Electric Distribution Investment and Maintenance Plans Stakeholder Meeting #5

Michigan Public Service Commission
Lake Michigan Hearing Room
November 19, 2019
9 AM – 12 PM

MPSC
Michigan Public Service Commission

Meeting Agenda

9:00 am	Welcome, Introduction, and Recap	Patrick Hudson, Manager, Smart Grid Section
9:10 am	Hosting Capacity Information: Levels of Detail and Costs *15 min per utility*	Consumers Energy DTE Indiana Michigan Power
9:55 am	Non-Wires Alternatives: Qualified Projects and Percentage of Total *15 min per utility*	Consumers Energy DTE Indiana Michigan Power
10:40 am	Break	
10:50 am	Definitions of NWA and Hosting Capacity	MPSC Staff
11:00 am	Discussion: A Framework for Non-Wire Alternatives	Facilitator: Patrick Hudson
11:35 am	Responses to Comments regarding Standard Distribution Plan Components	All Utilities
11:40 am	Response to Comments on Benefit Cost Framework and/or Pilot Proposals	Consumers Energy Indiana Michigan Power
11:55 am	Closing Statements / November 19 Stakeholder Session Overview	MPSC Staff
12:00 pm	Adjourn	

Distribution Planning Recap

- June 27, 2019
  - Modern Distribution Planning
  - Load & DER Forecasting
  - Non-Wires Alternatives
  - Hosting Capacity
  - Cost Benefit Analysis
- August 14, 2019
  - Cost Benefit Analysis
  - Risk Informed Decision Making/Performance Metrics
  - Regulatory Innovations with Operating Expenses
  - Preliminary Look at Utility Pilots
- September 18, 2018
  - Reliability & Resilience Metrics
  - Michigan Utility Reliability Reports
  - Hosting Capacity
  - Integrated Distribution Planning
  - Utility Pilot Proposal Comments
  - Discussion on Resilience in Michigan
- October 16, 2019
  - Consistent data across utilities for future distribution plans
  - Further discussion about benefit-cost analysis
  - Laura Sherman, MIEIBC: 3rd party uses of HCA (panel discussion)
  - Paul DeMartini: DSPx process and NWA analysis
  - Johana Mathieu, U of M: DER coordination with NWA

Hosting Capacity Analysis Pilot
DTE and Consumers Energy

November 19, 2019

Costs can vary among different levels of hosting capacity analysis, based on joint-utility analysis, industry benchmarks and RFP responses

Level	Approach	Upfront Cost Range[1]	Cost Basis	Level of Details	Accuracy
Area Based Assessment	General attributes such as substation and feeder voltage, design limits, three-phase vs single phase, miles from substation	$0.5 – 1 M	Utility analysis	Low	Low
Feeder Based Qualitative Assessment	Feeder level assessments including loading conditions, voltage regulation and feeder protection	$2 – 3 M	RFP	Medium	Low
Feeder Based Model Assessment	Power flow model on feeder basis, including initial model clean up for the power flow to solve	~$10 M	RFP	High	Medium
Feeder Based Model Assessment with verification	Power flow model on feeder basis, including field verification, phasing identification, hourly data and validation of results	~$40 M	Utility analysis & industry benchmark	High	High

1. Represents magnitude of upfront cost range. Maintenance costs can vary significantly depending on complexity of the analysis, frequency of the updates, and growth of DER resources

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To inform the next step on Hosting Capacity Pilot, DTE recently issued a request for proposal (RFP)

- A multiple tiered approach with increasing rigor and detail was asked for at a pilot and at a system level (~4,000 feeders)
  - A qualitative assessment at an area or feeder level
  - A model study at a feeder level
  - A model study at a feeder protective zone level
  - A model study at a line segment level
- Pricing includes model clean up to ensure the model solves with reasonable results
- Vendor provided DTE the data requirements for successful execution of the HCA
- HCA to be rerun when a circuit is modified, generation added or at least once every three years
- Pricing does not include model field verification, which would be required for frequent updates and high DER penetration

While Consumers Energy did not participate in the RFP discussed, it supports the scope and cost information presented as it aligns with Consumers Energy's experience and its own internal estimates

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There are a few learnings from the RFP response

