

# **A Strategic Path to Zero Energy Buildings**



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Are Greener Buildings the Future?**

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# Overview



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- The case for Zero-Energy commercial buildings
- Path(s) to Zero
- Zero-Energy Commercial Buildings Consortium



# A Broad Alliance of Public and Private Sector Associates

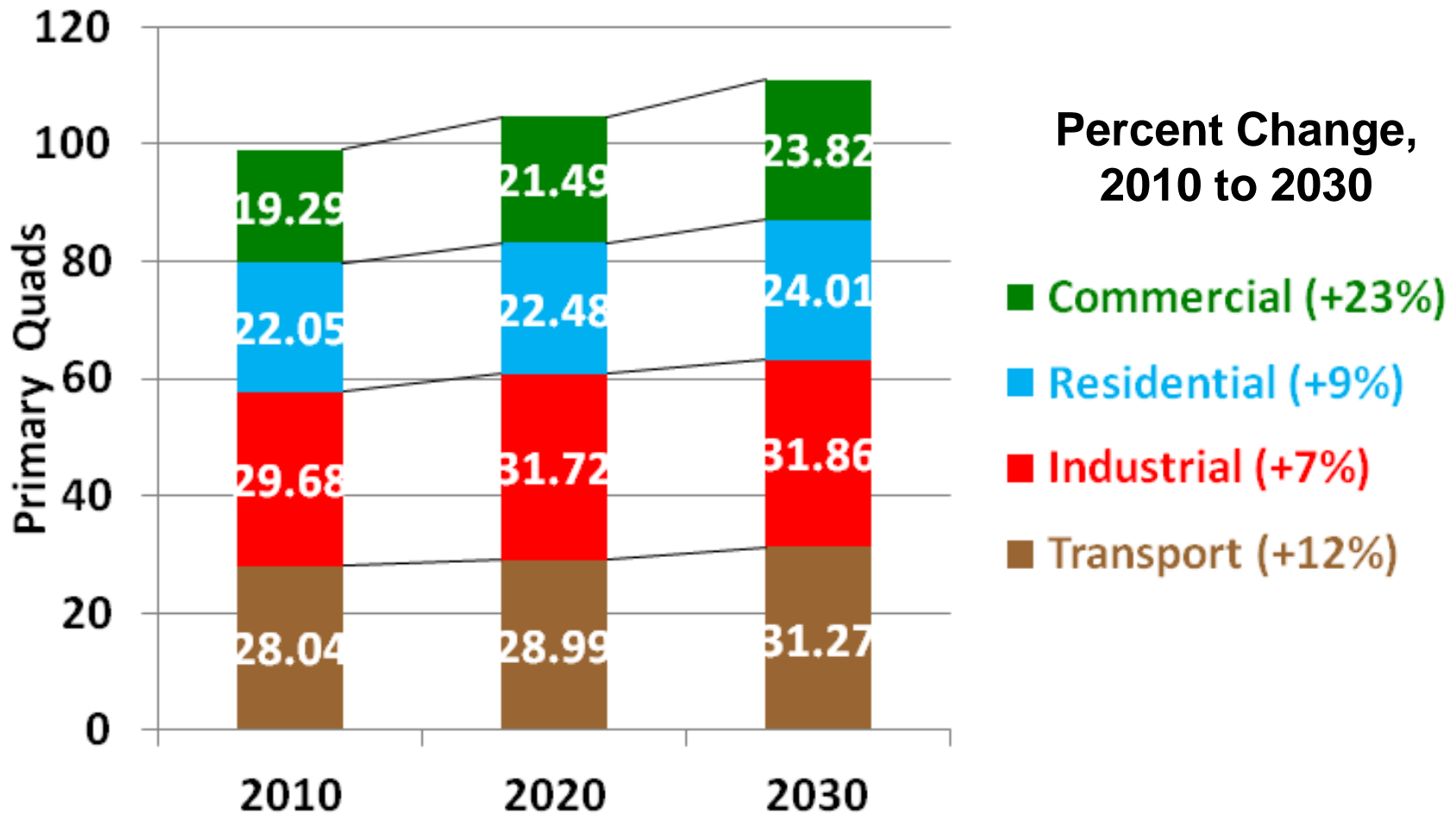


- Alliance Associates represent 165+ organizations
  - Operate in 50 states and 115 foreign countries
  - All economic sectors, with aggregate revenues of \$1.5 trillion
- Public agencies and utilities serving half the US population





