M&V 2.0: HYPE VS. REALITY

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DTE Energy

NAVIGANT

INTRODUCTION

NAVIGANT + ECOFYS

WE'VE JOINED FORCES

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AGENDA

- Background on M&V 2.0
- Summary of Project
- Findings from Phase 1 (Market Scan)
- Progress on Phase 2 (Pilot Test)
- Next Steps

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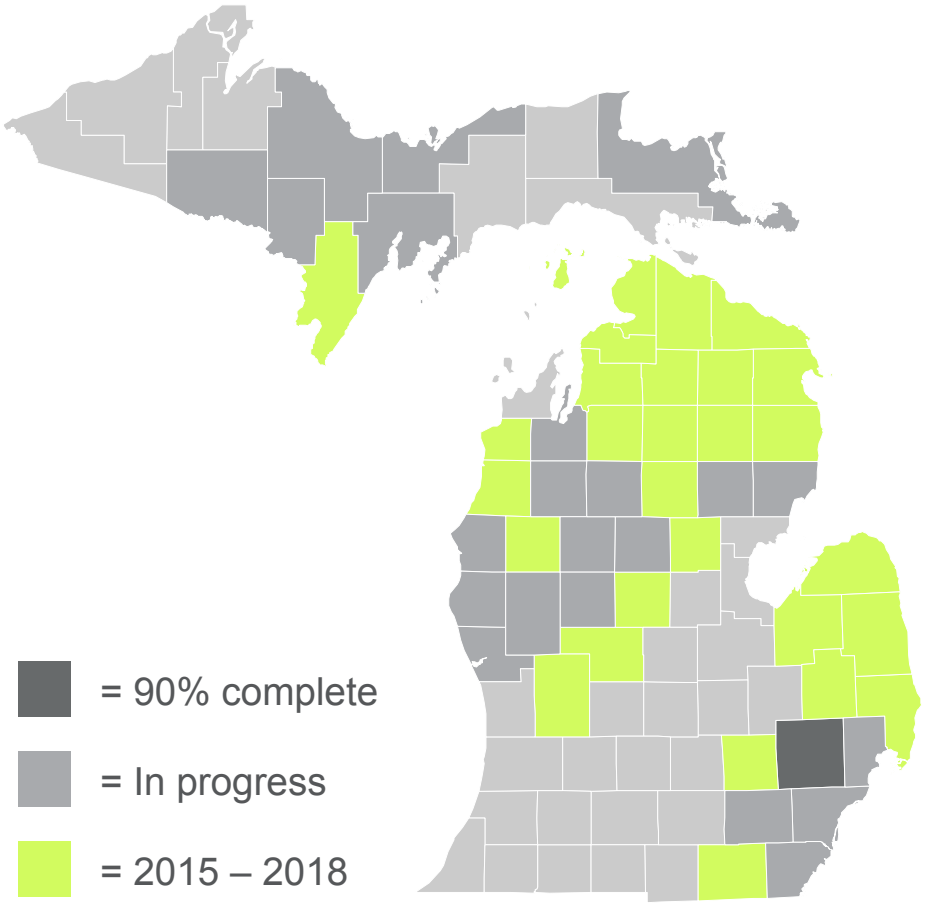
BACKGROUND ON M&V 2.0

- AMI Rollout: 95% have smart meters, with full rollout expected by 2018

- How can collected data be used for the purposes of evaluation?
  - Faster results
  - Specific impacts (time, location)

- Two types of M&V 2.0:
  - Custom Econometric Evaluation
  - 'Off the Shelf' M&V 2.0 Software