- Two methods were proposed by vendors, EPRI DRIVE or CYME ICA analysis
- Costs were heavily dependent on volume of circuits processed; Doing a circuit at a time was substantially more expensive
- The level of effort and therefore cost, for a model based study was the same for all three options, feeder, zone, line.
- Quality of the model based zone and especially the line level was greatly influenced by accuracy of the model to the field conditions

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Additional observations were made from utilities doing HCA

- Data accuracy is directly tied to results at all levels of study
- The tools are still under constant development and improvement
  - HCA on networked systems (such as Subtransmission system or downtown AC network) is uncommon and is achieved using traditional study methods
  - HCA does not typically include switching points, which are important factors to consider in interconnection studies
- Utilization rates and audience for hosting capacity are unclear
- HCA is not a replacement for studies when assessing a specific project impact to other customers and when determining upgrades.

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Hosting Capacity Analysis – I&M Perspective

Hosting Capacity Analysis is not necessary for I&M customers:

- The DER Penetration on the I&M MI System is very low (~0.1% of customers).
- I&M has not had any trouble accommodating small requests like residential and small commercial and we do not anticipate any trouble in near future.
- We are introducing Power Clerk which will further improve and streamline the process for DER application – especially the small ones.
- A preliminary review process for larger applications is in place to answer developer questions with limited analysis and time required. This process can focus on answering the needed questions for the needed opportunities being considered. This can be a low cost review paid by the developers and avoiding the high cost of HCA to be born by customers.
- HCA will be costly for I&M given the present data availability and the time required to make workable CYME studies which are the base study used to do the HCA. Since the circuits are dynamic periodic updates will be needed resulting in an on-going cost for customers.

Non-Wires Alternatives: Potential Opportunities

Doug Chapel

November 19, 2019

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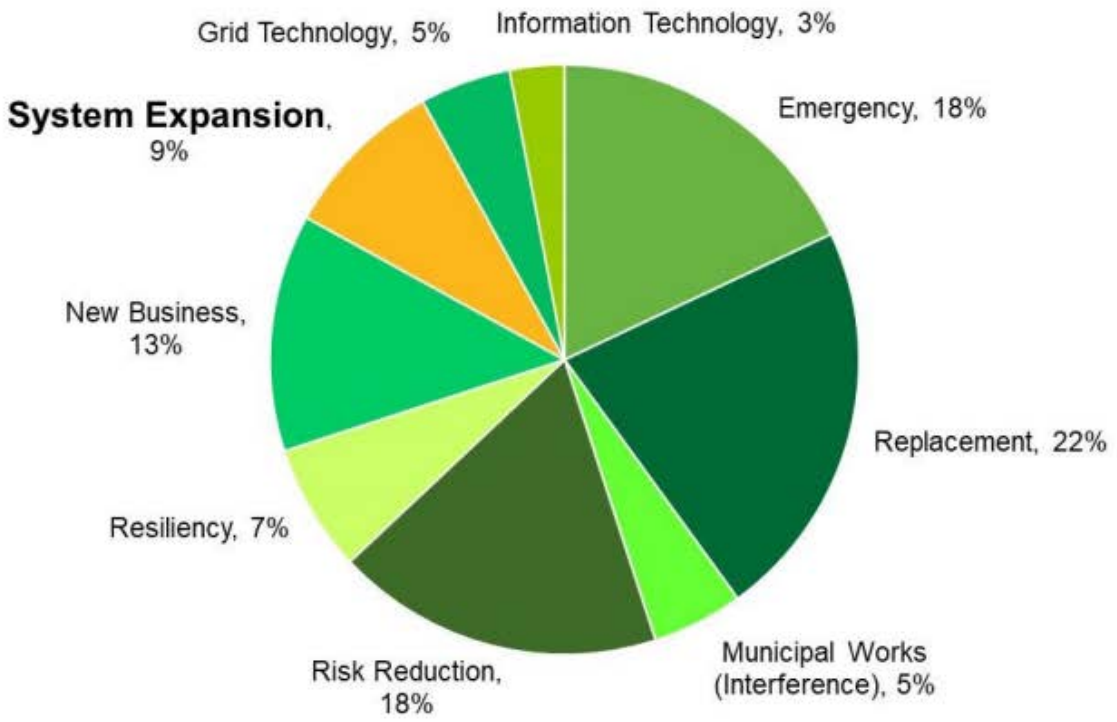
Non-Wires Alternatives: Industry Experience

