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MA C&I Depth of Savings Analysis: Issues and Preliminary Findings

Phillip Mosenthal
EEAC Consultant
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Overview of Purpose and Intent

- Better understand the range of projects completed and their depth of savings
- "Depth" = % of annual energy consumption (electric or gas)
- Analyzed overall, and by:
  - PA
  - Program
  - Year
- Considered average depth, frequency distribution of range of depth, looked for trends, major differences between years, PAs, programs, customer groups, types of end uses addressed

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Data Challenges

- There are many data challenges that limit the definitiveness of any findings — **not statistically significant…**but gives a picture of roughly where we are now.
- Limitations of data:
  - Gas and Electric projects not linked
  - Repeat customers not linked (although some PAs have other systems to determine this)
  - PAs still using legacy fields in dbase so not always apples to apples (e.g., GasNetworks)
  - Consumption data is difficult to accurately tie to projects (meters vs. customers, multi-meter campuses, large building with small tenants, etc.)
  - Blank data and duplicate data
  - Uncertainty of accuracy of consumption data — large percentage of outliers (e.g., >100% savings) implies reasonable looking data may also be unreliable.

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Data We Have to Work With

- Total number of project records = 21,025
- Spans 2007-2010, most PAs only 2009 and 2010
- Total Electric Projects statewide = 18,292
  - 16,208 (89%) with complete consumption data
  - 14,774 (81%) remain after removing projects with >50% savings
- Total Gas Projects statewide = 2,733
  - 1,595 (58%) with complete consumption data
  - 1,347 (49%) remain after removing projects with >50% savings

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Overall Findings

- Average (mean of projects) depth of savings statewide by fuel and program
  - All PAs and years combined
  - First column: Excludes projects with no consumption data or with >50% savings.
  - Second column: Also excludes projects with < 2.5% savings.

	Electric Depth		Gas Depth	
Program	**0-50%**	**2.5%-50%**	**0-50%**	**2.5%-50%**
Business Direct Install	9%	14%	11%	14%
Large Retrofit	9%	14%	14%	17%
New Construction	6%	13%	16%	18%
Grand Total	**8%**	**14%**	**14%**	**17%**

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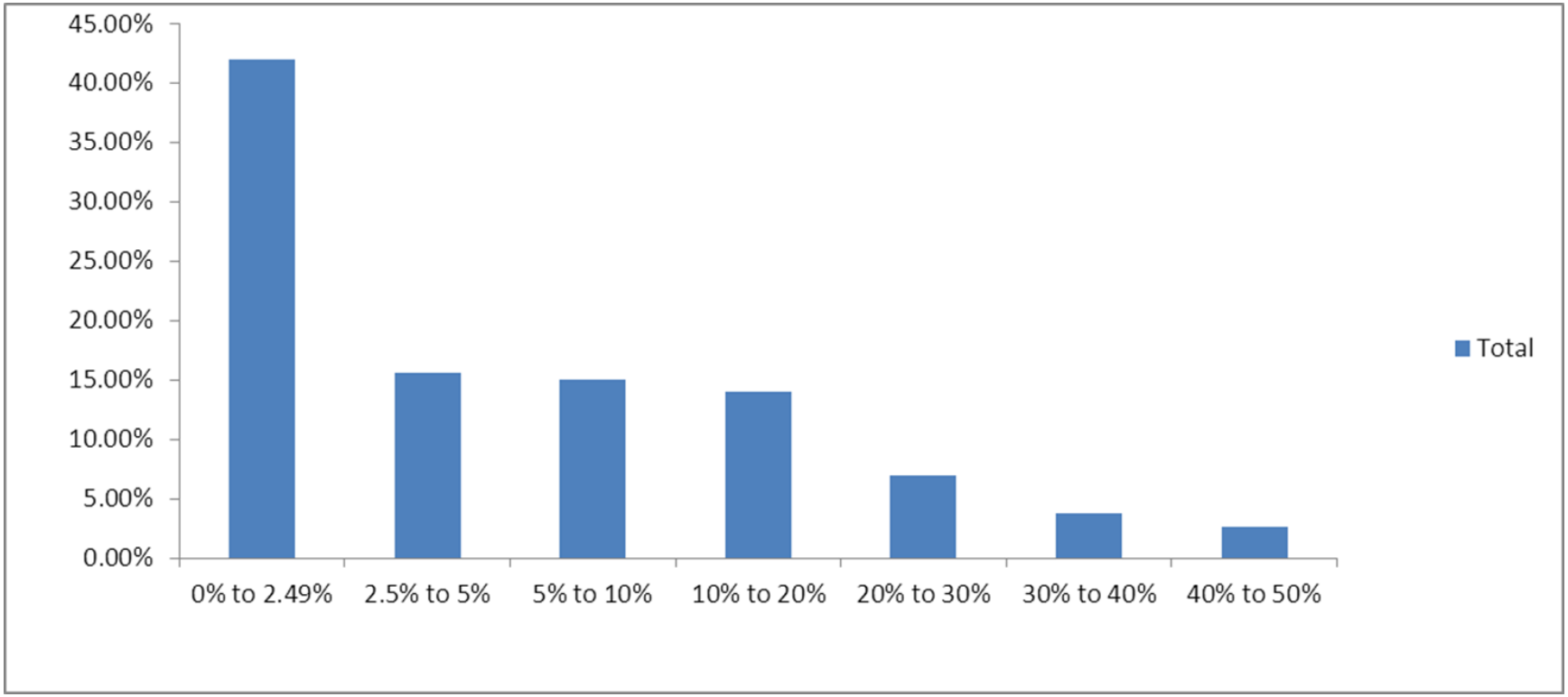
All Electric Programs – All PAs and Years



Roughly 13% > 20% savings.