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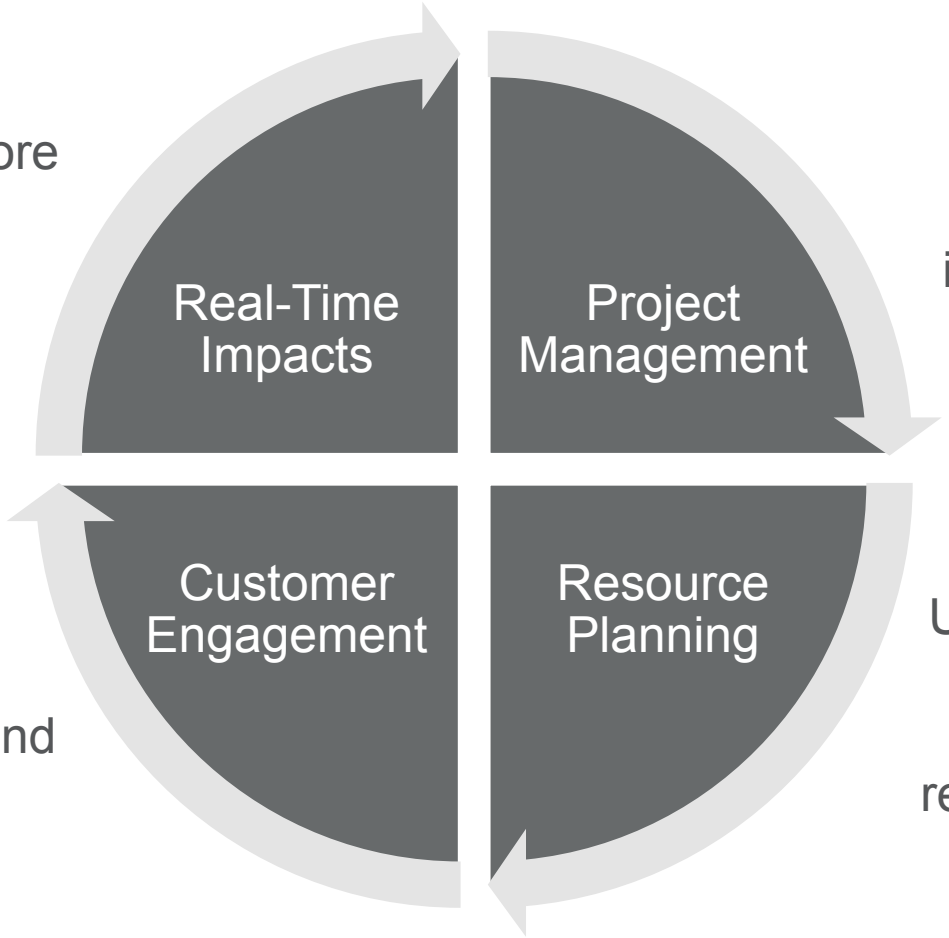
BENEFITS OF M&V 2.0

Data on program realization rates and savings impacts before the end of the year



Insight into various elements of the program, including measure-level and installer performance

Deeper insight into customer behavior and profiles, allowing for better targeting and engagement

Understanding of true demand impacts, for use in demand response programs or integrated resource planning process

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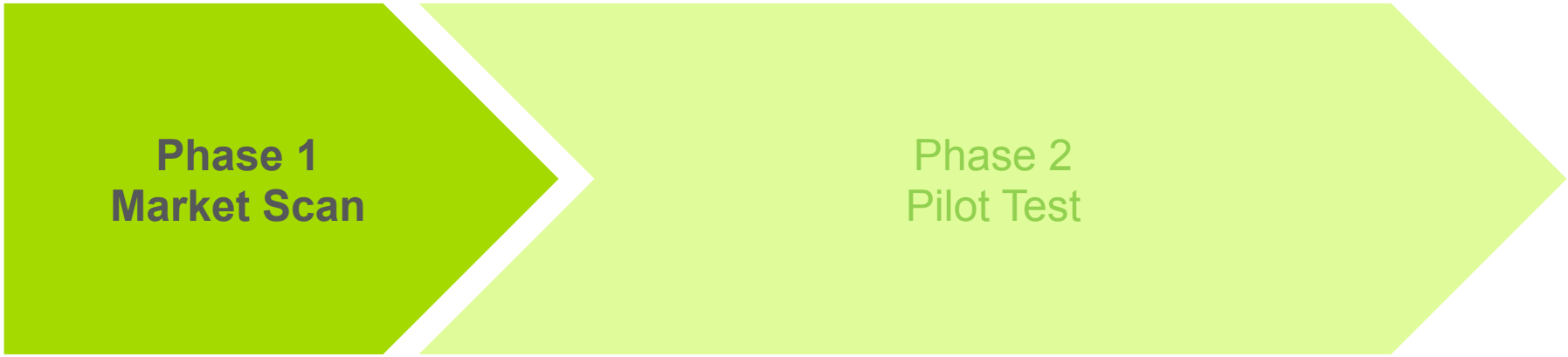
PROJECT BACKGROUND



Phase 1 Objective:

*Determine which M&V 2.0 software platforms are sufficiently **flexible**, **scalable**, and **robust** for the use in evaluation of residential energy efficiency programs. In addition, collect lessons learned from other utilities who have used these tools for the purposes of residential measurement & verification*