To-date NWAs nationally have focused on System Expansion projects driven by load growth and/or increasing hosting capacity



Illustrative Example of Utility 5-year T&D Capital Plan

[1] Paul De Martini; presentation to workgroup, 10/16/2019

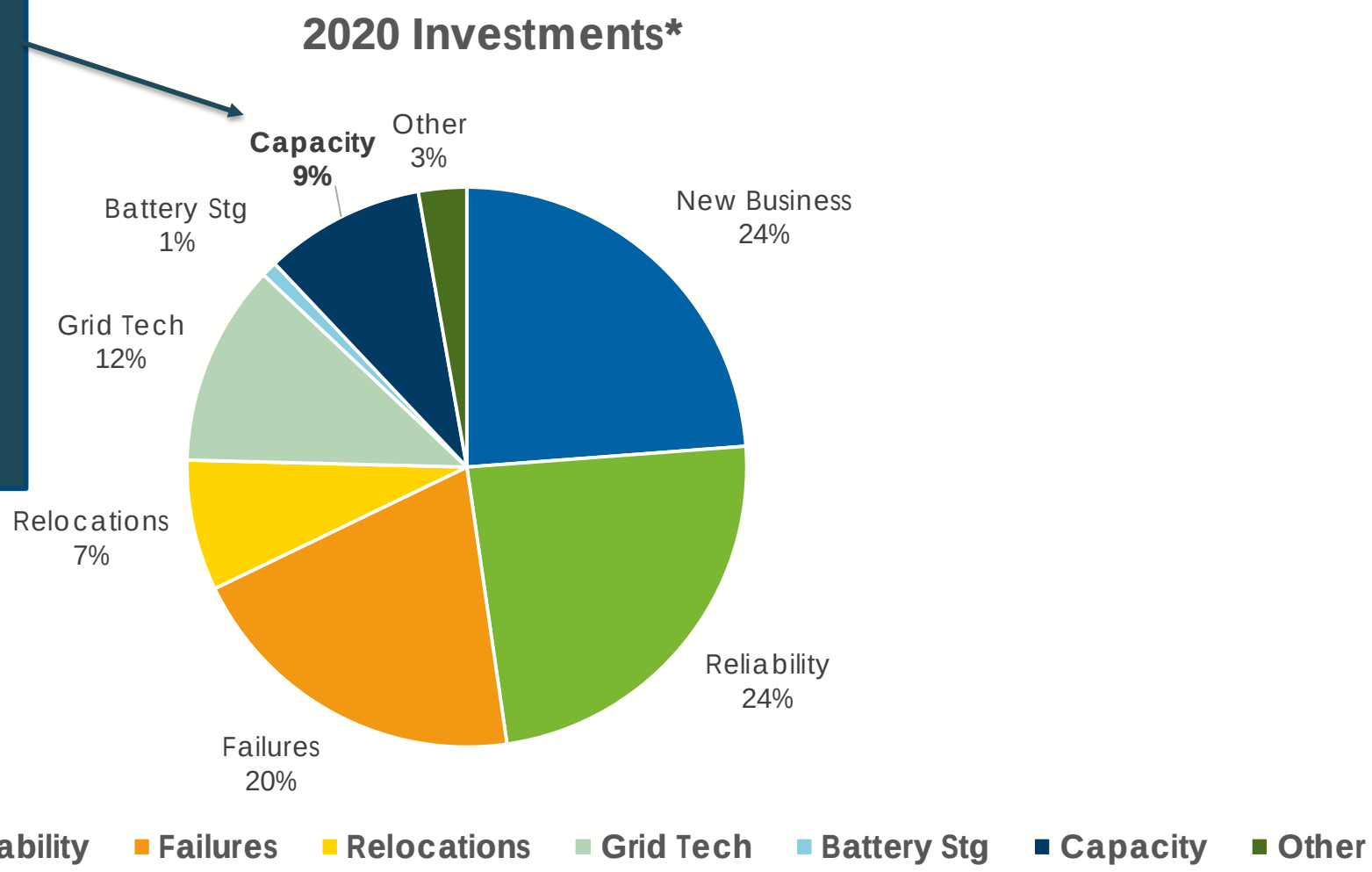
Non-Wires Alternatives: Consumers Energy Potential

