



CenterPoint's Insight-to-Action Development with SAP PdMS

Dan Greenwood, Asset Management Consultant, CenterPoint Energy
Oliver Mainka, Product Manager, SAP

Session ID 84572

About the Speakers

Dan Greenwood

- Asset Management Consultant, CenterPoint Energy
- Dan has more than 20 years of experience in the Electric Utility Industry which includes various roles both within the industry and as a consultant.
- I water skied when I was younger and actually received a college scholarship to water ski competitively.

Oliver Mainka

- Product Manager, SAP
- “SAP Lifer” since 1990. Responsible for parts of the PdMS product. Also the SAP point of contact for the ASUG EAM SIG.
- I have been writing an almost daily photo email to family and friends in Germany and the USA since 2001

Agenda

Brief Introduction to SAP Intelligent Asset Management (IAM) and SAP Predictive Maintenance and Service (PdMS)

Introduction to CenterPoint Energy and its asset management practices

Business value case

Applying PdMS to Underground Residential Distribution (URD) equipment

Project lessons learned / results and benefits

Outlook for our future with SAP PdMS

Invitation to influence SAP on PdMS / join the ASUG SIG EAM

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SAP Intelligent Asset Management



Asset Network and Collaboration

SAP Asset Intelligence Network (AIN)



Asset Strategy and Performance

SAP Asset Strategy and Performance Management (ASPM)



Asset Health Prediction and Optimization

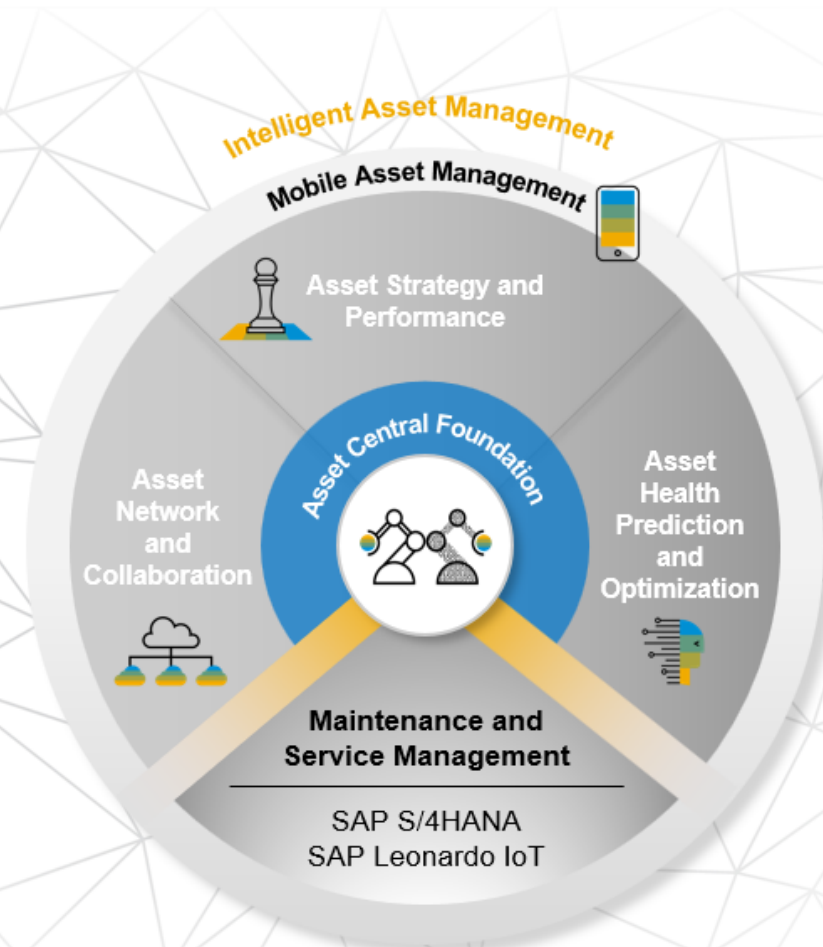
SAP Predictive Maintenance and Service (PdMS)