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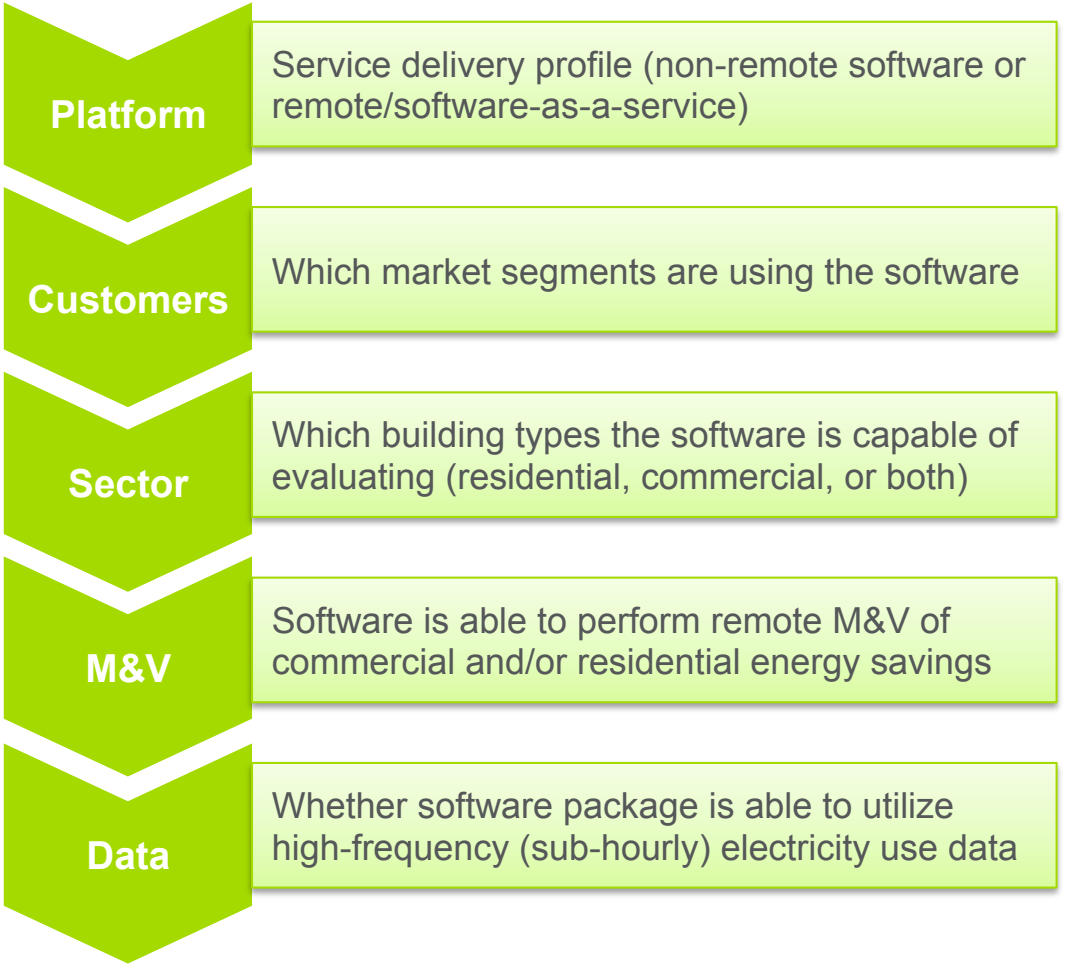
PHASE 1: OVERVIEW

DTE structured Phase 1 research to answer **three key questions**:

- What tools currently **exist**, how are they **used**, and which are of **greatest interest**?
- What **utilities** are using software-based M&V, for what **purposes** (evaluation or other), and what have their **experiences** been?
- How do **timeliness**, **accuracy**, and **measured savings** compare to **traditional evaluation**?



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PHASE 1: DATA COLLECTION

1

Literature Review
Review of academic publications, industry resources, press releases, journal articles, and research papers

2

Market Scan
Identification and profile of 20+ software packages with significant industry presence

3

Market Actor Interviews
Interviews with industry, utility, academic, and private research experts on remote M&V

