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

DOE Solid-State Lighting Program

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James R. Brodrick, Ph.D.

U.S. Department of Energy

DOE Solid-State Lighting Program Mission and Goal

MISSION

Guided by a government-industry partnership, DOE's mission is to create a new, U.S.-led market for high-efficiency, general illumination products through the advancement of semiconductor technologies, to save energy, reduce costs, and enhance the quality of the lighted environment.

GOAL

By 2025, develop advanced SSL technologies that — compared to conventional lighting technologies — are much more energy efficient, longer lasting, and cost competitive, by targeting a product system efficiency of 50 percent with lighting that accurately reproduces sunlight spectrum.

Legislative Authority

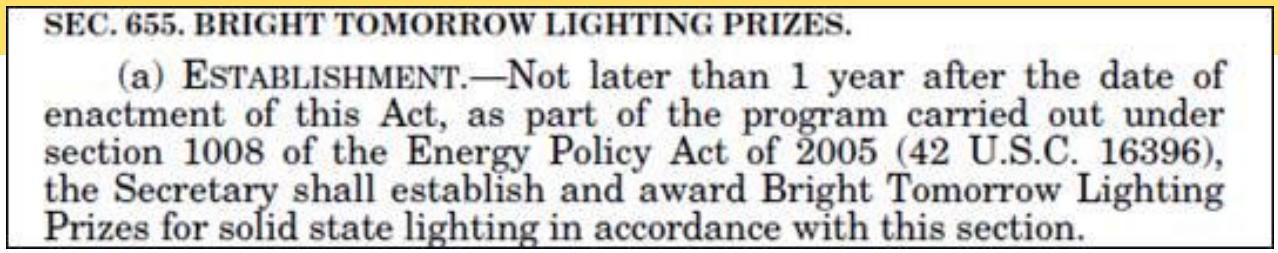
DOMENICI-BARTON ENERGY POLICY ACT OF 2005, SECTION 912

"**The Secretary shall carry out a Next Generation Lighting Initiative** in accordance with this section to support research, development, demonstration, and commercial application activities related to advanced solid-state lighting technologies based on white light emitting diodes."

Legislative Authority

ENERGY INDEPENDENCE AND SECURITY ACT OF 2007, SECTION 321

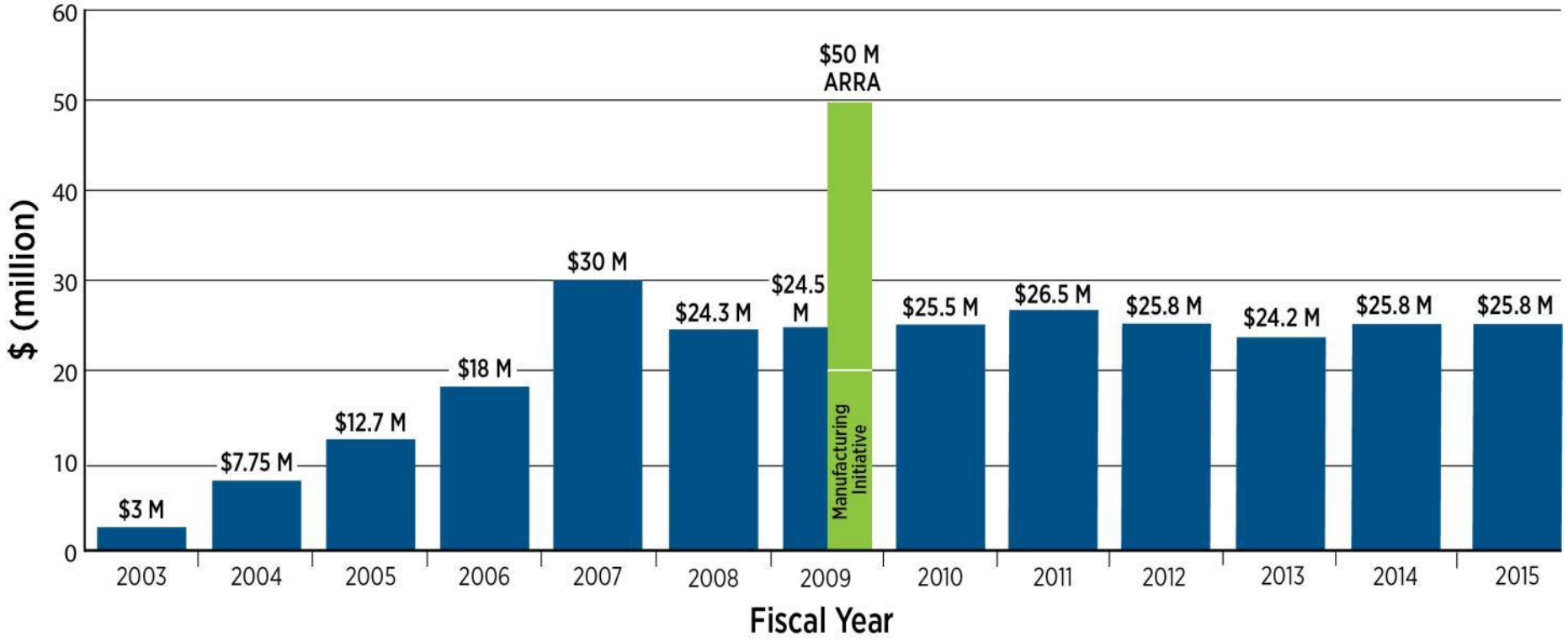
(g) Research and Development Program.— (1) In General.— The Secretary may carry out a lighting technology research and development program—(A) to support the research, development, demonstration, and commercial application of lamps and related technologies sold, offered for sale, or otherwise made available in the United States…