Potential NWAs limited to load-growth capacity projects

- ~9% of 2020 capital spending

NWAs further limited by suitability criteria:

- Load relief needed
- Deferrable cost
- Lead time
- Customer mix



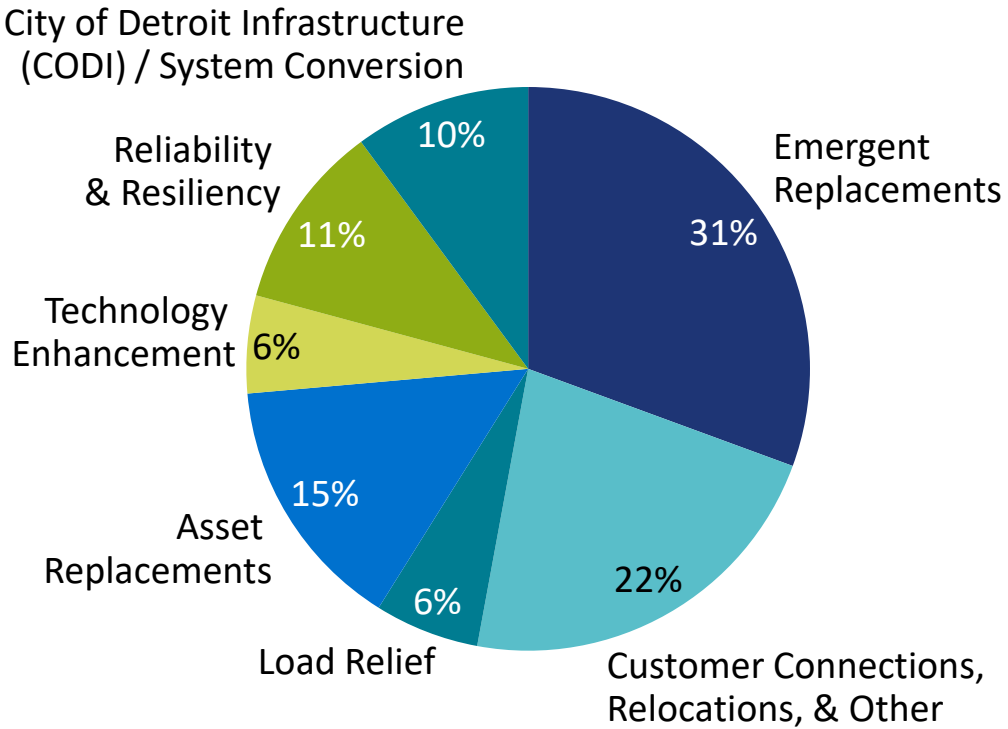
Indicative 2020 capital spending

Utility Investment Portfolio – NWA Considerations

MPSC Collaborative on Electric Distribution Investment and Maintenance Plan

November 19, 2019

Typical DTE Distribution Investment Portfolio



Category	Examples
Load Relief	Ann Arbor System Improvements, Prospect Substation Expansion, Sigma / Grayling Substation
Asset Replacements	Pole/Pole Top, Breaker, Disconnect and Switcher, URD, Cable, Relay
Technology Enhancement	ADMS, SOC, AMI, Telecommunication, Automation
Reliability & Resiliency	4.8kV Hardening, Frequent Outage
CODI / System Conversion	Charlotte Network Upgrade, I-94/Promenade, Lapeer/Elba

Not all the projects in load relief category are good candidates for non wire alternatives

Key Considerations	Description
Other Drivers / Benefits	Projects bring additional benefits such as replacing aging, at risk assets and address reliability concerns. Examples include Ann Arbor System Improvement project that not only provides load relief, but also addresses area wide reliability and power quality concerns
Amount of Overload	Projects address large amount of overload / overfirm, which is difficult to be addressed by NWA. Analysis and early results on the NWA pilots and lessons learned from other utilities' experience indicate limitation in NWA load relief
Timeline of the Need	NWA usually requires 3-5 years for full implementation. Some load relief projects need to be done within much shorter time period due to critical loading conditions. Examples include Prospect Transformer Replacement
Economics / Costs	Projects involving load transfer or phase balancing are effective low cost options to address localized loading issues, making them less desired candidates for NWAs

