Residential Grid-Interactive Efficient Building Technology and Policy

NASEO-NARUC GEB Working Group Roundtable and Workshop

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Residential Grid-Interactive Efficient Building Technology and Policy:

Harnessing the Power of Homes for a Clean, Affordable, Resilient Grid of the Future

NASEO
National Association of State Energy Officials

www.anndyl.com/GEB_Report.html
Username: AnnDylGEB
Password: smartHome2019

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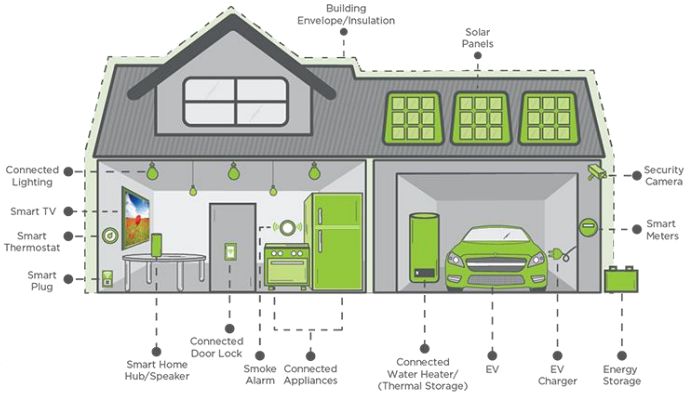
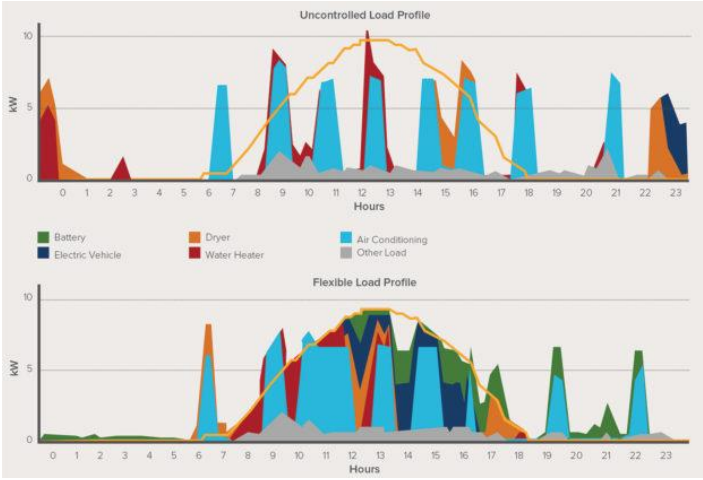
Why Connected Homes?

- Changing electric grid
  - Variable renewable energy requires demand flexibility
  - DERs, two-way power flows
  - Goals: clean, affordable, resilient, reliable
- Residential buildings consume more electricity than any other sector and are an under-addressed contributor to peak demand
- *GEBs provide occupant and grid benefits*



Source: Navigant



Source: Rocky Mountain Institute, Demand Flexibility: The Key to Enabling a Low-Cost, Low-Carbon Grid, February 2018

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Residential GEB Technologies:
Current and Future Potential

1. Energy Efficiency
2. Smart Home Technology/ Home Energy Management Systems (HEMS) (sensors, intelligent control, optimization)
3. Storage: Battery, Thermal, EV chargers
4. Distributed Generation
5. Smart Meters & Interoperability

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Barriers & Challenges

- EE, DR, other DERs are siloed
- Valuing all GEB benefits
- Traditional utility planning + infrastructure investment
- Educating and engaging homeowners & contractors
- Interoperability/data access/ standard communications protocols
- Equity and rural broadband access

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Policy/Regulatory Opportunities

- Integrated Demand Side Management (IDSM)
- Cost-Effectiveness Testing
- Utility planning & incentive structures
- Time-Varying Rate Structures
- Measured savings models (P4P)
- Use real-time granular data to verify savings, improve programs
- Access to utility data
- Low and Moderate Income (LMI)
- Building codes
- Interoperability Incentives/Requirements
- Energy Policy Goals: *RPS, EERS, Clean Peak Standard (CPS), emissions targets*