SEC. 655. BRIGHT TOMORROW LIGHTING PRIZES.

(a) ESTABLISHMENT.—Not later than 1 year after the date of enactment of this Act, as part of the program carried out under section 1008 of the Energy Policy Act of 2005 (42 U.S.C. 16396), the Secretary shall establish and award Bright Tomorrow Lighting Prizes for solid state lighting in accordance with this section.

Congressional Appropriations



SSL Program Strategy

Core Research

Scientific research to fill technology gaps, provide enabling data

Product Development

Projects to develop or improve commercially viable materials, devices or systems

Manufacturing R&D

R&D to reduce costs through improvements in equipment, processes

Applied Technology R&D

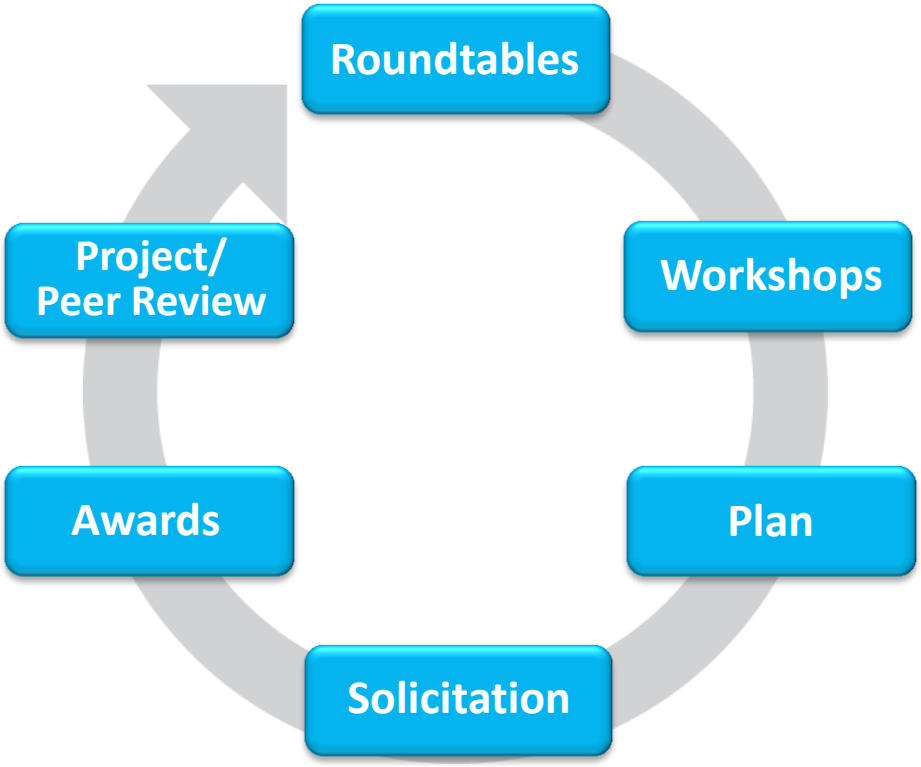
Field and laboratory evaluations, technical support for standards, technology competitions