# Why Commercial Buildings: Fastest Growth





# Federal Response: Commercial Bldgs Initiative



- 2007 Energy Independence and Security Act (EISA) §421-423
- Administered by U.S. DOE
- Government/industry partnership consortium
- Milestones:
  - 2030: NZE new commercial buildings
  - 2040: NZE for 50% of all commercial buildings
  - 2050: NZE for all commercial buildings



# Changing Policy Landscape for NZE Buildings



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- Architecture2030, Cool Mayors, AIA “commitment”
- ASHRAE Std 90.1, Std 189, Advanced Guides
- NAHB Green Standard & ICC Green Code
- California AB 32 & Strategic Plan
- 2007 EISA, 2008 tax credit extensions, 2009 ARRA
- Next:
  - Jobs bill
  - Climate/energy legislation
  - ... or/and EPA regulation of GHGs ?



# Setting a Long-term Goal: “Net-Zero” Energy



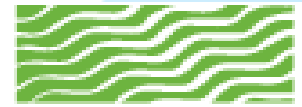
## Defining NZE:

A building that is designed, constructed, and operated:

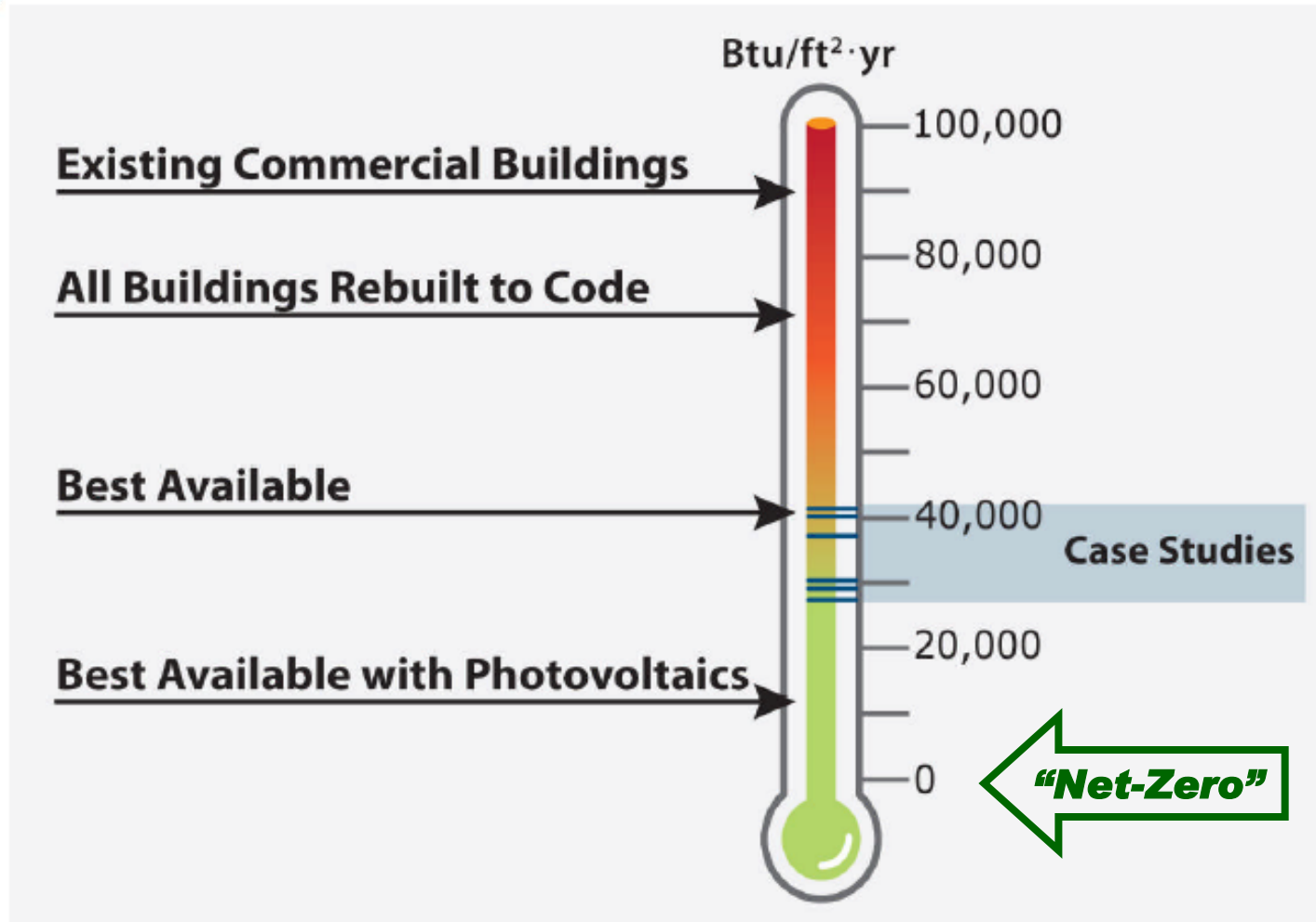
- To greatly reduce energy use (i.e. ~80%)
- ...and meet remaining energy needs from renewable sources
- Carbon-neutral (?)
- Economically viable (net-zero cash flow)



