CVR as an Energy Efficiency Strategy

Results from the DOE National Assessment of CVR

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U.S. DEPARTMENT OF ENERGY
Electricity Delivery & Energy Reliability

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Proprietary

DOE National Study on CVR

Objectives

- Build a body of knowledge on CVR costs, benefits, and deployment models
- Draw conclusions and make recommendations on how to overcome industry barriers
- Develop a self-sustaining CVR industry group (CIG)

Research Methods

- Broad industry outreach relying on literature reviews direct utility interviews
- Project Case Studies
- Industry input on major findings and recommendations.

41 Utility Participants

- Adams Columbia EMC
- Alabama Power Co
- Ameren - Illinois
- **AEP - Ohio**
- Avista Utilities
- BG&E
- BPA
- **Central Hudson**
- **Central Lincoln PUD**
- Clark County PUD
- Cowlitz County PUD
- Clinton Utilities Board
- ComEd
- Connecticut Lt & Pow
- Dickson Electric System
- Dominion Virginia Power
- Duke Energy
- Fort Loudon EMC
- GPC
- Hydro Quebec
- Idaho Power Company
- Indianapolis P&L
- Inland P&L
- Iowa Lakes EMC
- Johnson City PUB
- Morristown Utility Systems
- NEEA
- OG&E
- Oneida-Madison EMC
- PacifiCorp
- Palmetto Electric Coop
- **PECO**
- Public Service Co of OK
- Ripley Power & Light
- SMUD
- Snohomish PUD
- West Penn Power
- **Xcel Energy - PSCo**

Case Study Utilities

Finding 1 – Major advancement in CVR technologies are enabling greater CVR savings without compromising power quality and reliability

Observations

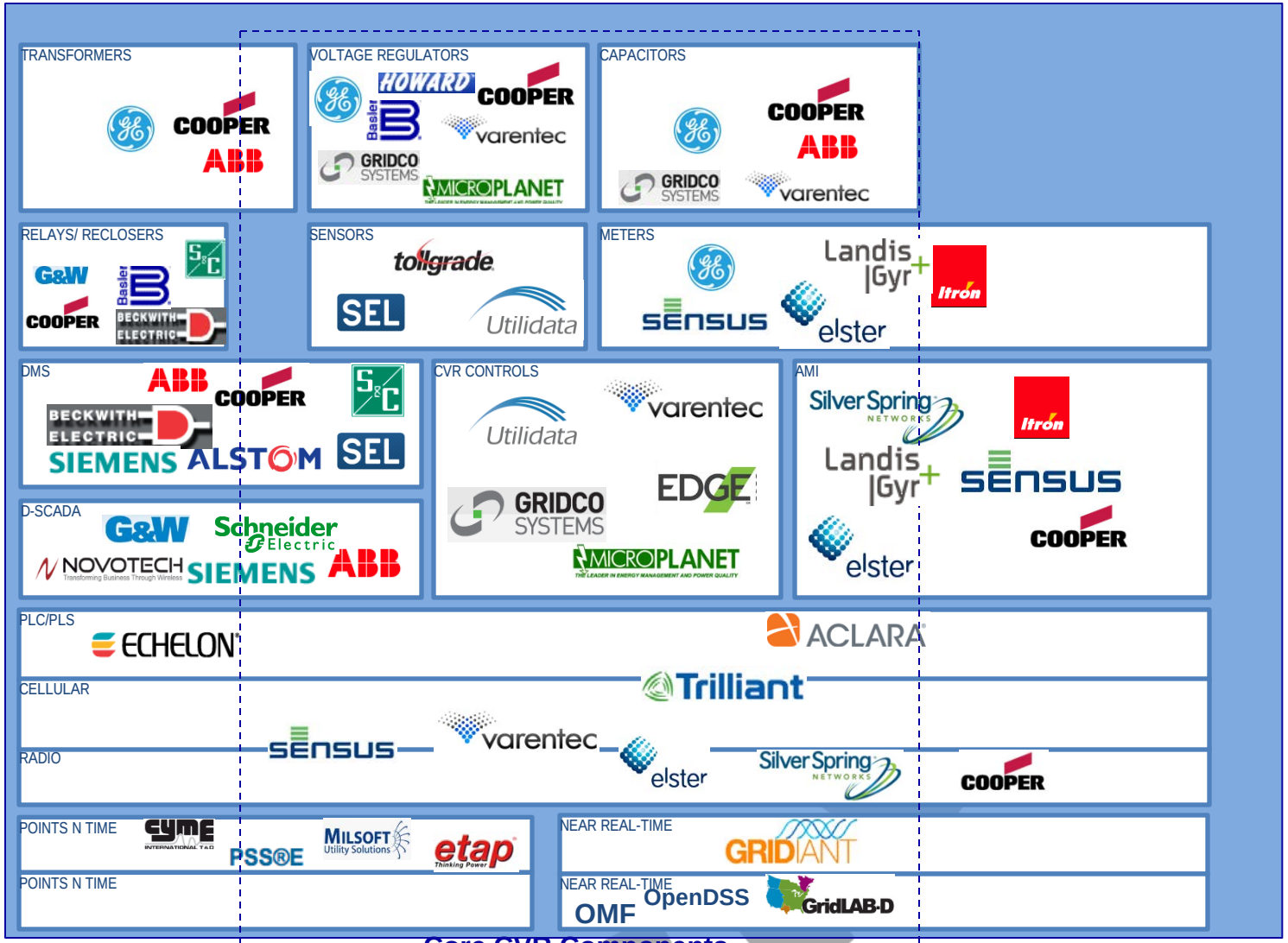
- Major manufacturers are building CVR/VVO functionality into their core distribution technology offerings
- New companies are bringing to market innovative monitoring, control and analytic systems
- Use of AMI data allowing for more precise voltage regulation.