>50% savings removed.

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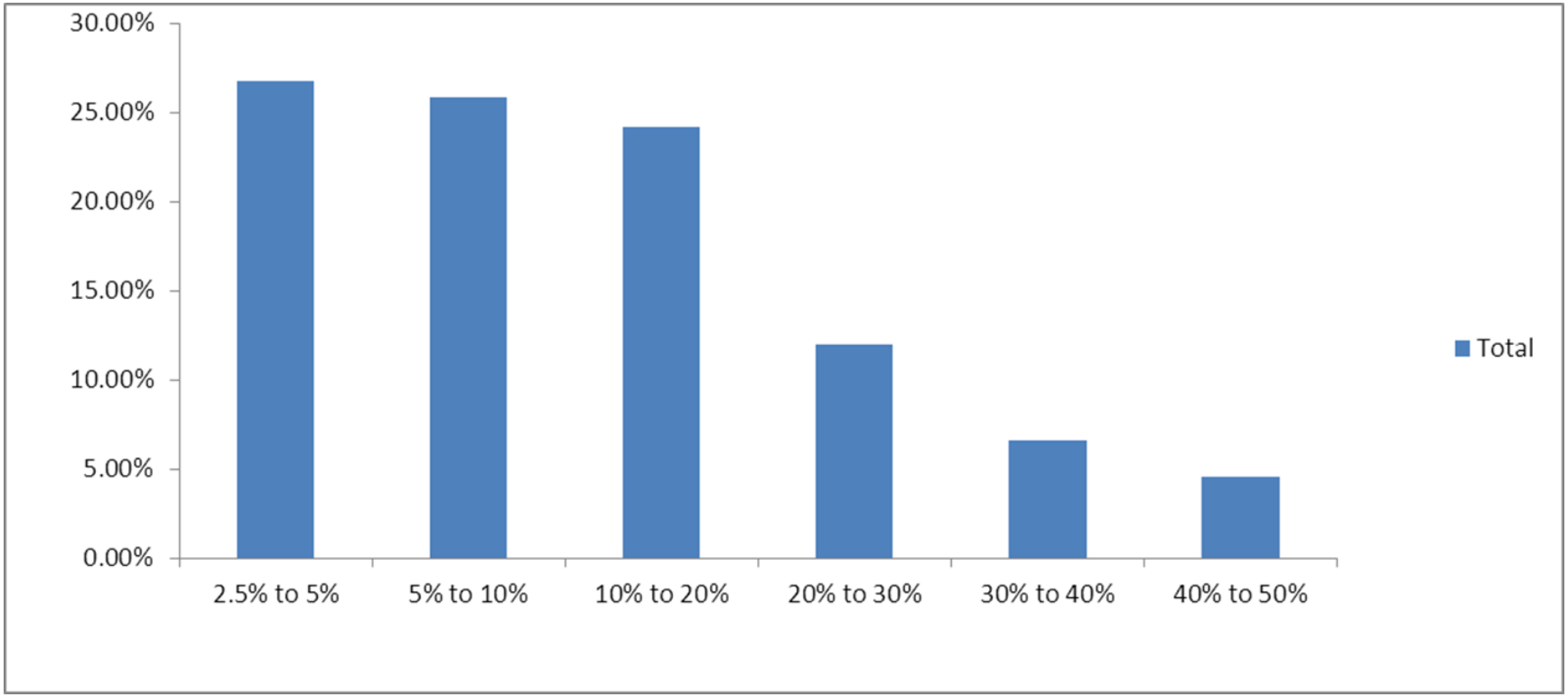
All Electric Programs – All PAs and Years (<2.5% Omitted)



Roughly 24% > 20% savings.

<2.5% and >50% savings removed.