# Net Zero Energy – Where Are We Today?



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Source: R. Anderson, NREL



# Barriers and Challenges



- Components and systems integration
- Performance assurance and feedback
- Lack of information
- Highly diverse sector (climate, size, etc.)
- Perceived risk
- Split incentives
- Financing
- Insufficient workforce capacity



# Elements of a Zero-Energy Buildings Strategy



- **Research and Development – *Create new technology***
  - RD&D Partnerships with Industry
- **Incentives & voluntary programs – *Create buyer demand***
  - Tax incentives, rebates, loan guarantees, etc.
  - Utility programs (DSM, Demand Response, REPS/EEPS)
- **Public Education – *Build market share***
  - Consumer education and awareness campaigns
  - Energy labels (equipment and buildings)
- **Standards – *Set a floor & trigger innovation***
  - Appliance standards, building codes, vehicles
  - Utility Energy Efficiency Resource Standards (EERS)
- **Public sector leadership – *Reduce market risk***
- **Workforce development – *Capacity building***



# Utility DSM Options: Beyond Rebates (& Tax Incentives)

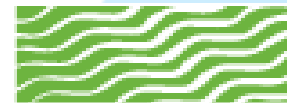


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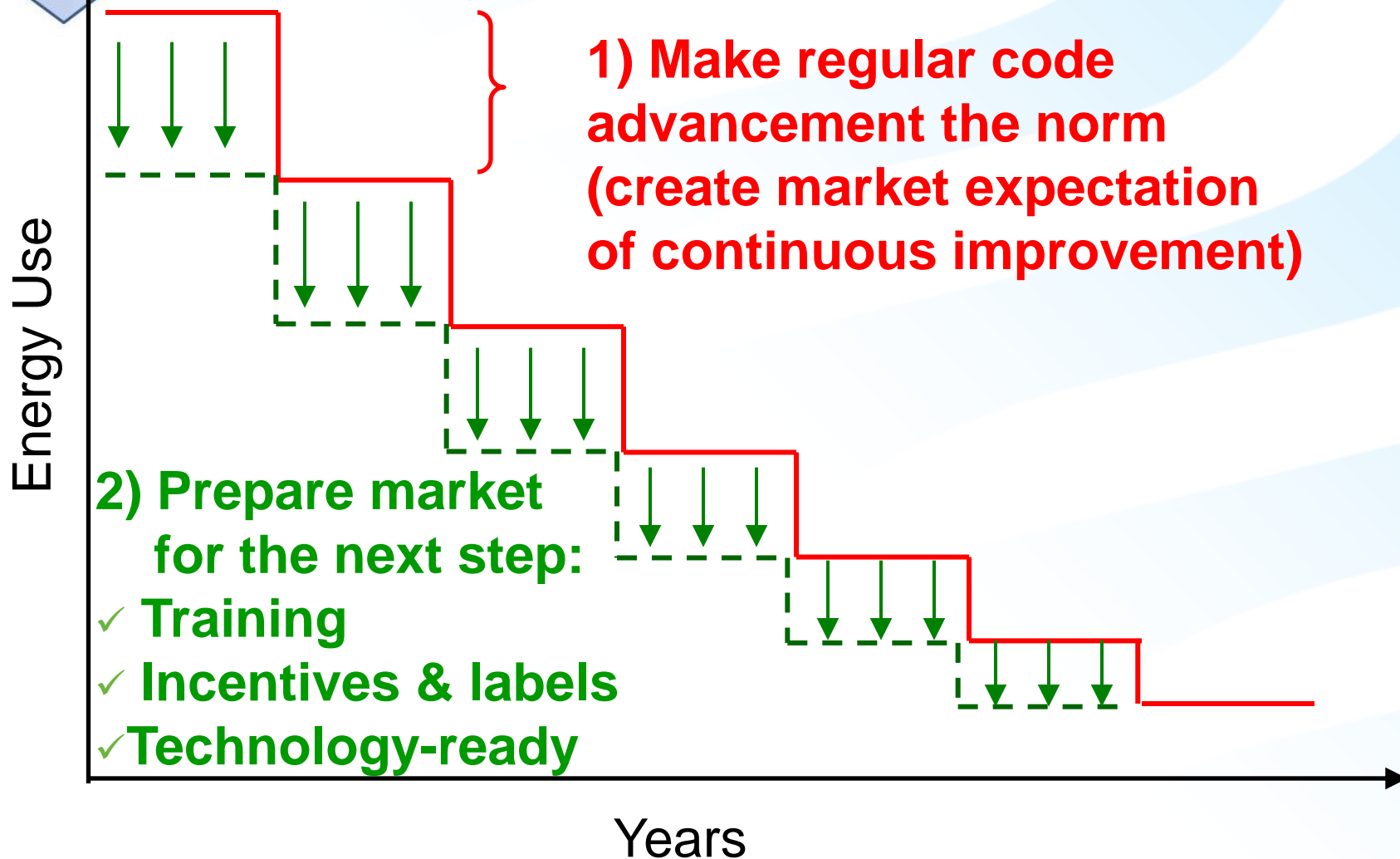
- Utility collaboration in Code adoption/compliance
- Building energy labeling, benchmarking, and disclosure
- Whole-building integrated design (e.g., CA Savings by Design, NW Better Bricks, etc.)
- Life-cycle performance assurance (Continuous Cx, BOC operator training/certification, A&E curricula)
- New technology development and demonstration (ASERTTI)
- ETC.!