SAP Predictive Engineering Insights Enabled by ANSYS (PEI)

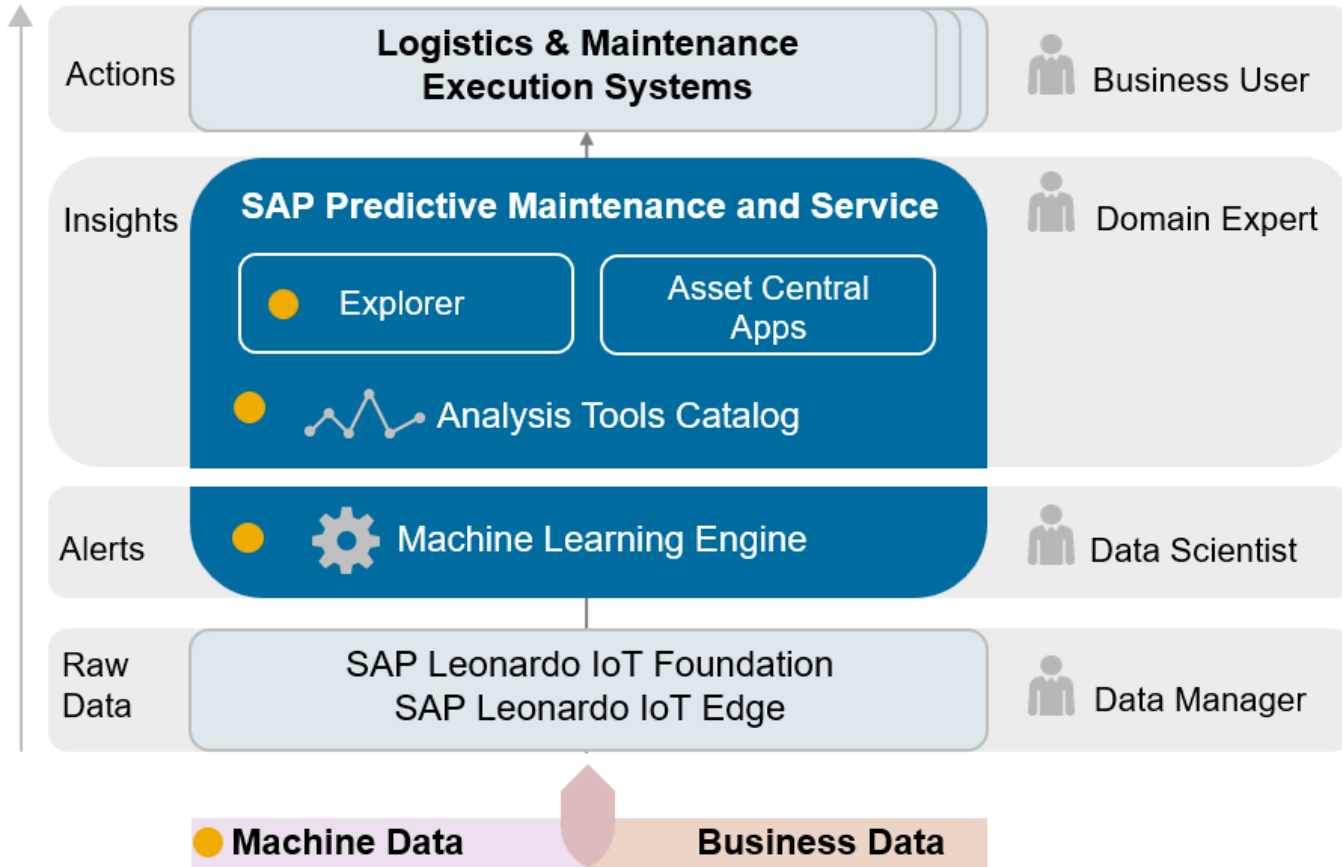


Mobile Asset Management

SAP Asset Manager

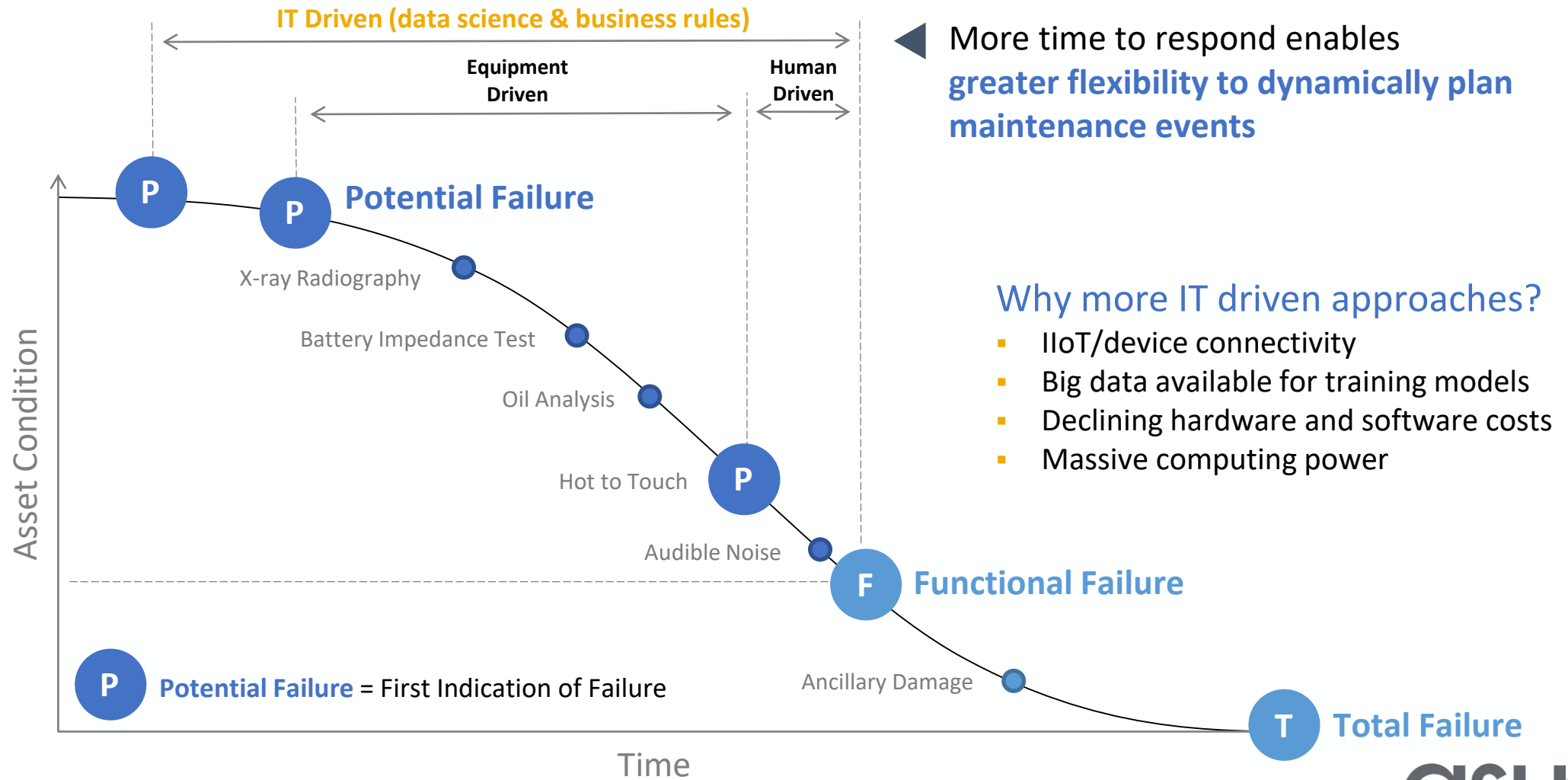


SAP Predictive Maintenance and Service



- Enables a **data science driven approach** to condition monitoring
- Flexible **extension concept** for customers to build industry or customer specific models and analytics
- A scalable **Machine Learning Engine** that drives data science insights into our business processes
- **Flexible visualizations** across equipment structures
- End-to-end process integration... **Alert, Discover, Remedy**