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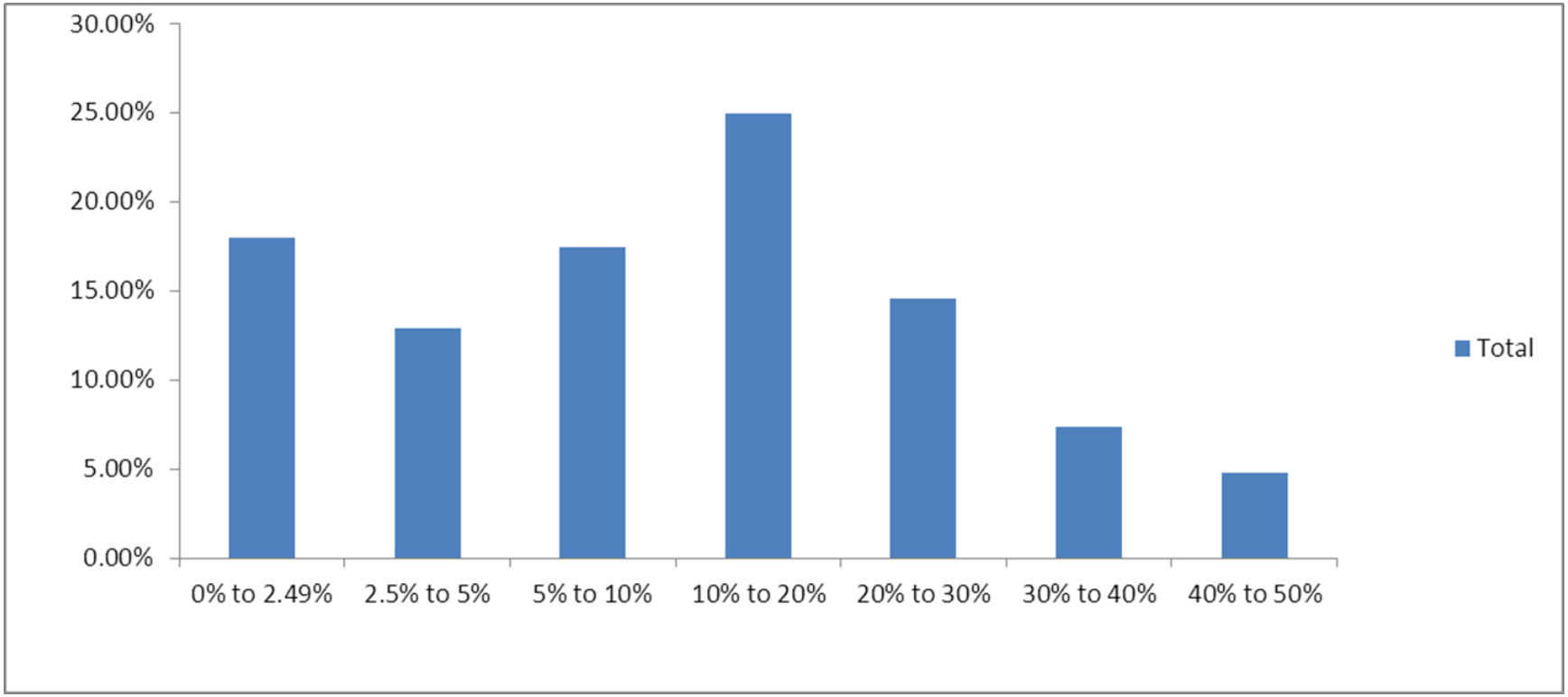
All Gas Programs – All PAs and Years



Roughly 27% > 20% savings.

>50% savings removed.

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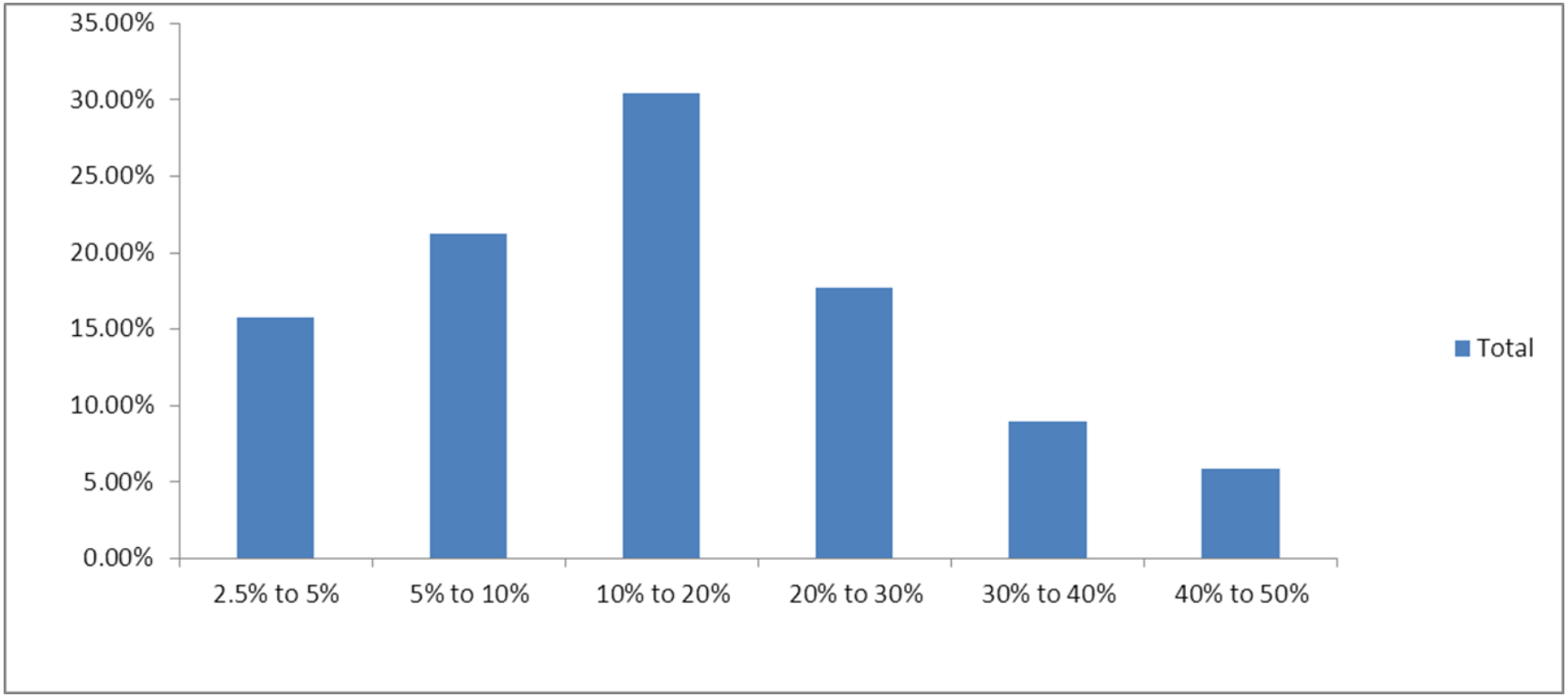
All Gas Programs – All PAs and Years (<2.5% Omitted)



Roughly 32% > 20% savings.