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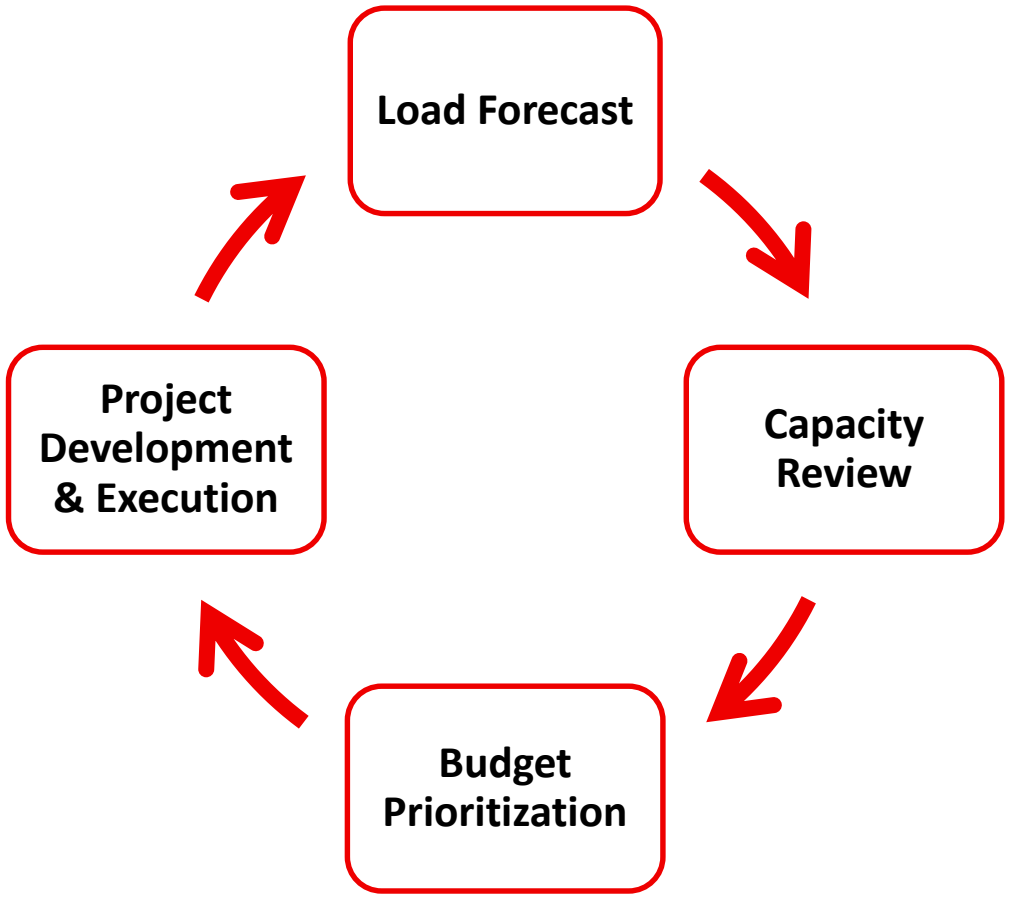
I&M
Non-Wires Alternative

Michigan Public Service Commission
Five-Year Distribution Planning
November 19, 2019

Distribution System Planning

Annual Distribution System Planning Cycle



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Planning Process Overview

1. Planning populates load forecast with the latest seasonal metering data.
2. Planning hosts load forecast meetings with I&M operations personnel to incorporate new development information.
3. Planning reviews load and reliability impacts for each station and circuit and develops high level solutions, including traditional, non-wires, and Grid Modernization alternatives.
4. Planning reviews and coordinates with new and existing Smart Grid deployments/plans to ensure the capacity upgrade plan is designed efficiently and proactively to accommodate new technologies.

Planning Process Overview (Cont'd)

5. Planning develops high level budget forecasts for I&M funding allocation discussions.
6. Planning hosts annual meeting to discuss upcoming T&D project work plans to determine any crossover opportunities and longer range planning.
7. Planning hosts a meeting with T&D personnel to discuss the ten-year distribution capacity plan and solicit feedback.
8. Planning develops projects for submission and internal authorization by I&M.