Recommendations

- New technology demonstration projects need to be analyzed and shared throughout the industry

CVR Market Taxonomy

AEG Applied Energy Group



Finding 2 – The value proposition for CVR is strong. There are many examples of project yielding 2% savings or more per feeder at cost below other supply and demand-side options.

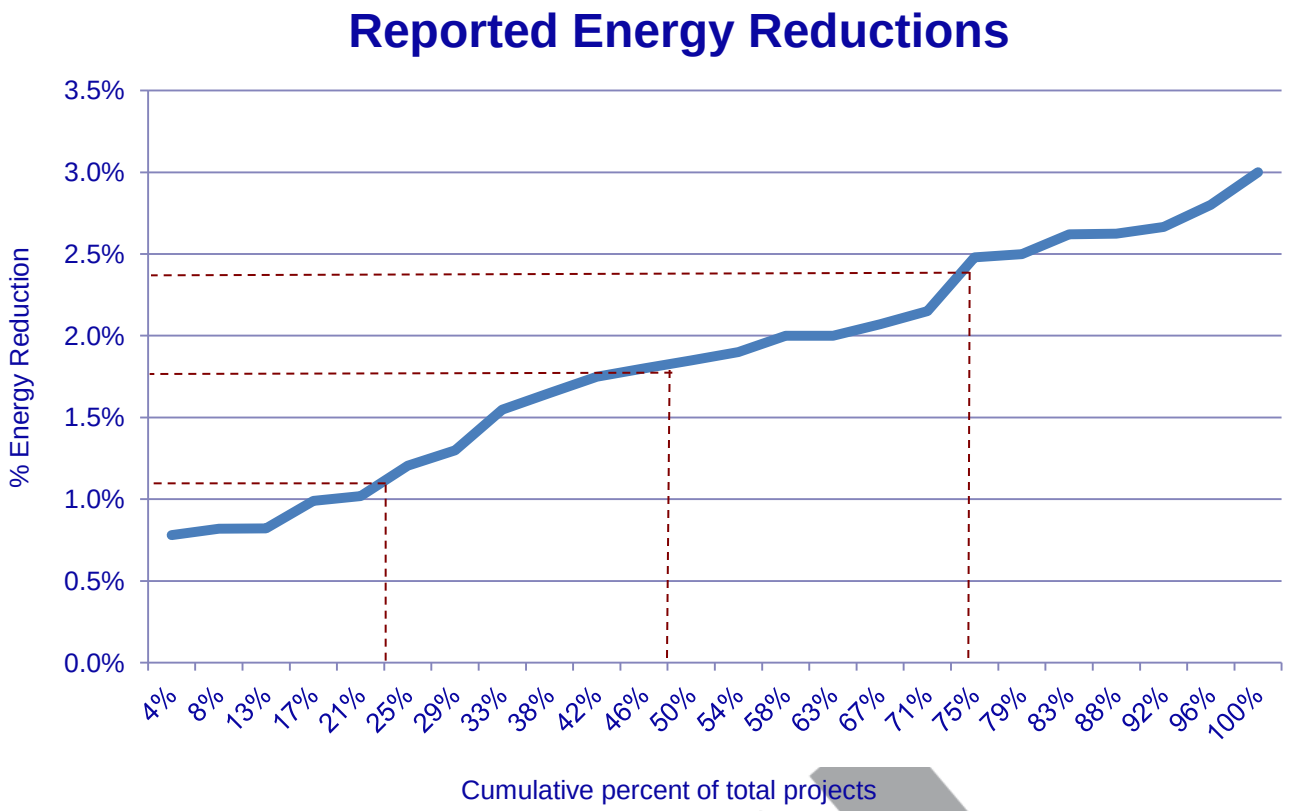
Observations

- Over half of the projects reviewed in this study are achieving energy savings and demand reductions of over 1.8% per feeder, with some as high as 5%.
- CVR costs are typically below $0.03/kWh on an LCOE basis.
- A majority (61%) of projects reviewed are in the pilot / demonstration phase making full scale deployment costs difficult to obtain.