<2.5% and >50% savings removed.

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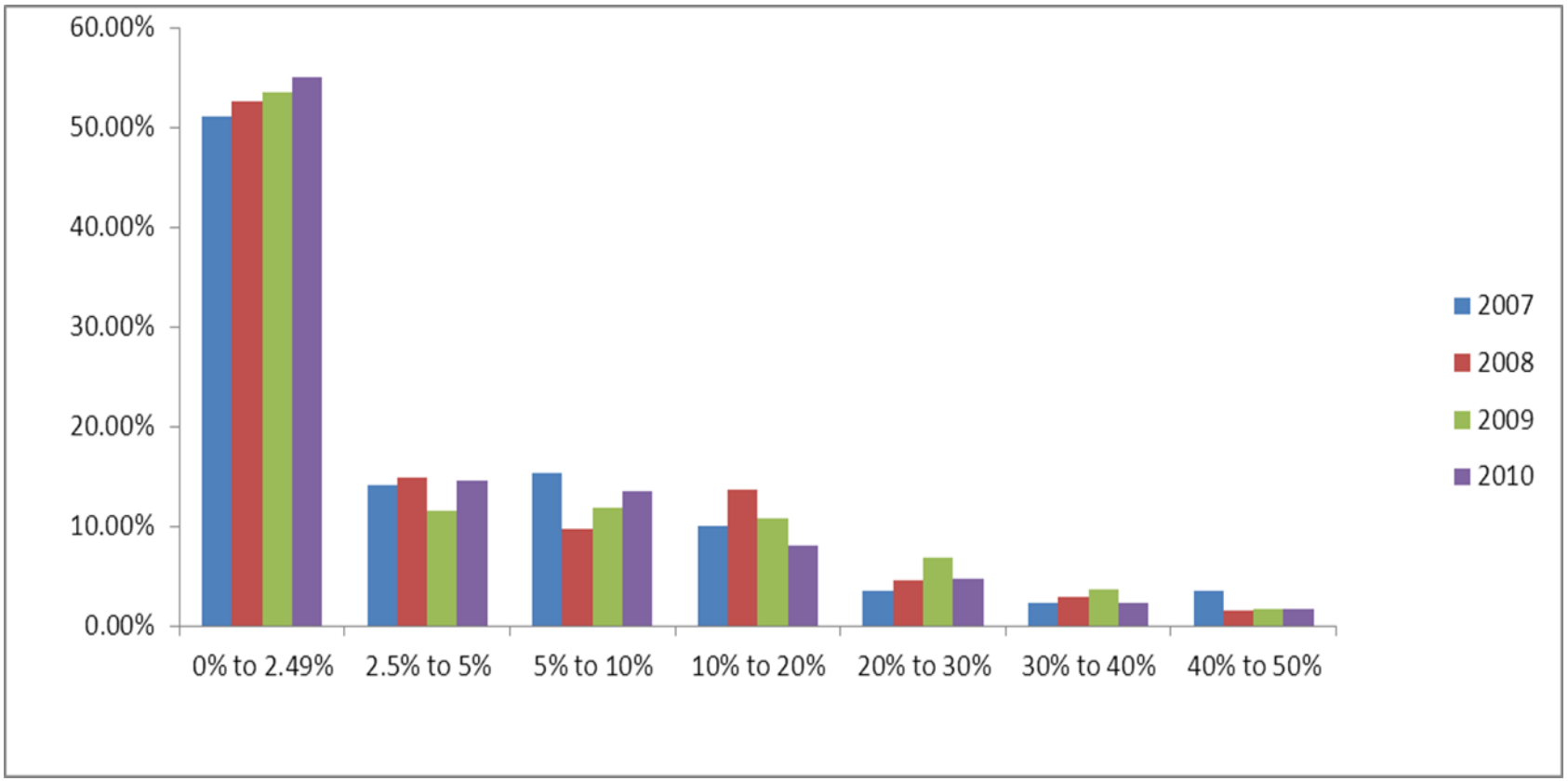
Electric New Construction by Year, All PAs



Very consistent across years — how do we move the curve to the right?

Are the 0-2.5% just equipment replacement?

How do truly new buildings and major renovation compare to equipment replacement?