Non Wires Alternative (NWA) Considerations

Capacity Deferral

- Low customer growth
- Future load growth questionable
- Future T&D plans uncertain/evolving
- Area not likely to get block loads
- Traditional project mostly capacity addition with little incremental reliability improvement (e.g., new station, transformer, feeders)
- Traditional project has long lead time
- Hybrid capacity and reliability project
- Automated circuit reconfiguration with limited capacity

Reliability

- Parts of circuits needing reliability improvement requiring costly traditional project (e.g., long feeder project, new station/T line)
- Automated or manual backup ties available but capacity constrained in peak load periods
- Parts of circuits with critical loads (e.g., water/sewer, emergency operations centers, industrial customers with critical processes)

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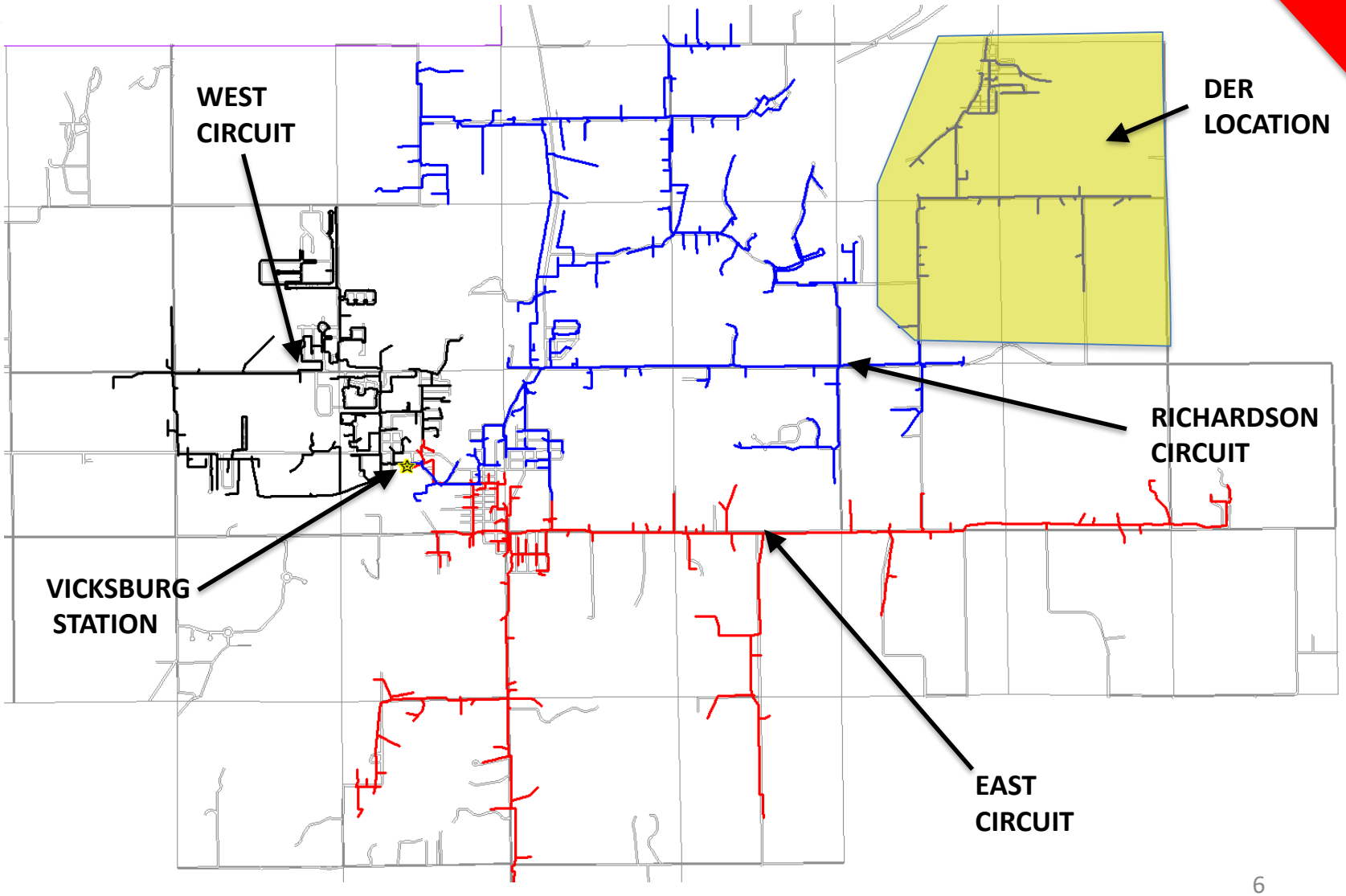
PRELIMINARY