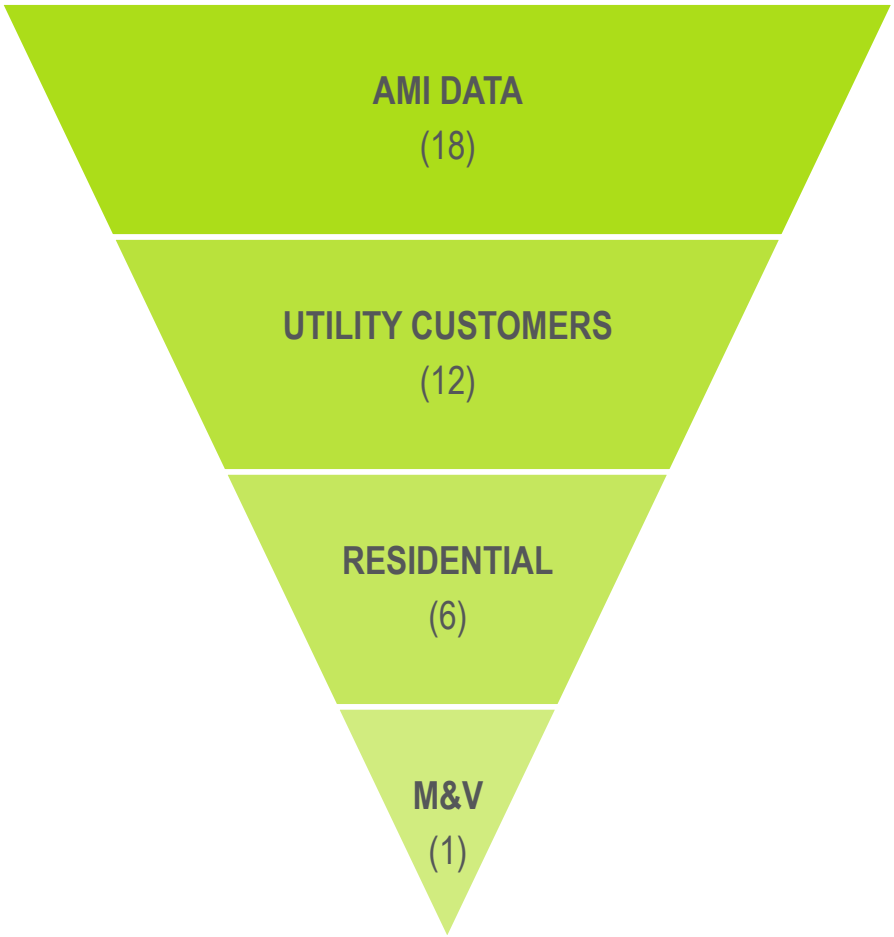
PHASE 1: MARKET SCAN

COMPANY[1]	PLATFORM	DATA	CUSTOMERS	SECTOR	M&V
EnergySavvy	Remote	< Hourly	Y	Both	Y
Opower	Remote	< Hourly	Y	Residential	N
FirstFuel	Remote	< Hourly	Y	Commercial	Y
Retroficiency	Remote	< Hourly	Y	Commercial	Y
PlotWatt	Remote	< Hourly	Y	Both	N
Bidgely	Remote	< Hourly	Y	Residential	N
Ecova	Remote	< Hourly	Y	Both	N
C3	Remote	< Hourly	Y	Commercial	N
BuildingIQ	Remote	< Hourly	Y	Commercial	Y
Eeme	Remote	< Hourly	Unknown	Residential	N
Energy Ai	Remote	< Hourly	Unknown	Commercial	N
UT3	Software (Free)	< Hourly	Y	Commercial	Y
EnerNOC	Remote	< Hourly	Y	Commercial	Y
UT3	Software (Free)	< Hourly	Y	Commercial	Y
kWIQly	Remote	< Hourly	Unknown	Commercial	N
Wegowise	Remote	< Hourly	Unknown	Commercial	Y
Aclara	Remote	< Hourly	Unknown	Commercial	N

PHASE 1: MARKET SCAN

DTE identified **21** software platforms to review as part of the Phase 1 market scan

- **Nearly all** (18) identified software tools used AMI data
- **Half** (12) claimed to have utility customers
- **Six** software platforms were used by utilities and were capable of evaluating residential buildings
- Only **one** capable of performing remote M&V on residential buildings



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PHASE 1: FINDINGS

1. The field of software platforms using AMI data is **crowded**, but the field is **changing rapidly**
2. There is little evidence of **utilities** using software to perform remote M&V
3. Current software offerings in this space are aimed at the **commercial** sector, and far fewer platforms are capable of evaluating residential AMI data
4. Most platforms focus on **creating energy savings** through customer targeting and engagement, rather than **measuring** energy savings
5. Questions remained as to the **cost** of various software platforms, the **timing** associated with launching a platform, and the **accuracy** or **precision** of such tools

PHASE 1: CONCLUSION

While some quantification of energy use and savings at scale is possible, **no software is capable of replacing traditional impact evaluation** of energy efficiency programs.

And, while there was **no clear example** of a platform with all the capabilities DTE was looking for, there was **enough evidence and promise** to move forward with Phase 2.