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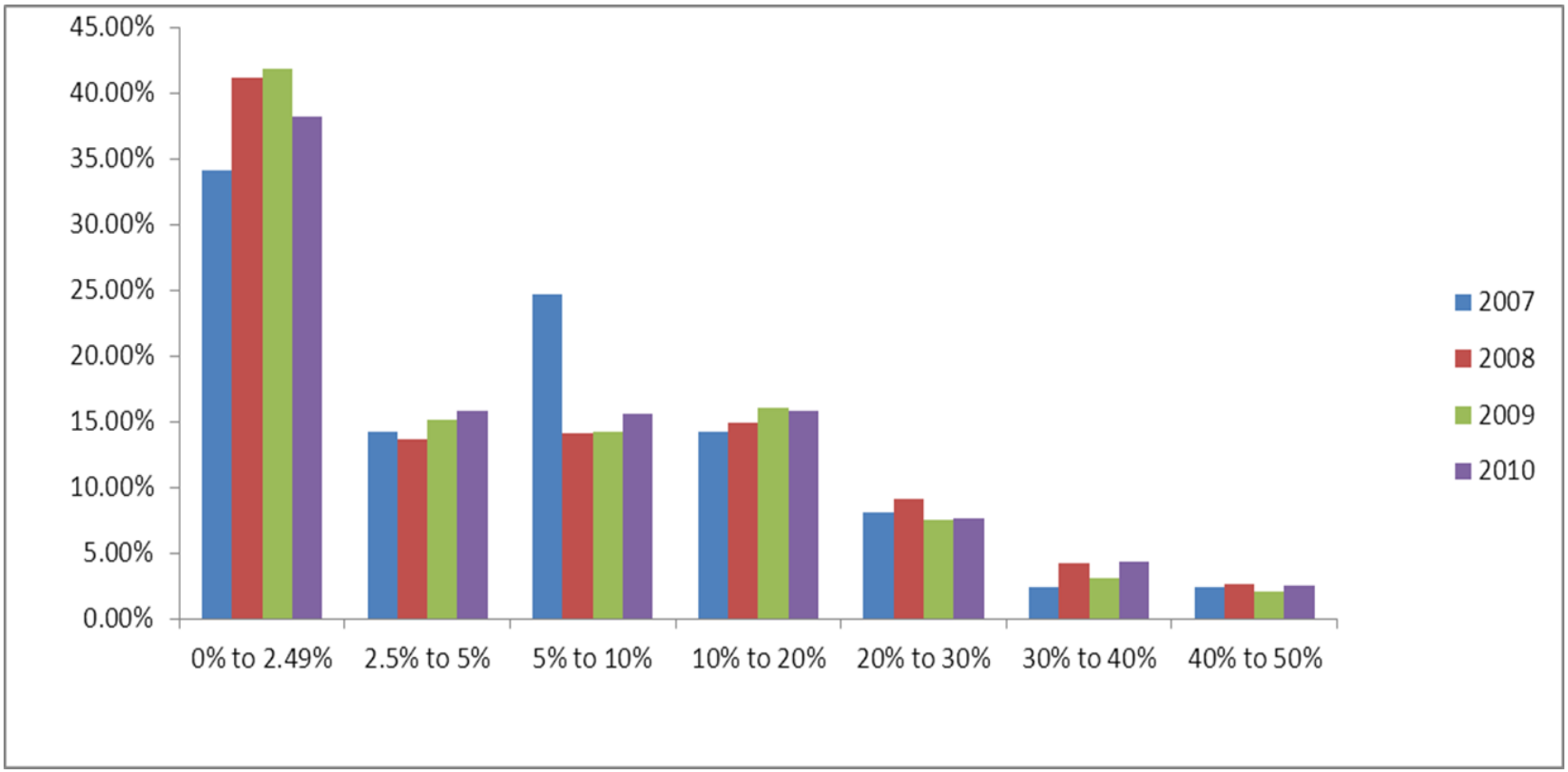
Electric Large Retrofit by Year, All PAs



Very consistent across years — how do we move the curve to the right?

How different would this look with good data on repeat participants?

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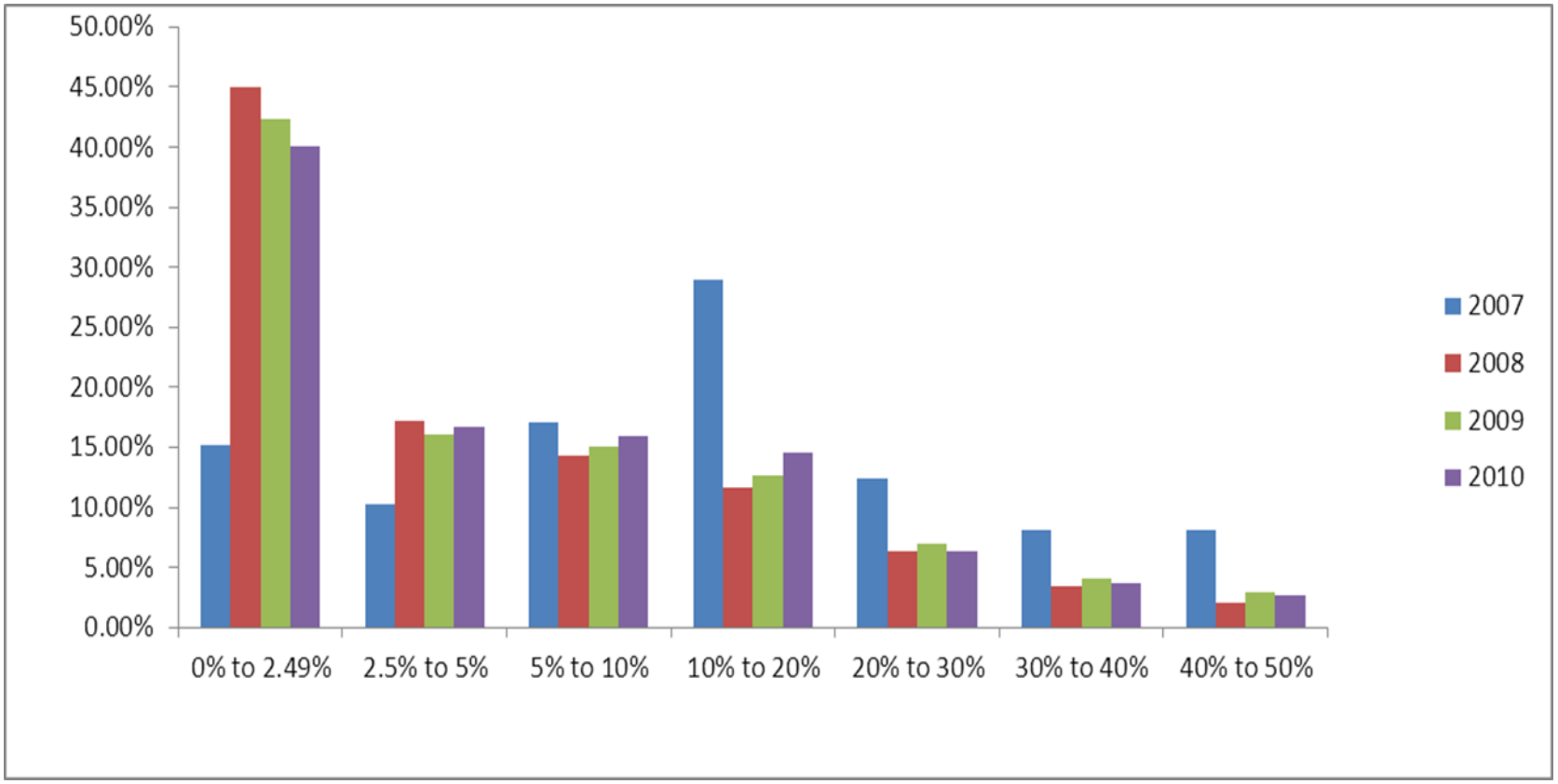
Electric Direct Install by Year, All PAs