Vicksburg Richardson circuit

Vicksburg Station

- Richardson Circuit
- Serves 358 Premises Downstream of Recloser KA0571000016 (Mostly Residential, 1 Elementary School, 1 Church)

Customer perspective: This solution would have eliminated 4 outages in the last 3 years, representing a total of 20.5 hours



Vicksburg Pilot - Equipment

- 0.5 Acre lot
- 2 x 800kW Generators, Natural Gas
- Switchgear
- Battery system with Inverter
- Microgrid Controller
- Additional Reclosers
- Load Balancing

Vicksburg Pilot - Loads

- 358 Premises
  - 6 Commercial
  - 352 Residential
- Peak Load – 1226 kW
- Minimum Load – 237 kW

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Summary

- I&M has a well established Annual Distribution System Planning Cycle utilizing Multi-Year Load and Project Forecasts.
- The Planning Process includes interaction with Transmission Planning, Distribution Customer Services, Distribution Operations, and I&M Management.
- The Planning process considers NWA, DER, Energy Storage, Smart Circuits and Grid Modernization.

MORNING BREAK
10:40 – 10:50 AM

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Definitions: Hosting Capacity and Non-Wires Alternatives

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Hosting Capacity Definition

The term “hosting capacity” refers to the amount of distributed energy resources (DER’s) that can be accommodated on the distribution system at a given time and at a given location under existing grid conditions and operations, without adversely impacting safety, power quality, reliability or other operational criteria, and without requiring significant infrastructure upgrades.

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Proposed Hosting Capacity Definition

- Amount of distributed energy resources that can be accommodated without adversely impacting operational criteria, such as power quality, reliability, and safety, under existing grid control and operations and without requiring infrastructure upgrades.

Locational Value Assessment Definition

- Locational value assessment is intended to quantify the benefits and costs of DER, which are often locational in nature.
  - U.S. DOE Office of Electricity. (2018). Integrating Distribution Planning: Utility Practices in Hosting Capacity Analysis and Locational Value Assessment.

Non-Wires Alternatives (NWA) Definitions

- An electricity grid investment or project that uses non-traditional transmission and distribution (T&D) solutions, such as distributed generation (DG), energy storage, energy efficiency (EE), demand response (DR), and grid software and controls, to defer or replace the need for specific equipment upgrades, such as T&D lines or transformers, by reducing load at a substation or circuit level.
  - Navigant definition
  - Used in:
    - Exploring Programs and Policies for Deep Energy Efficiency Opportunities, Jennifer Potter, Commissioner for Hawaii Public Utilities Commission, November 2018
    - Smart Electric power Alliance, Peak Load Management Alliance, and E4TheFuture. (2018). Non-wires alternatives: Case Studies from Leading U.S. Projects.

- Investments in energy efficiency, demand response, distributed generation and storage that provide specific services at specific locations in order to defer, mitigate or eliminate the need for traditional distribution infrastructure investments
  - GRID Modernization Laboratory Consortium, U.S. Department of Energy, June 2018

- A portfolio of distributed energy resources (DER) such as energy efficiency (EE), demand response (DR), solar PV, battery energy storage (BES), combined heat and power (CHP) etc. that can be used to help provide grid needs
  - Non-Wires Alternatives, ICF Resources, LLC, June 2019

- Portfolios of distributed energy resources in specific locations that defer or eliminate an investment in traditional and costlier “wires-and-poles” infrastructure…[that] can deliver ratepayers cost savings and support the integration of smart customer-centered technologies that promote a cleaner, more flexible, and more resilient grid.
  - Rocky Mountain Institute: The Non-Wires Solutions Implementation Playbook: A Practical Guide for Regulations, Utilities, and Developers
  - For non-wires solutions