Guiding Principles

- Dynamic program constantly evolving in pace with technology advances
- Recognized worldwide: DOE is convener, facilitator; tackles broad national goals
- Program conducts targeted R&D for focused needs
- Partners heavily involved in planning
- Open information and process
  - Workshops
  - Roundtables

Strategic Vision Defined in DOE R&D Plan

Industry input from roundtables and workshops shape R&D priorities and DOE solicitations



DOE targets push industry to levels of efficacy and performance that might not otherwise be achieved

Analysis of emerging products prompts improvements, informs R&D priorities

Expert Information Exchange

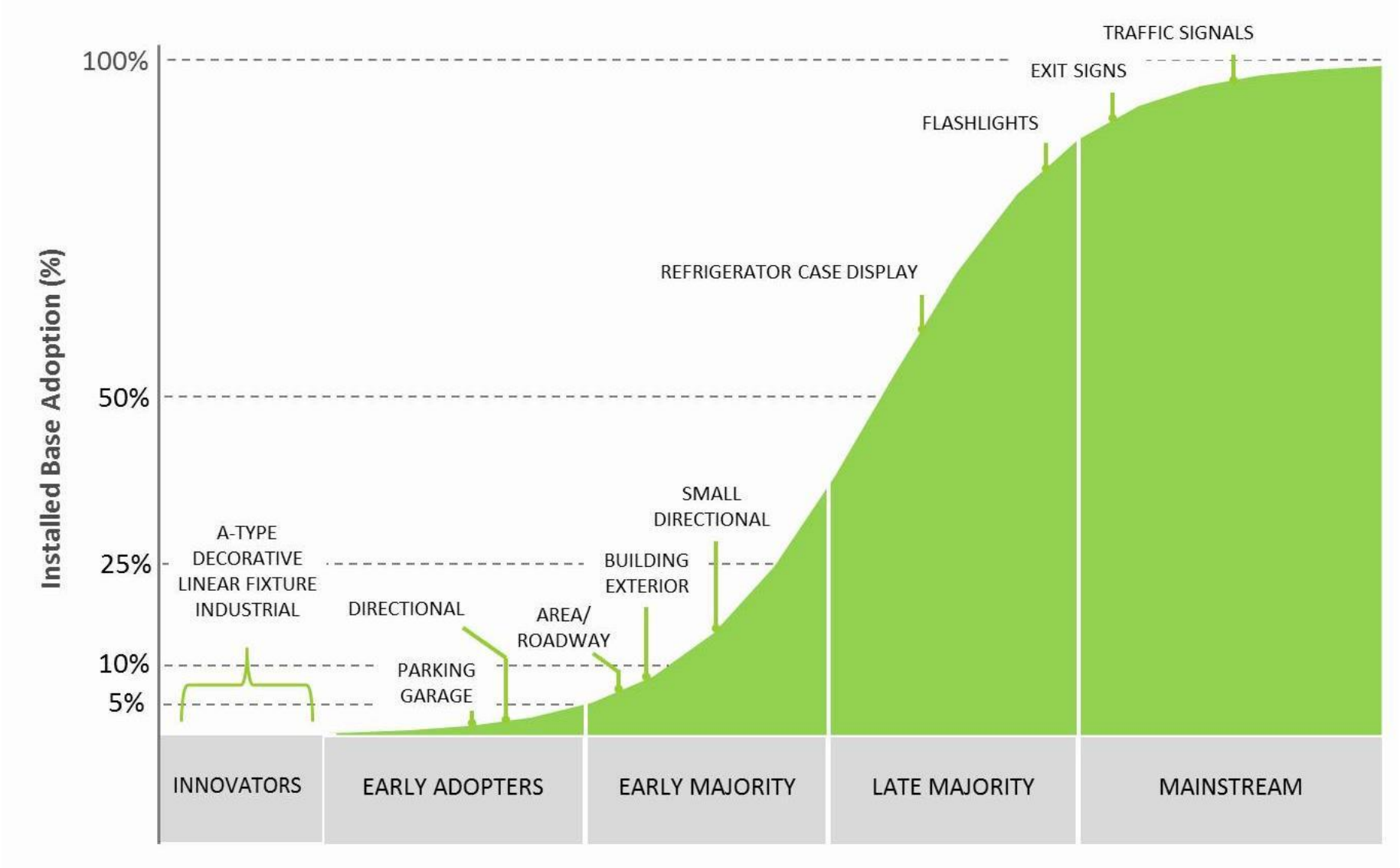
- Frequent interactions with key researchers, manufacturers, lighting users at workshops and roundtables
- Share latest information and data
- Seek input on technology needs