PHASE 2: OVERVIEW

Phase 2 Objective:

*Compare the **methodology**, **results**, **accuracy**, **usefulness** in program management, and **cost** between custom econometric M&V 2.0, software-based M&V 2.0, and traditional measurement & verification methods.*

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PHASE 2: TASKS

1. **Goal Setting**
   Determine goals, outcomes, and metrics for determining pilot success
2. **Program Selection**
   Determine two testbed programs with which to pilot M&V 2.0 approaches
3. **Vendor Selection**
   Draft and release RFP, and select software vendor to perform M&V 2.0 analysis
4. **Econometric Analysis**
   Run econometric analysis to determine impacts for testbed programs
5. **Software Analysis**
   Customize and launch software tool to perform remote M&V 2.0 analysis
6. **Evaluate Approaches**
   Evaluate results, accuracy, and usefulness of M&V 2.0 approaches

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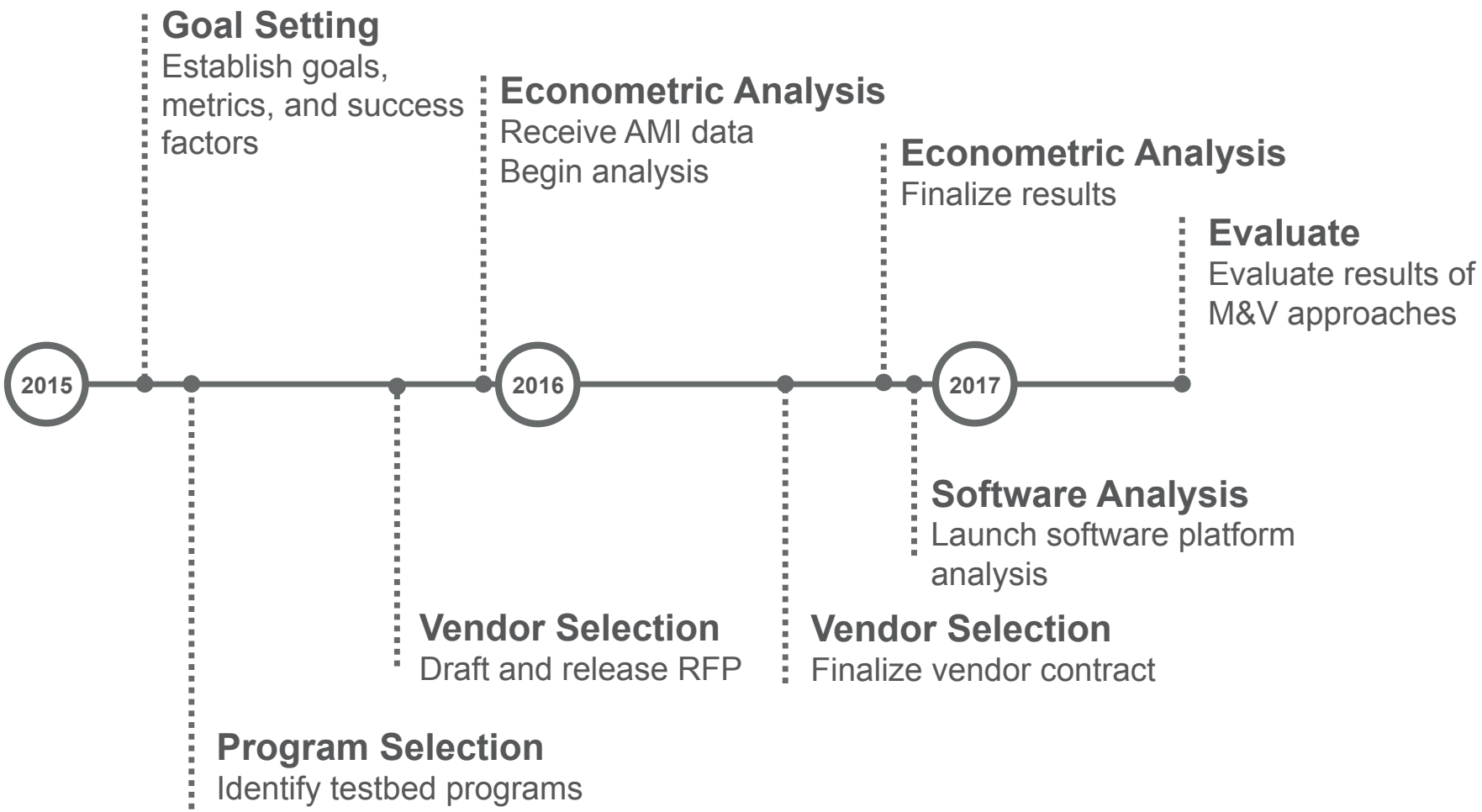
PHASE 2: TIMELINE