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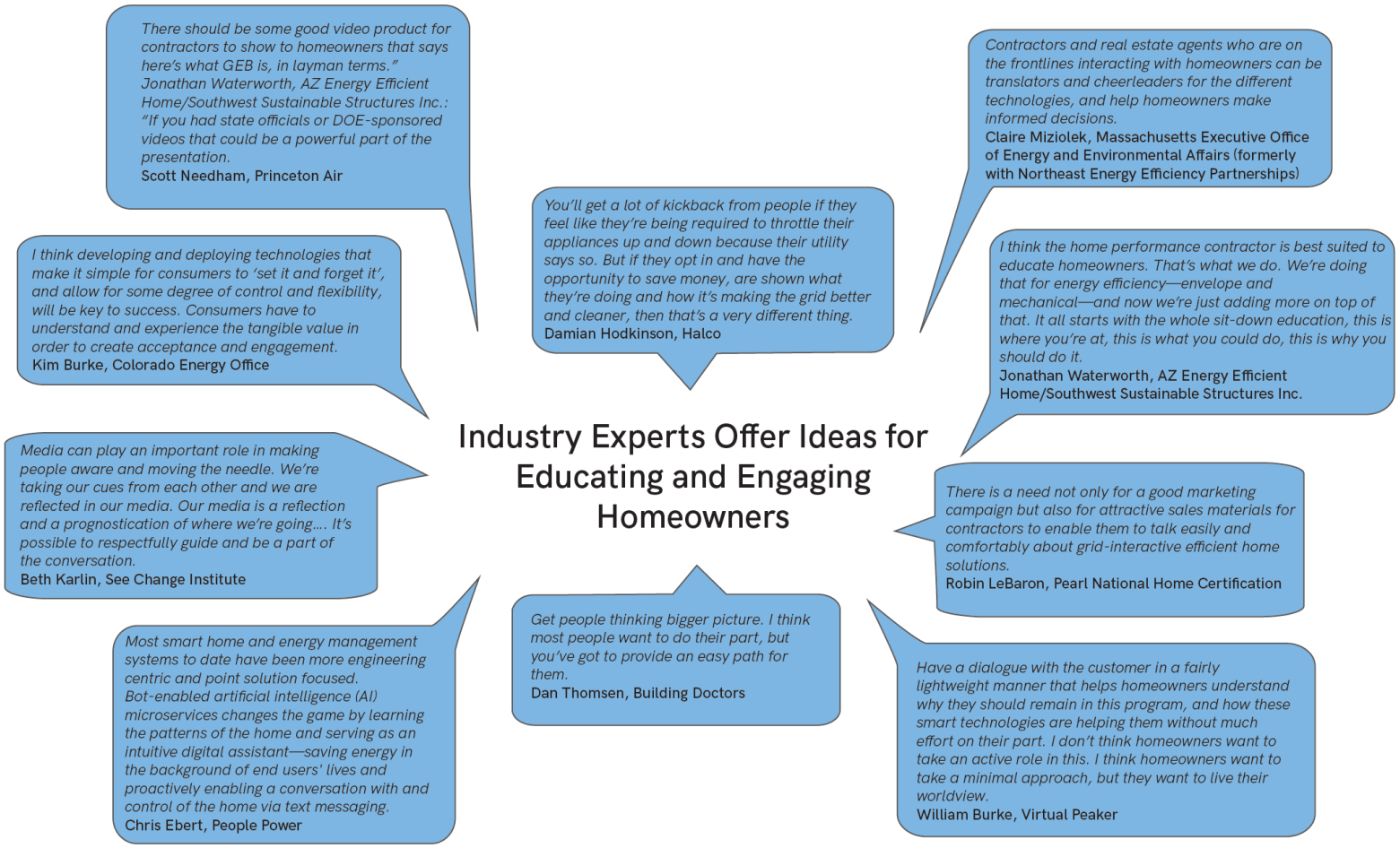
Industry Experts Offer Insights