Broad Mix of Partners

Invited Projects

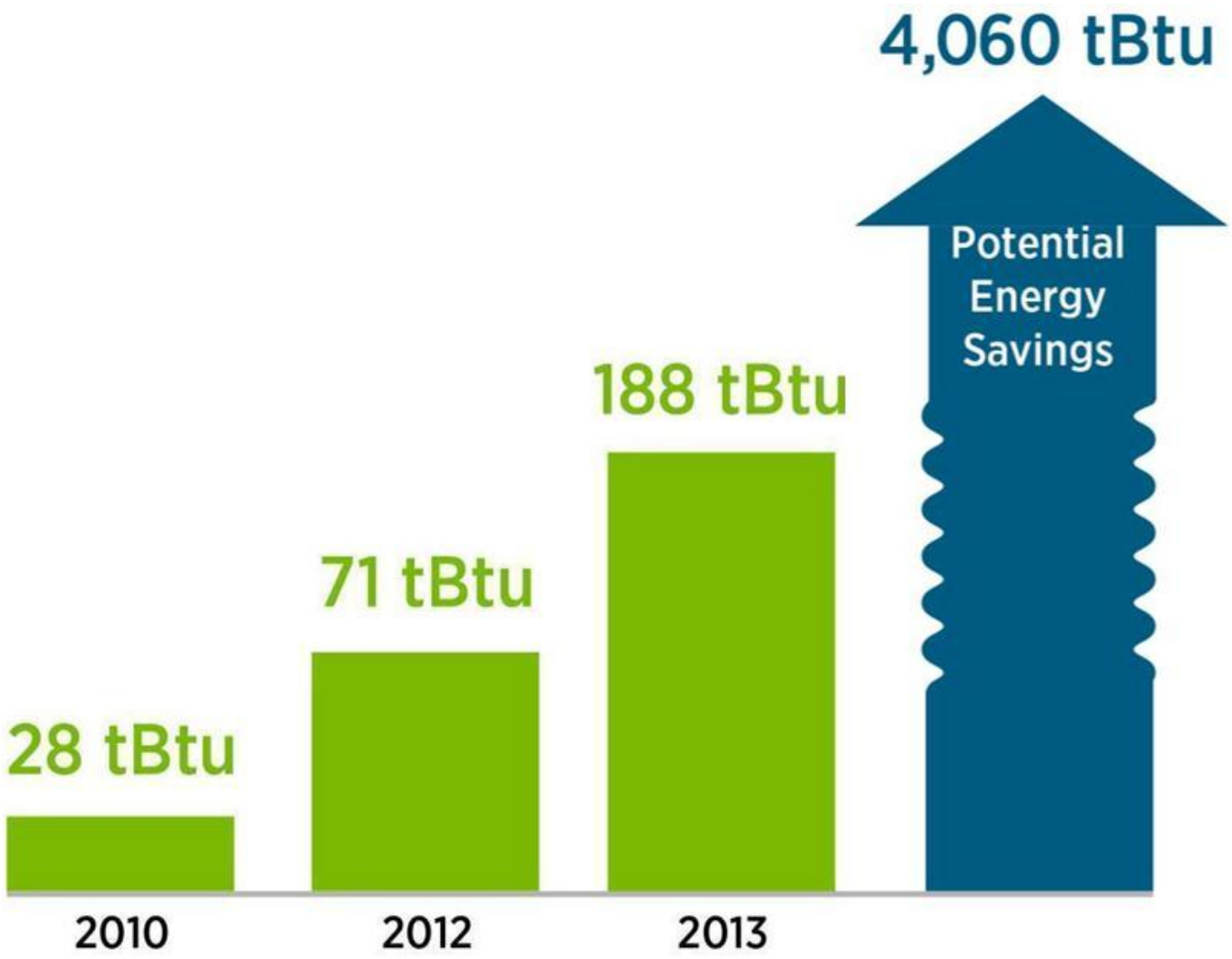
- **Manufacturing Process for OLED Integrated Substrate**, Cheng Hung, PPG Industries
- **Innovative High-Performance Deposition Technology for Low-Cost Manufacturing of OLED Lighting**, John Hamer, OLEDWorks
- **Development and Industrialization of InGaN/GaN LEDs on Patterned Sapphire Substrates for Low Cost Emitter Architecture**, Joseph Flemish, Philips Lumileds
- **Solid-State Lighting Luminaire Reliability Model,** Lynn Davis, Research Triangle Institute
- **Print-based Manufacturing of Integrated, Low Cost, High Performance SSL Luminaries**, Sri Nimma, Eaton
- **Scalable Light Module for Low-Cost, High Efficiency LED Luminaires**, Paul Fini, Cree, Inc.