Very consistent across years after 2007 — how do we move the curve to the right?

Believe the 0-2.5% are outliers resulting from data problems on big multi-use buildings.

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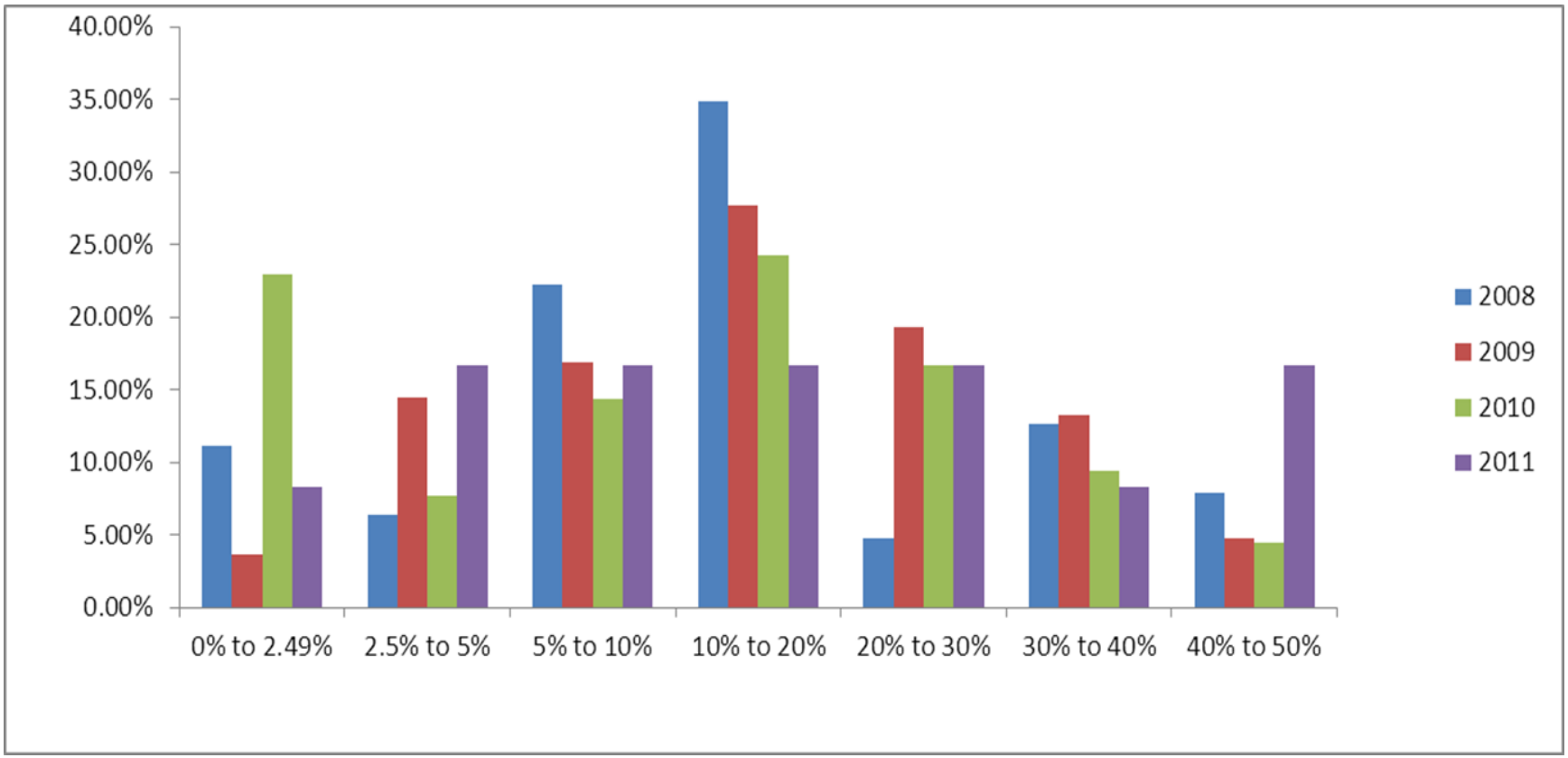
Gas New construction by Year, All PAs



Reasonable depth, relatively consistent across years.