- Projects [that] allow utilities to defer or avoid conventional infrastructure investments by procuring distributed energy resources (DER) that lower costs and emissions while maintaining or improving system reliability.
  - New York REV Connect https://nyrevconnect.com/non-wires-alternatives/

- Any nontraditional measure aimed at deferring, mitigating, or eliminating the need for traditional utility transmission and distribution investments.
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- A portfolio of distributed energy resources (DER) such as energy efficiency (EE), demand response (DR), solar PV, battery energy storage (BES), combined heat and power (CHP) etc. that can be used to help provide grid needs
  - Non-Wires Alternatives, ICF Resources, LLC, June 2019

- Portfolios of distributed energy resources in specific locations that defer or eliminate an investment **in traditional and costlier "wires-and-poles" infrastructure**…[that] can deliver ratepayers cost savings and support the integration of smart customer-centered technologies that promote a cleaner, more flexible, and more resilient grid.
  - Rocky Mountain Institute: The Non-Wires Solutions Implementation Playbook: A Practical Guide for Regulations, Utilities, and Developers
  - For non-wires solutions

- Projects [that] allow utilities to defer or avoid **conventional infrastructure investments** by procuring distributed energy resources (DER) that lower costs and emissions while maintaining or improving system reliability.
  - New York REV Connect https://nyrevconnect.com/non-wires-alternatives/

- Any nontraditional measure aimed at deferring, mitigating, or eliminating the need **for traditional utility transmission and distribution investments**.
  - GTM Research https://www.greentechmedia.com/articles/read/gtm-research-non-wires-alternatives-market

Non-Wires Alternatives (NWA) Definitions

- An electricity grid investment or project that uses non-traditional transmission and distribution (T&D) solutions, such as distributed generation (DG), energy storage, energy efficiency (EE), demand response (DR), and grid software and controls, to defer or replace the need for specific equipment upgrades, such as T&D lines or transformers, **by reducing load at a substation or circuit level**.
  - Navigant definition
  - Used in:
    - Exploring Programs and Policies for Deep Energy Efficiency Opportunities, Jennifer Potter, Commissioner for Hawaii Public Utilities Commission, November 2018
    - Smart Electric power Alliance, Peak Load Management Alliance, and E4TheFuture. (2018). Non-wires alternatives: Case Studies from Leading U.S. Projects.

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- Any nontraditional measure aimed at deferring, mitigating, or eliminating the need for traditional utility transmission and distribution investments.
  - GTM Research https://www.greentechmedia.com/articles/read/gtm-research-non-wires-alternatives-market

Proposed Non-Wire Alternatives Definition

- A portfolio of distributed energy resources, such as distributed generation, energy storage, energy efficiency, demand response, combined heat and power, and grid software and controls, used to defer, mitigate, or eliminate the need for traditional utility infrastructure investments.

Discussion: A Framework for Non-Wire Alternatives

Electric Distribution Investment and Maintenance Plans Stakeholder Meeting

Michigan Public Service Commission
Lake Michigan Hearing Room
November 19, 2019

MPSC
Michigan Public Service Commission

Responses to Comments regarding Standard Distribution Plan Components

Electric Distribution Investment and Maintenance Plans Stakeholder Meeting

Michigan Public Service Commission

Lake Michigan Hearing Room

November 19, 2019

MPSC

Michigan Public Service Commission

Response to Comments on Benefit Cost Framework and/or Pilot Proposals

Electric Distribution Investment and Maintenance Plans Stakeholder Meeting

Michigan Public Service Commission

Lake Michigan Hearing Room

November 19, 2019

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Closing Comments

Electric Distribution Investment and Maintenance Plans Stakeholder Meeting

Michigan Public Service Commission
Lake Michigan Hearing Room
November 19, 2019

MPSC
Michigan Public Service Commission

Staff Report Outline

- Executive Summary
- Introduction
- Background
  - Purpose of stakeholder process
- Summary of stakeholder process
  - Stakeholder meetings and comments
- Staff recommendations
- Draft framework for future plans
- Conclusions
- Appendix
  - Stakeholder comments submitted to docket will be included in appendix.

Staff Report Timeline

- February 5, 2020 — Draft staff report posted to docket for stakeholder comments
- March 5, 2020 — Deadline for stakeholder comments on draft staff report
- April 1, 2020 — Final staff report deadline.