

Integration of Energy Efficiency and Distributed Energy Resources

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The American Council for an Energy-Efficient Economy is a nonprofit 501(c)(3) founded in 1980. We act as a catalyst to advance energy efficiency policies, programs, technologies, investments, & behaviors.

Our research explores economic impacts, financing options, behavior changes, program design, and utility planning, as well as US national, state, & local policy.

Our work is made possible by foundation funding, contracts, government grants, and conference revenue.

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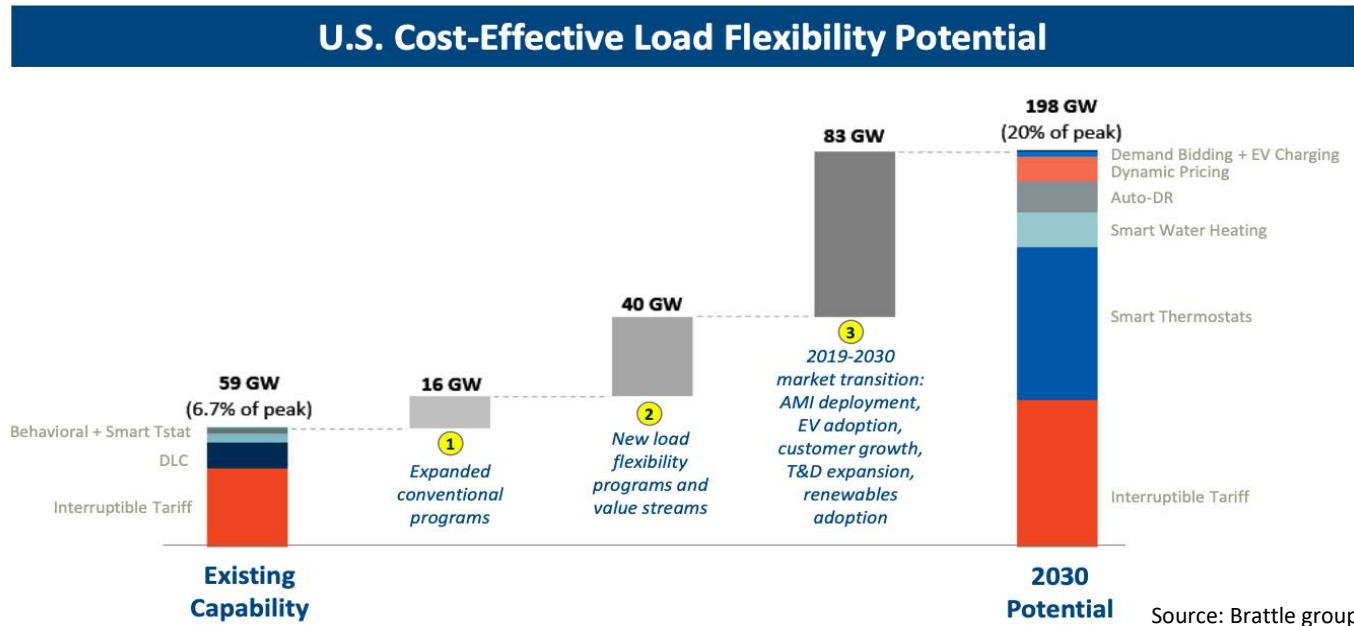
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Agenda

- Motivation
- Scope of research
- Benefits of and barriers to integration
- Findings
 - Levels of program integration
 - Program landscape and examples
- Key takeaways

Motivation

- The energy sector is transforming
 - Changing customer preferences
 - Increased distributed energy resources (DERs)
 - Climate action goal for net zero energy and emissions
 - Affordability goals
- Integration can help harness flexible resources



Scope of research

- Focused on programs that integrate energy efficiency with distributed energy resources (DERs)
 - DERs considered include: demand response, solar, storage
- Research goals:
 - Characterize the landscape of integrated programs
 - Identify benefits, barriers, enabling mechanisms, and challenges to integration
 - Provide lessons for integrating programs

Benefits of integration

Commonly realized benefits:

- Greater energy and customer bill savings
- Increased participation and program satisfaction
- Lower program costs
- GHG reductions

Emerging benefits:

- Increased resource adequacy and grid reliability
- Grid congestion relief
- Earnings opportunities (e.g. shareholder incentives)
- Serve disadvantaged communities (e.g. LMI customers)

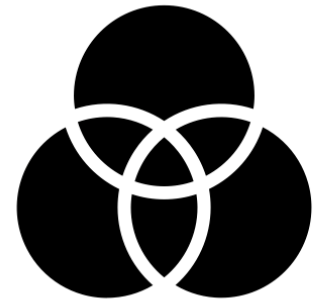
Benefits not yet realized:

- Increased wholesale competition & lower wholesale prices
- Increased availability of ancillary services