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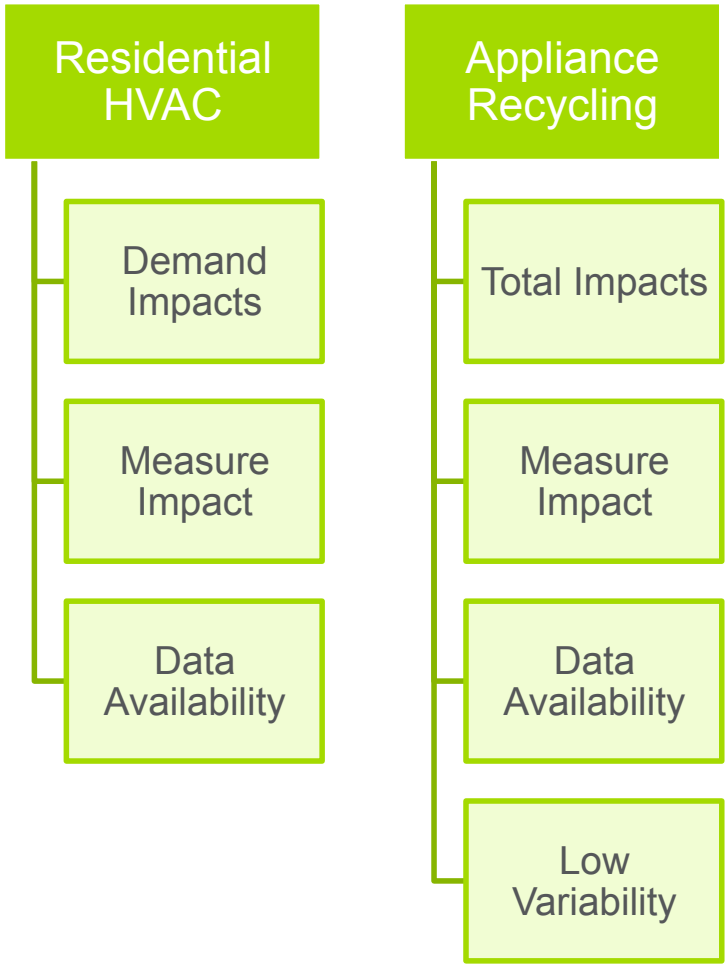
PHASE 2: INITIAL TESTBED PROGRAMS

- Significant time-sensitive savings, maximizing the value of M&V 2.0 analysis
- Significant volume of savings, addressing potential data volume concerns
- Large number of program participants, addresses potential data volume and scalability questions



- Large number of participants and volume of savings, addresses potential data volume, impact granularity, and scalability questions
- Significant amount of peak demand savings
- Lack of variable operating conditions for measures, creates ideal basis for methods comparison

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PHASE 2: FINAL TESTBED PROGRAMS

Residential HVAC

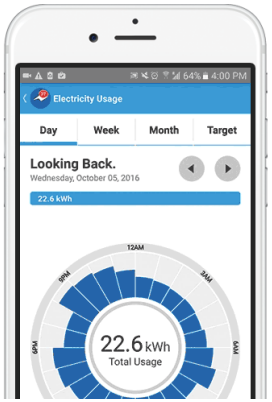
- Demand Impacts
- Measure Impact
- Data Availability

Appliance Recycling

- Total Impact
- Measure Impact
- Data Availability
- Low Variability

DTE Insight

- Deeper Insights
- Approach Consistency



- **Expanded learnings:** M&V 2.0 promises to provide deeper insight into how DTE Insight app engagement drives savings
- **Approach Consistency**: DTE Insight app is currently evaluated through a billing analysis, so M&V 2.0 analysis should be fairly consistent

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PHASE 2: VENDOR SELECTION

Released RFP due to **lingering uncertainty on price and scalability**

Respondents presented with a **list of required and desired capabilities** to determine what is “hype”, and what is not

Wide distribution, but initiations sent to specific vendors identified in Phase 1

Vendor selected, and contract finalized in late July 2016

Required Capabilities

- Determines energy & demand impacts
- Analyzes AMI data
- Web-accessible
- Customizable
- Scalable
- Generates reports
- Determines real-time and historical impacts
- Supports multiple program types