How would this look if just new construction and major renovation?

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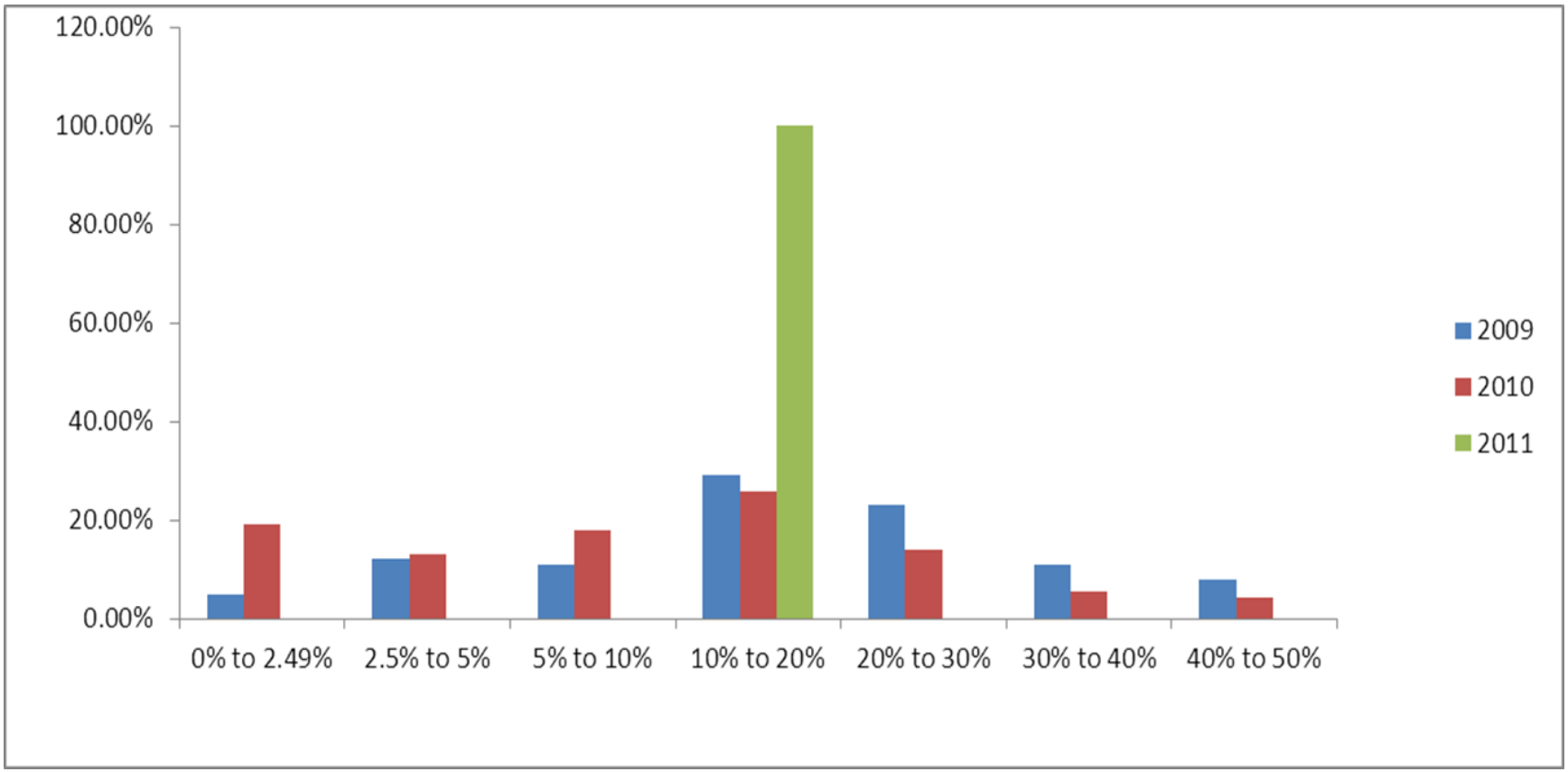
Gas Large Retrofit by Year, All PAs



Appear to be going in wrong direction — but not statistically significant.

Greater depth than electric — perhaps because more focused on heating which is main end use?