Recommendations

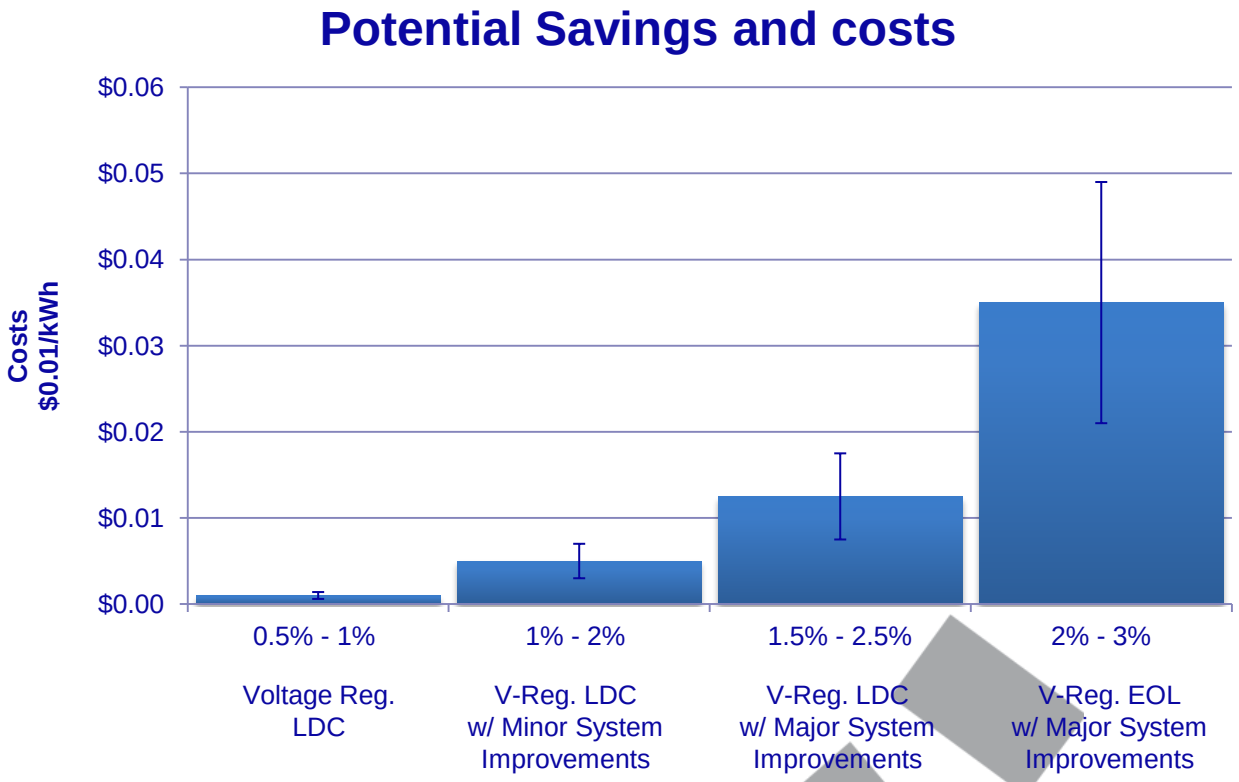
- As pilot programs expand to full scale, data on CVR costs and benefits need to be captured and shared.
- More data needs to be collected on CVR incremental costs and benefits.

Average CVR Project Energy Reductions ranged from a low of .8% to a high of 3%.



Source: DOE National CVR Assessment. 2014

While low cost CVR options exist, deeper CVR deployments have the potential to generate significant savings at very reasonable costs



Source: Northwest Energy Efficiency Alliance, Distribution Efficiency Initiative Project Final Report. December 2007

Finding 3 – Although momentum is building, most States currently do not allow utilities to count CVR as a qualified Energy Efficiency resource

Observations

- Five states currently include CVR in their EE portfolios (OH, MD, WA, OR, PA). Three others are under consideration (CO, CA, IL)
- NARUC's 2012 resolution supporting CVR/VVO as an EE resource has been helpful, but the fact remains that no new States have incorporated CVR into their EE portfolios since the resolution was passed.