Barriers to integration

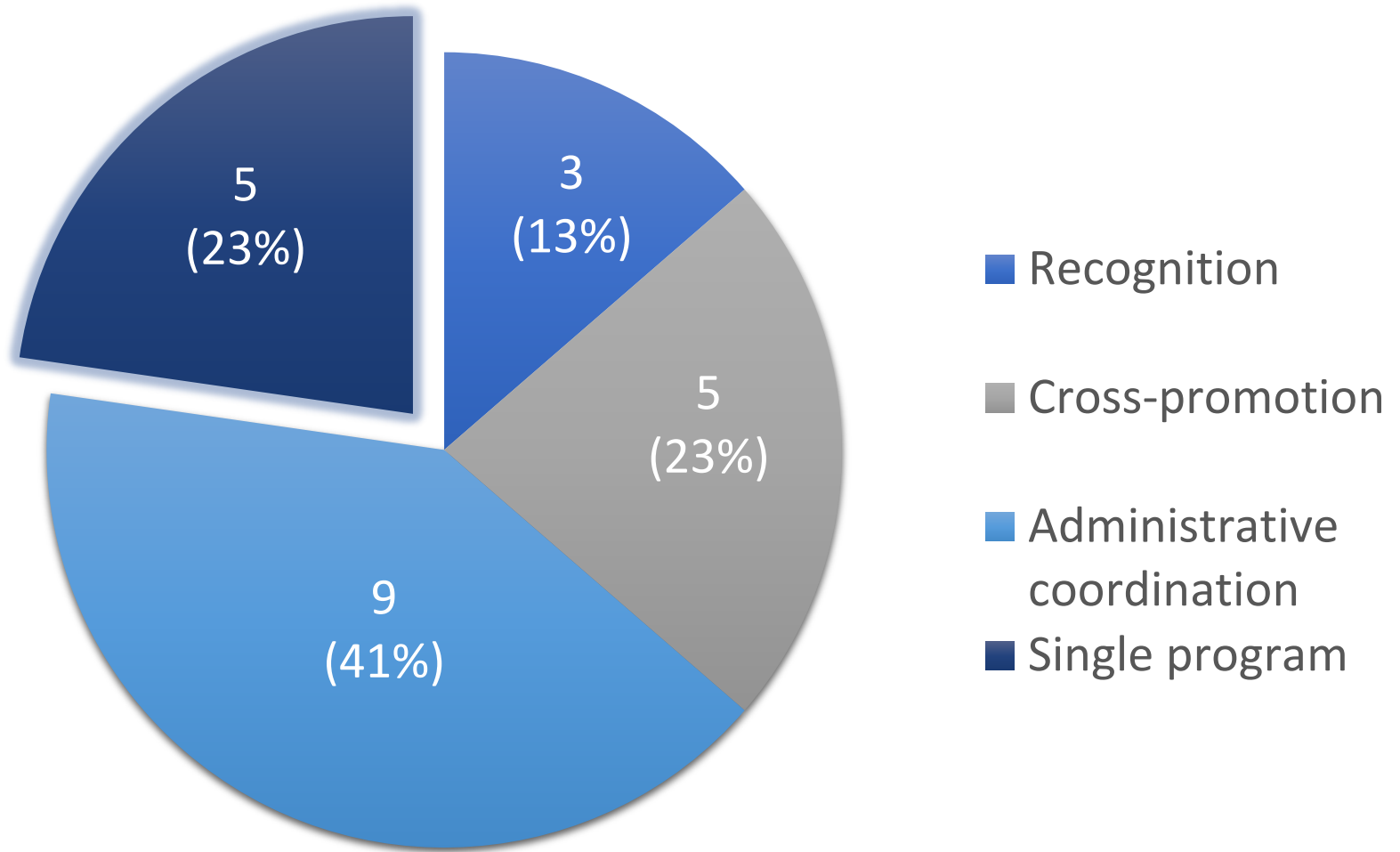
- Regulatory and policy context
- Economic drivers and market actor power
- Siloed work streams and budgets
- High initial project cost for customers
- Contractor coordination
- Lack of metrics for evaluating benefits of integration

Levels of integration



RECOGNIZE → PROMOTE → COORDINATE → INTEGRATE

Program offerings



Baltimore Gas & Electric: Home Energy Check-Up and PeakRewards

- Simultaneous enrollment for quick home energy check-up & demand response programs
 - Provides measures including LEDs, smart power strips, faucet aerators



Source: BGE

- 2017-2018 Results:

Spending	Savings (MWh)	Savings (MW)	Participants in demand response days
\$6.9M	1,062	330	804,966

AEP Ohio: It's your power

- Smart home and demand response program with 3 elements:
 - Mobile app with marketplace
 - Energy Bridge
 - Connected equipment and devices
- 2017-2018 Results:



Source: AEP OH

Spending	Estimated savings (MWh)	Savings (MW)	Participants (devices)
\$3M	569	557	21,790

Consolidated Edison: Connected Homes Platform

- Demonstration project to provide energy efficiency products and DER offerings
 - Personalized communications to send offers for audits, energy retrofit, and rooftop solar
 - Online marketplace
 - To buy products like LEDs, thermostats
 - Concierge-type service for solar
- By end of 2018: 121,000 products sold, with 138 solar contracts

Energy Trust of Oregon: Path to Net Zero

- For commercial new construction and major retrofits with 3 phases
 - Phase 1: Determine EUI target for building
 - Phase 2: Design assistance with up to 75% of the costs of energy studies covered
 - Phase 3: Incentives for construction, solar installation, and commissioning
- By end of 2018: 19 complete projects with 70 underway

Strategies for future program design

- Consider which level of integration best meets the administrator's goals
- Focus on customers and clearly define the value proposition for them
- Leverage utility data to target geographical areas
- Form partnerships with contractors and installers
- Use online marketplaces to engage customers

Key Takeaways

- There are few utility integrated programs.
- New technologies are creating opportunities for integration.
- Residential smart thermostat programs are the most prevalent among current offerings.
- Robust financing will be key to reduce customer's first costs.
- Programs that collaborate with existing market providers are likely to see greater participation.
- Organizational changes and supportive regulation will reduce barriers to integration.

Administrators should pursue integrated programs when the net benefits outweigh the costs of integration.

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Report at: <https://aceee.org/research-report/u1906>

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