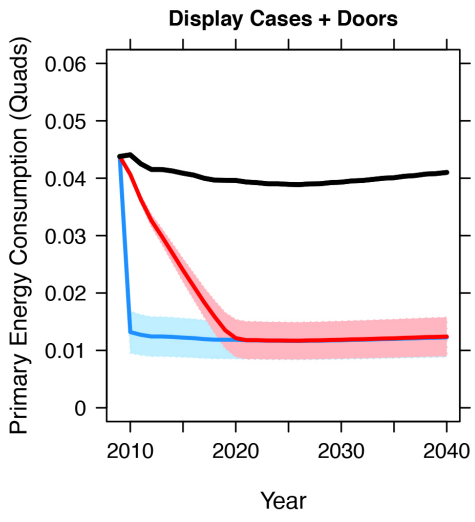
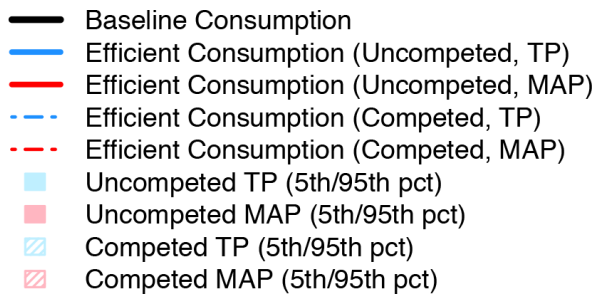






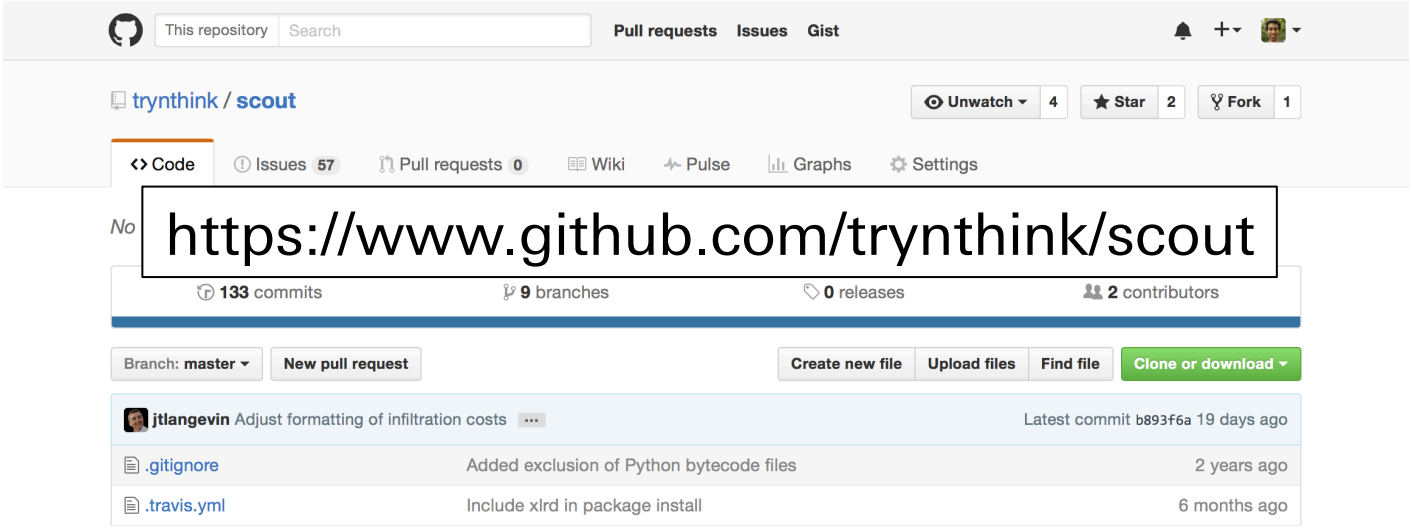






First command line-dependent beta is slated for late 2016; GUI forthcoming

- Residential and commercial measures tested
- Preliminary measure portfolio defined
- Switch to Building America climate zones
- User documentation available online



Acknowledgements

- DOE Building Technologies Office
  - Jared Langevin, Scout Co-developer
  - Amir Roth
  - Patrick Phelan
- NREL Building Energy Modeling
  - Brian Ball
  - Larry Brackney
  - Andrew Parker
- Phil Farese
- Omar Abdelaziz
- Navigant Consulting

Icon attributions

Slide 3: Buildings (Milky-Digital Innovation); US Dollar (Christopher Beach); Lightning bolt (Tristan)

Slide 4: LED (Nikita Kozin); Water heater (Michael Thompson); Air conditioning unit (Arthur Shlain); Fan (Edward Boatman); Refrigerator (shashank singh); Washing machine (Ed Harrison); Window (Arthur Shlain); Teacher (TukTuk Design); Utility tower (Maurizio Fusillo); Capitol building (Kelcey Hurst); Lab scientist (Edward Boatman); Business team (lastpark)

Slide 6: United States (Bohdan Burmich)

Slide 9: Energy dollar (Nicholas Menghini); Power plant (Francesca Ameglio)

Slide 10: Gauge (Nicolas Vicent); Clock (Nadya Bratt)

Slide 18: Energy (Edward Boatman); buildings, Mosque, House (Creative Stall); School (Tran)

Slide 19: Plug (Arthur Shlain); Flame (Samuel Q. Green); Propane Tank (Carlos Salgado); Fluorescent Light Bulb (Matt Brooks); Light Bulb (Marco Galtarossa); led bulb (Alex Podolsky)

Slide 26: Figure (Alexander Smith)

Slide 35: homepage (Lil Squid)

Slide 38: solar panels (Adam Terpening); turbines (Creative Stall); Power Plant (Iconathon); clock (Karen Tyler)

Slide 39: Faucet (Carla Gom Mejorada)

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