A Long Way to Go



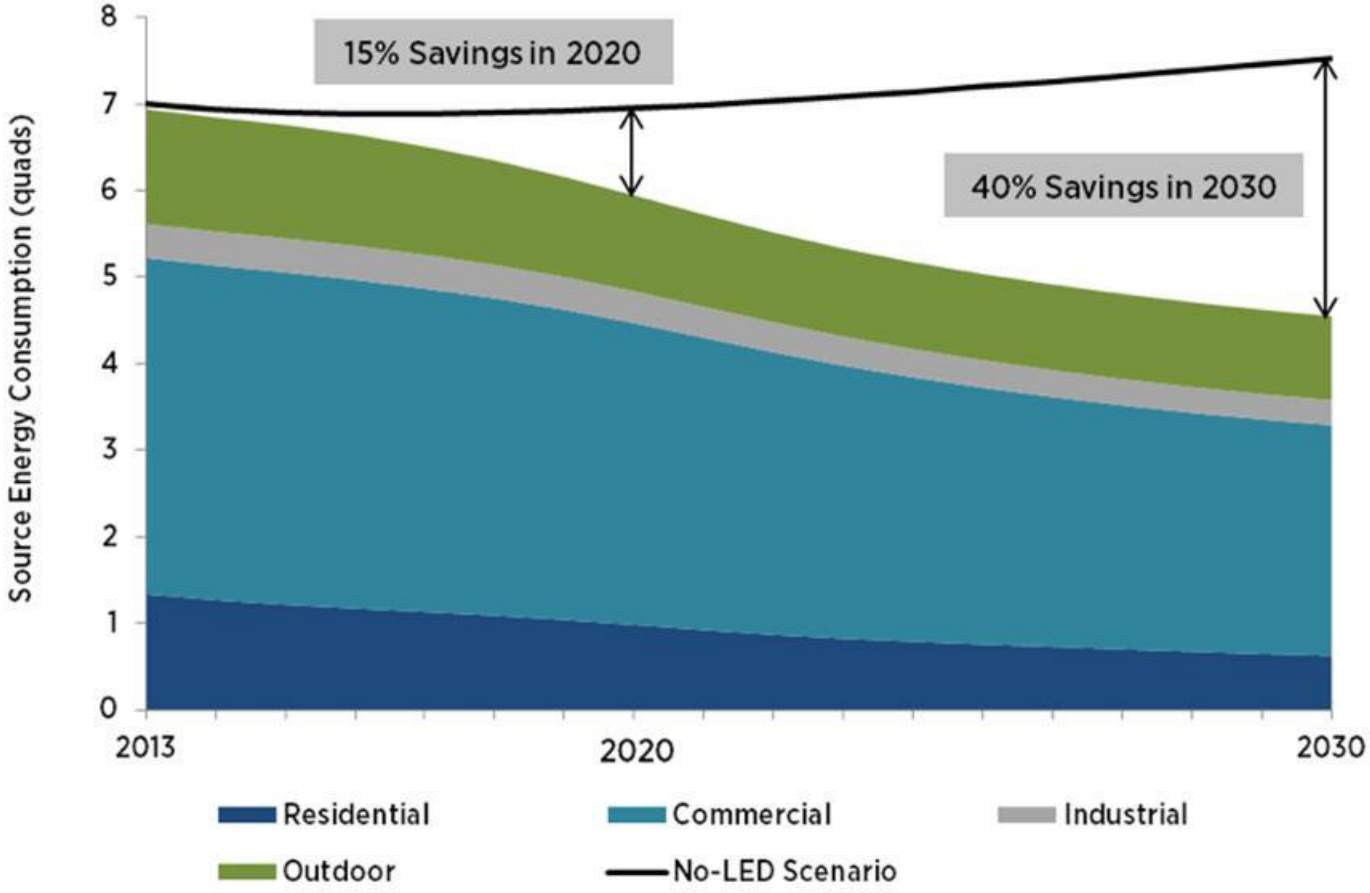
Source: Navigant Consulting

Achievable Energy Savings



Source: Navigant Consulting

Energy Savings Forecast

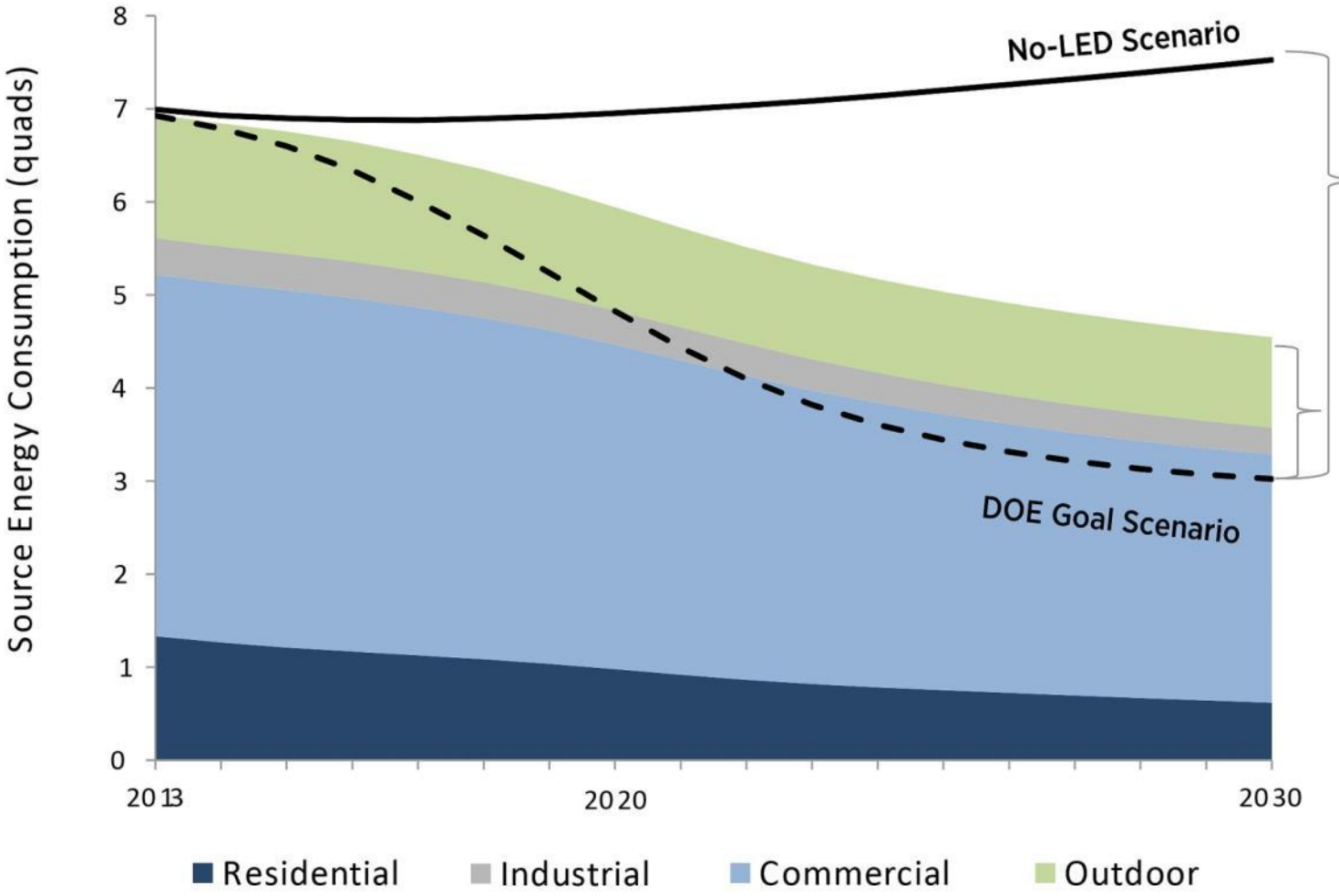


Total LED Potential Energy Savings = 3.0 quads $26 Billion (US)

= Annual Energy Used by 24 Million US Homes

= 35 Million Vehicles Taken Off the Road

Energy Savings Forecast



60% Energy Savings

Reaching DOE goals can increase savings by an additional 20%

http://energy.gov/eere/ssl/market-studies