Predictive Maintenance Enables Earlier Issue Detection

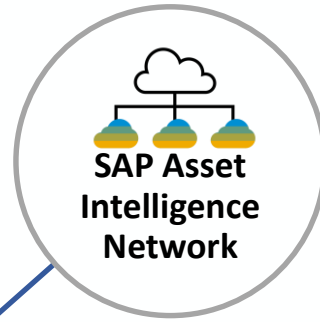


SAP Predictive Maintenance and Service

E2E process integration



Part of a comprehensive asset management portfolio



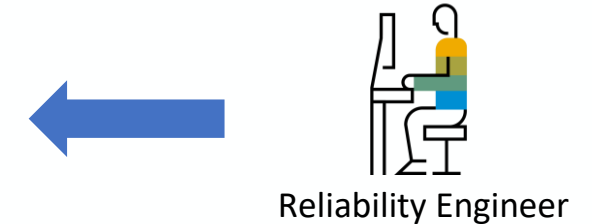
- Share asset health indicators with operators/customer



SAP Predictive Maintenance and Service



- Assess asset health indicators and real-time performance to determine maintenance strategy effectiveness



- Monitor asset condition and health indicators to prioritize work and plan resources (tools, parts, tech pubs)



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Cautionary Statement

This presentation and the oral statements made in connection herewith contain statements concerning CenterPoint Energy, Inc.'s ("our," "CenterPoint Energy," or the "Company") expectations, beliefs, plans, objectives, goals, strategies, future operations, events, financial position, earnings, growth, costs, prospects, capital investments or performance or underlying assumptions (including future regulatory filings and recovery, liquidity, capital resources, balance sheet, cash flow, capital investments and management, financing costs, and rate base or customer growth) and other statements that are not historical facts. These statements are "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. You should not place undue reliance on forward-looking statements. Actual results may differ materially from those expressed or implied by these statements. You can generally identify our forward-looking statements by the words "anticipate," "believe," "continue," "could," "estimate," "expect," "forecast," "goal," "intend," "may," "objective," "plan," "potential," "predict," "projection," "should," "target," "will," or other similar words. The absence of these words, however, does not mean that the statements are not forward-looking.

Examples of forward-looking statements in this presentation include statements about our anticipated capital investments, among other statements. We have based our forward-looking statements on our management's beliefs and assumptions based on information currently available to our management at the time the statements are made. We caution you that assumptions, beliefs, expectations, intentions, and projections about future events may and often do vary materially from actual results. Therefore, we cannot assure you that actual results will not differ materially from those expressed or implied by our forward-looking statements.

Some of the factors that could cause actual results to differ from those expressed or implied by our forward-looking statements include but are not limited to the timing and impact of future regulatory, legislative and IRS decisions, financial market conditions, future market conditions, economic and employment conditions, customer growth, Enable's performance and ability to pay distributions, and other factors described in the Company's Form 10-K for the period ended December 31, 2017 under "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations—Certain Factors Affecting Future Earnings" and in other filings with the Securities and Exchange Commission ("SEC") by the Company, which can be found at www.centerpointenergy.com on the Investor Relations page or on the SEC's website at www.sec.gov.