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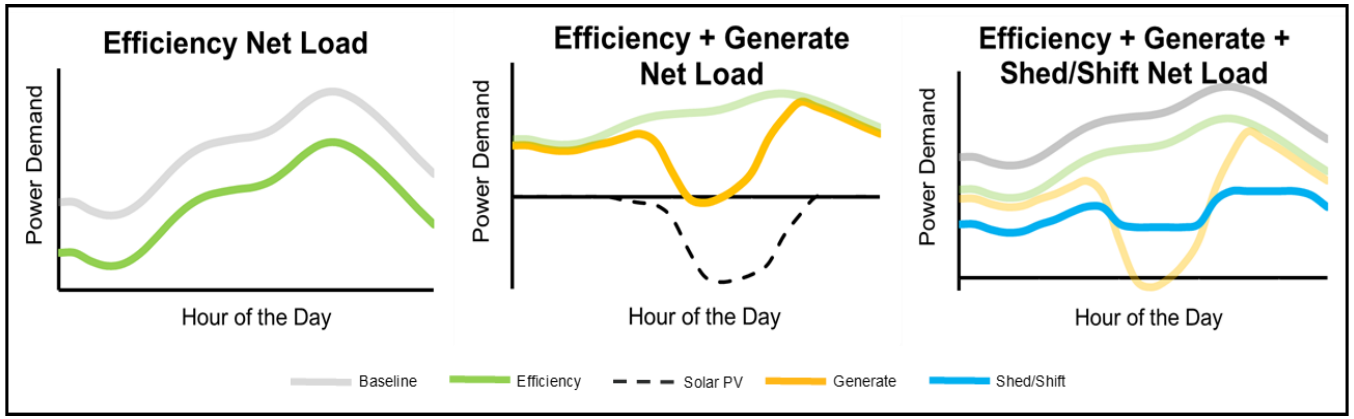
Recommendation #1

- **Break down the siloes between renewable energy, energy efficiency, and DERs**
  - Advance Integrated Demand Side Management (IDSM)
  - Include residential EE and technology incentives in energy policy goals, renewable and GHG targets



Source: U.S. Department of Energy

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Recommendation #2

- **Ensure proper valuation of residential DERs (including energy efficiency)**
  - Update Cost-Effectiveness Testing
  - Require planning models to include residential DERs and capture their value

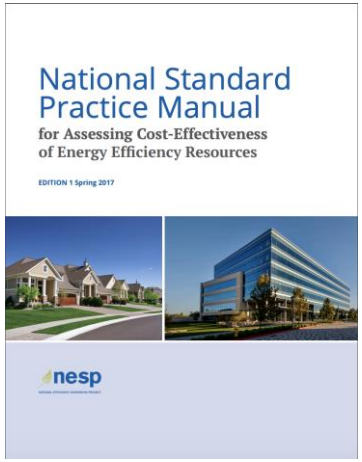

Image credit: NESP, U.S. EPA

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Recommendation #3

- **Incentivize residential energy efficiency and load flexibility**
  - Advanced rate structures for residential customers
  - Modernize utility incentive structures

Image credit: 123RF

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Recommendation #4

- **Engage the public and design policies that work for everyone**
  - Consumer education about advanced rate structures
  - Information campaigns using all forms of media
  - Access to utility data (+security protocol best practices)
  - Ensure equitable access, consider LMI impacts
  - Provide market flexibility

Image credit: 123RF

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Recommendation #5

- **Establish necessary infrastructure to pave the way to a grid-interactive efficient future**
  - Complete residential AMI penetration
  - Promote interoperability
  - Include smart technology in residential energy stretch codes for efficiency.

Image credit: Engerati, Shutterstock

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Research & Development Needs

Develop and Promote Standards for Residential GEB Technologies

- Connected/grid-interactive appliance standards
- Standards for interoperability and communications protocols

Identify Security Risks and Best Practices

- Investigate specific cybersecurity risks for residential IoT in the energy space
- Formulate security protocol best practices for third-party data access

Conduct Behavioral Science Research and Usability Studies

- Research to define and remove barriers to GEB technology adoption
- User engagement and usability studies

Advance Workforce Education

- Develop contractor curriculum on smart technology

Develop Strategies to Maximize GEB Potential of Homes

- Potential of retrofit measures to increase energy efficiency, grid interactivity, and demand flexibility
- Energy optimization strategies across different technologies
- Utilize EM&V 2.0 strategies to streamline program administration
- Physical and regulatory research pilots on smart technologies' benefits to low-income homes

Quantify the Value of Residential GEBs and Benefits

- Advanced performance measurement to quantify value of GEB
- New methods and tools for valuing the hard-to-quantify benefits such as energy resiliency and non-energy benefits

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Thank you!

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