Desired Capabilities

- Analyzes gas consumption
- Analysis of program drivers
- Tracks workflow stages
- Easily customizable by DTE staff
- Minimal required training

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PHASE 2: DATA

Included

- Residential customers with single meter
- Hourly usage data at site level

Excluded

- Data for customers with agreements effective and terminated on the same day
- Data for customers who have an account terminated
- Data for customers with landlord agreements
- Data for customers who do not have a responsible person last name on record
- Data for non-DTE Energy customers

Project success hinged on access to AMI data

Leveraged **existing pathways** from behavior program to gain access to data

Data requested of **nearly all** DTE Energy residential customers to provide the most robust set of data for econometric and vendor analysis

Result was over 1.8 million data points each day on which analysis could be performed

PHASE 2: ECONOMETRIC ANALYSIS

Analysis selects the customers with the **lowest difference** in energy usage as matches

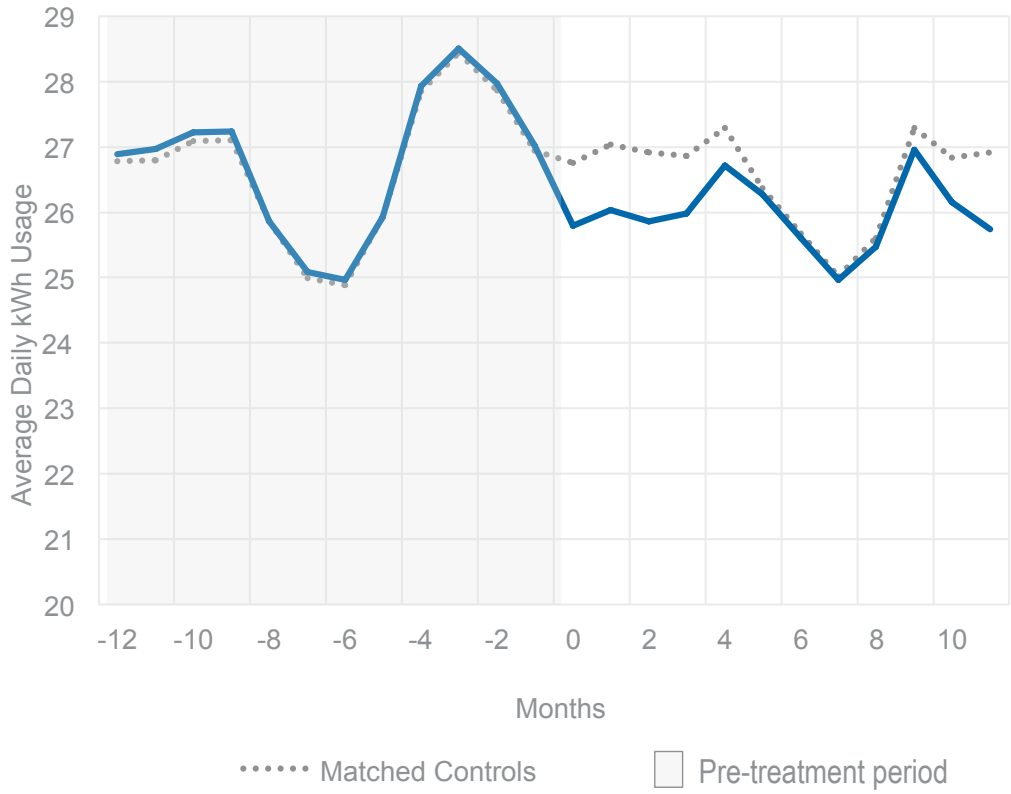
Effective matches show participants and non-participants with **nearly identical usage** prior to program participation

With a high enough quality match, change in a participant's electricity usage in the post-participation period can be **attributed to the program's effect**

Resulting impacts are presented as **net** savings or reduction

Pre- and Post-Participation Energy Use[1]

Matched control customer compared to program participant



[1] Example is meant to be illustrative, and does not represent per-participant savings