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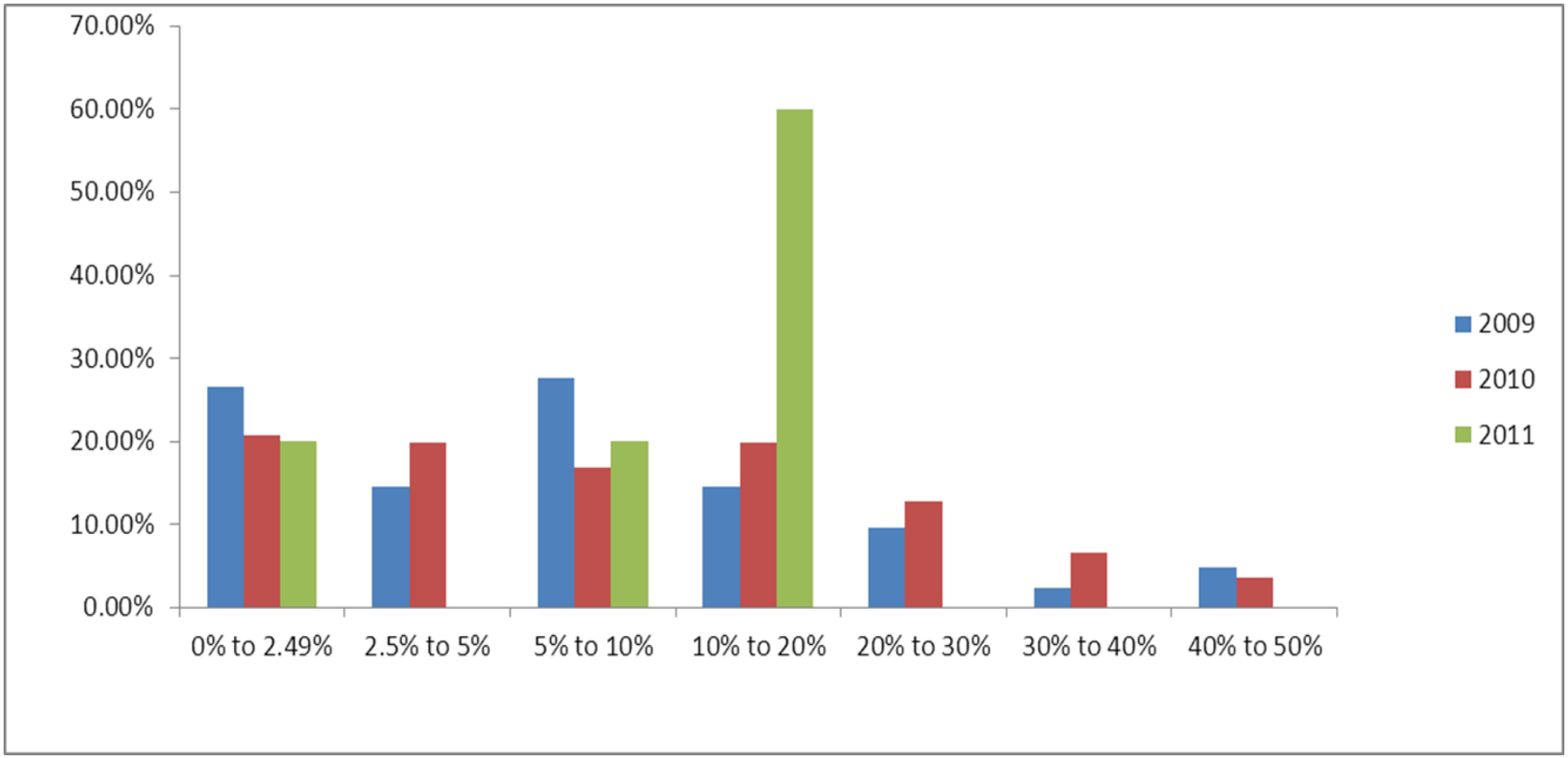
Gas Direct Install by Year, All PAs



Movement is in right direction — is it significant?

Gas measures started in July 2009.

Limited gas opportunities for DI results in wide variation of depth.

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Overall Trends and Findings - Temporal

- Initial data provides a useful snapshot of current baseline.
- Overall, data is fairly consistent across years — implying that we may not be making major progress.
  - Caveat is that given data limitations, it may be progress is just clouded by other issues.
  - Since goals have increased dramatically (2X), even with minimal change in distribution, means **we are getting significantly more deeper projects, just not proportionally more.**
  - Enough projects are "deepish" to indicate we are capable of deep dives. Need to focus in on the characteristics of those projects to understand how they differ from less deep ones (e.g., customized approach vs. PEX and Rx forms? Certain sectors more willing to go deep? Certain staff PMs involved? New construction vs equipment replacement? Specific end-uses or measures? Etc.)

Overall Trends and Findings - Magnitude

- Overall, depth seems reasonably good. Lack of comparison to other states and prior analyses make difficult to make firm judgments.
- But: Depth data implies we will not reach future goals unless we continue to get lots of repeat participants (effectively deep over time rather than per project) or shift to more single deeper projects.
  - We may already be doing this (repeat participation), but data problems prevent determination at this point.
- Gas seems to be deeper, and more typical bell curve. Issues to consider in this context:
  - Gas savings data are not adjusted for current evaluation findings, which will significantly lower net savings estimates.
  - Is this a function of heating being single big end use and lots of furnaces and boilers? – Sustainable?
  - Do more electric projects focus on single measures?

Overall Trends and Findings - PA Divergence

- Overall, PA performance is quite consistent — indicates data taken as a whole probably reasonably reliable, and no red flags in terms of PA performance
- Large retrofit and new construction programs very consistent by PA
  - Only significant outliers are very small PAs with very small samples
- Major differences seen in DI program, but believe these are data issues because:
  - DI program is very consistent delivery and measures across PAs, and same vendors throughout state
  - Outliers seem to be some PAs that serve large multi-use buildings where only fraction of buildings are treated, but consumption may reflect whole building. Plan to investigate more.
  - Overall savings and cost data for DI by PA do not support that differences are significant across PAs.

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Next Steps

- Data set offers a good snapshot overall, and raises many questions we encourage PAs to explore. What are characteristics of deep vs. shallow projects, and what can we learn from them?
- DSM project data and energy consumption should be linked.
- DSM projects should link gas and electric information.
- Projects should be tracked by facility and customer, to monitor depth over time.
- Each PA uses an independent data system — merging, or at least "communicating" with each other would help support integrated statewide effort.

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Thank You

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EEAC Consultant

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