# New Codes Paradigm: “Dynamic” & “Tech-Ready”



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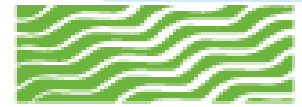
# Building Energy Rating and Disclosure



- Goals:
  - Make energy performance visible to the market
  - Capitalize (securitize) future \$ savings
- Labeling approach:
  - Technically valid – and perceived as valid
  - Empirical – based on available data (or “default”)
  - Practical – consider cost vs value of information
  - Target key decisions (decision-makers) :
    - Asset rating (buy/sell/rent/finance)
    - Operational rating (manage, retrofit)
    - Main EE features (all)
  - Universal (mandatory not voluntary)



# Thinking “Outside the [Building] Envelope...”



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- Locational efficiency
  - Transit
  - Mixed-use
- Grid integration (“net-zero energy” framework is incomplete)
  - Smart grids
  - Microgrids
- Rediscover district heat/cooling
- Managing potable water (“use cascading”)



# Zero Energy Commercial Buildings Consortium



## ■ Broad industry representation:

- Design professionals
- Development, construction, financial and real estate industries
- Building owners and operators
- Academic and research organizations
- Building code agencies and organizations
- High-performance green building organizations
- Indoor air quality and intelligent buildings experts
- Utility energy efficiency programs
- Manufacturers and providers of equipment and techniques
- Public transportation experts
- Nongovernmental energy efficiency organizations



# Working Groups

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## **Technologies & Practices**

- Building Envelope
- Mechanical Systems and Controls
- Lighting/Daylighting and Controls
- Process, IT, and Misc. Equipment
- Grid and Micro-Grid Integration

## **Market & Policy**

- Codes and Standards
- Integrated Design and Building Delivery
- Benchmarking and Performance Assurance
- Financing and Appraisal
- Voluntary Programs and Incentives
- Owner/Tenant Issues
- Workforce Development



# Visioning a Zero Energy Future



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- Henry Ford

***“The best way to predict the future is to invent it.”***

- Alan Kay





- Washington DC Convention Center, May 10-12, 2010 - <http://eeglobalforum.org/>
- Previous EE Global meetings:
  - Washington DC – November 2007
  - Paris – April 2009
- NEXT: Beijing – 2011



# For More Information...



- Contact Diana Lin ([dlin@ase.org](mailto:dlin@ase.org)) for more information on membership
- Contact Kate Marks ([kmarks@naseo.org](mailto:kmarks@naseo.org)) for all other inquiries
- Visit us at [www.zeroenergycbi.org](http://www.zeroenergycbi.org)

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