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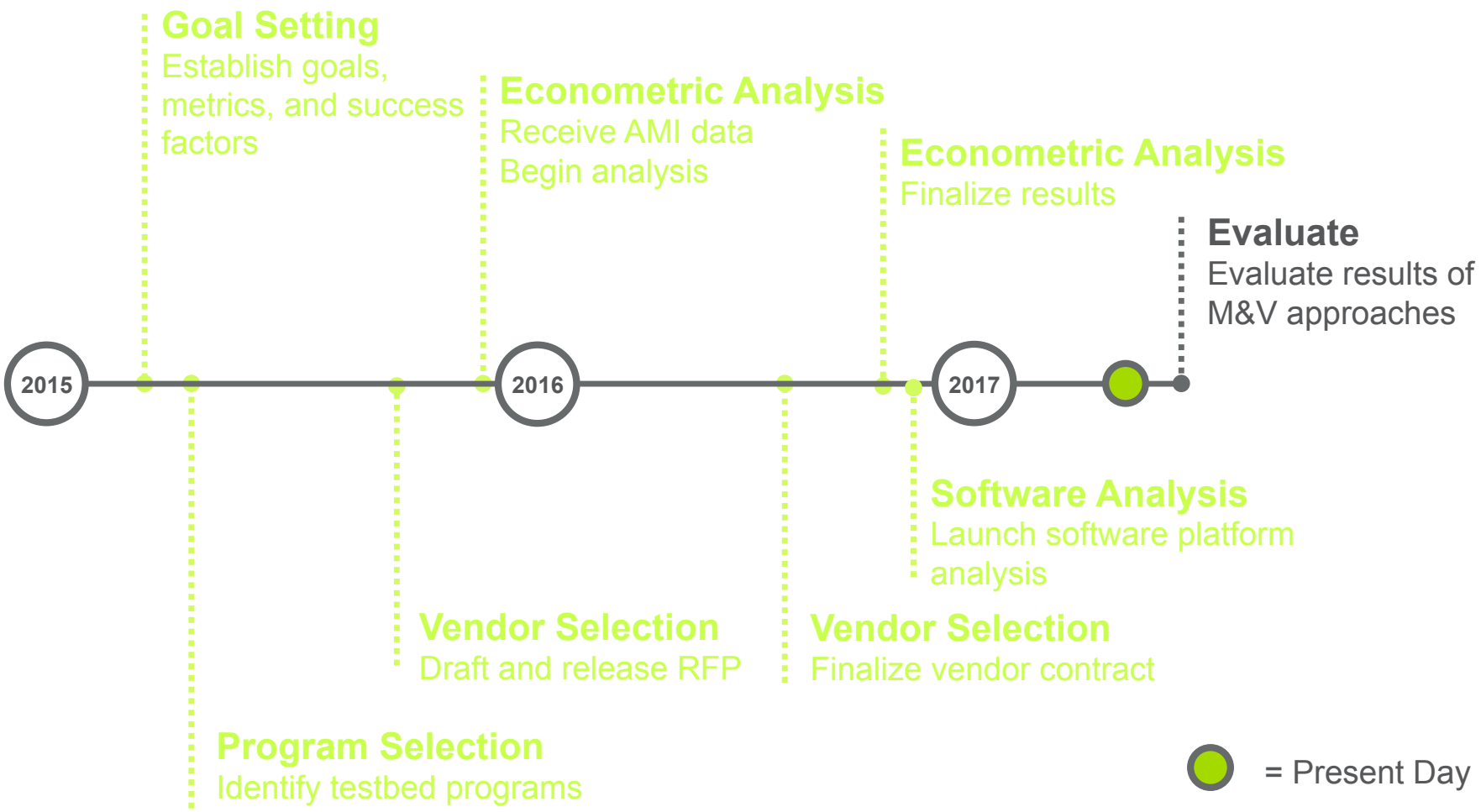
PHASE 2: REMAINING TIMELINE



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PHASE 2: RESULTS UNDER DEVELOPMENT

4

Econometric Analysis ✓

- ❑ Finalize electric savings results
- ❑ Determine demand savings
- ❑ Update results quarterly to compare against real-time vendor estimates

5

Software Analysis ✓

- ❑ Set up data flow between vendor and DTE Energy
- ❑ Design and customize vendor dashboard
- ❑ Launch vendor dashboard
- ❑ Review calculation methodology to ensure “apples-to-apples” comparison
- ❑ Perform historical M&V analysis for 2015 program year
- ❑ Create real-time results for 2016 and 2017 program years

6

Evaluate Approaches 

- ❑ Perform detailed review of vendor methodology
- ❑ Compare results and accuracy between M&V 2.0 methods
- ❑ Review overall usefulness of M&V 2.0 approaches outside of evaluation

PHASE 2: PRELIMINARY FINDINGS

Shhhhhhhhhhhhhhhh . . .

- Comparisons between econometric analysis and software results – similar, but not 100% (vendor precision somewhat overstated)
- M&V 2.0 will not replace traditional ex-post evaluation approaches, but it will supplement it
  - Provides greater operational visibility
  - Provides faster/real-time information
  - Provides granularity at contractor-level

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