Recommendations

- Organizations like NARUC, ACEE, and the proposed CIG can provide a valuable vehicle for educating regulators, policy makers, and EE stakeholders on the issues and benefits of incorporating CVR into EE portfolios.

10 States have enacted, or are in the process of enacting regulations that address CVR.

	CVR-related Activity		Regulatory Mechanisms					
State	Legislative	Regulatory	General Rate Case	Accelerated Cost Recovery	Revenue Decoupling	Lost Revenue Recovery	EE Targets / Incentives	Notes
CA	✓	✓	✓	✓	✓		✓	Legislation enacted in 1976 for VVO pilot in 2013
OH	✓		✓		✓			SB 221 mandates EE; allows for T&D upgrades
IN		✓				✓	✓	AEP receives accelerated cost recovery.
MD		✓	✓					The Maryland PSC encourages CVR through EmPOWER
WA	✓		✓				✓	I-937 includes Distribution Efficiency
OR		✓	✓				✓	Order No. 10-066 directs PacifiCorp to assess CVR
IL		✓	✓	✓			✓	ICC ComEd Final Order 13-0495 qualifies VO as EE
MA		✓	✓	✓	✓		✓	MA DPU launches Grid Modernization workshops
CO		✓	✓	✓				Xcel / PsCO files for CVR in EE program plan
PA	✓	✓	✓	✓			✓	PECO meets PA Act 129 using CVR

Source: DOE National CVR Assessment. 2014

Finding 4 – Major Regulatory hurdles exist, impeding CVR adoption

Observations

- CVR regulations are mostly developed in an ad hoc manner as part of a utility-specific filing / rate case.
- Lost margins, uncertain cost-recovery, and lack of incentives dilute the utility CVR business case.
- While regulatory interest is picking up, lack of information permeates.

Recommendations

- The promotion of CVR regulatory constructs similar to what has occurred in the EE industry would help accelerate CVR adoption.
- Including CVR into existing EE regulatory structures would provide a very efficient mechanism for addressing CVR regulatory issues.

Finding 5 – Market Barriers need to be address before CVR can reach its full potential

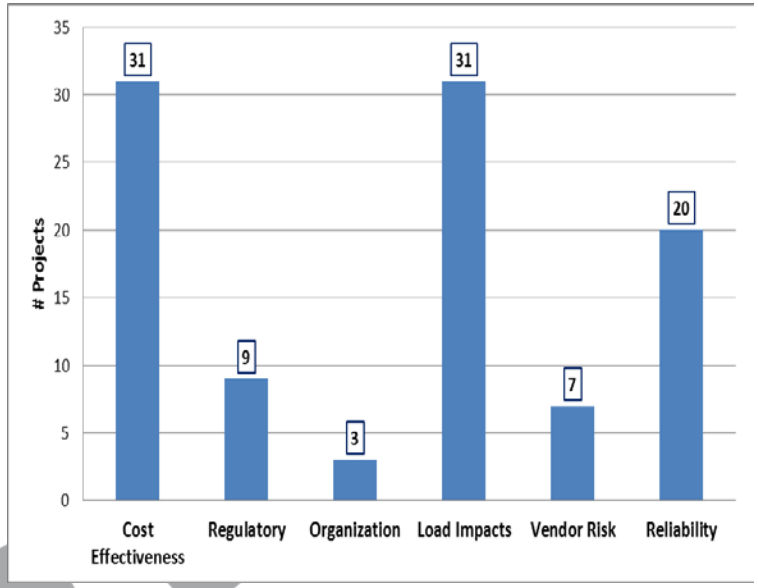
Observations

- Key market barriers include
  - new technology and vendor risk,
  - inertia to change current utility engineering and operating practices,
  - difficulties bridging utility organizational silos, and
  - competing utility investment priorities.

Recommendations

- Dissemination of CVR performance data would help reduce utility adoption concerns.
- Public policy and utility executive leadership are essential to overcoming many of the market barriers hindering CVR adoption.

Key Business Risk Factors



Source: DOE National CVR Assessment. 2014

Finding 6 – To make CVR a reliable resource, better planning methods and M&V protocols must be developed.

Observations

- There are no recognized standards for developing CVR resource plans and measuring CVR impacts, resulting in unacceptable levels in uncertainty in CVR savings estimates.
  - Research on M&V methods was one of the most requested topics of the CVR Industry Group webinar.

Recommendations

- IEEE, EPRI, NEETRAC and other industry organizations can play a vital role in helping develop and promote reliable planning and evaluation tools and protocols.