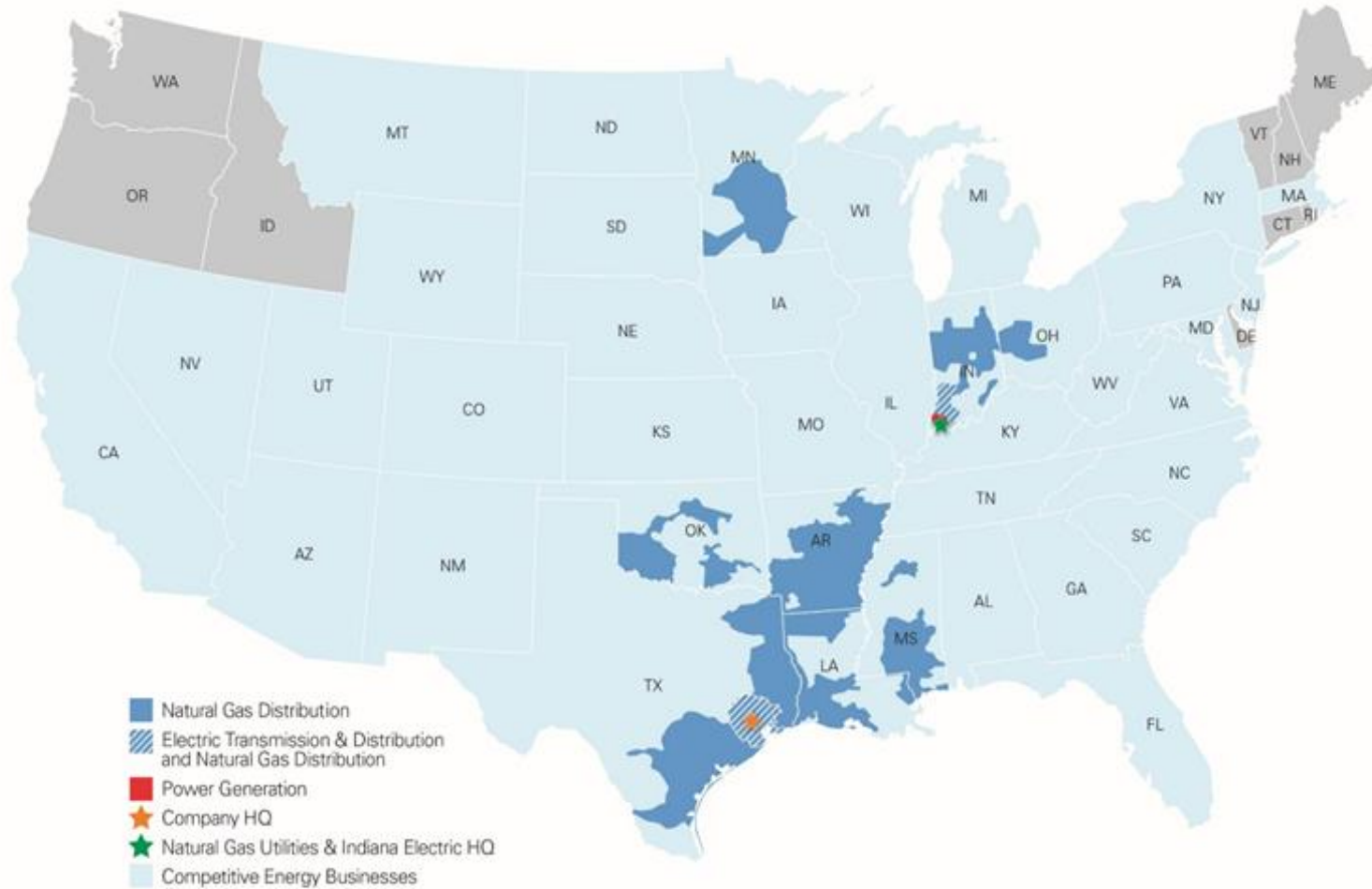
This presentation contains time sensitive information that is accurate as of the date hereof (unless otherwise specified as accurate as of another date). Some of the information in this presentation is unaudited and may be subject to change. We undertake no obligation to update the information presented herein except as required by law. Investors and others should note that we may announce material information using SEC filings, press releases, public conference calls, webcasts and the Investor Relations page of our website. In the future, we will continue to use these channels to distribute material information about the Company and to communicate important information about the Company, key personnel, corporate initiatives, regulatory updates and other matters. Information that we post on our website could be deemed material; therefore, we encourage investors, the media, our customers, business partners and others interested in our Company

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Website



CenterPoint Energy: An Electric & Natural Gas Utility



Electric Transmission & Distribution
and Power Generation



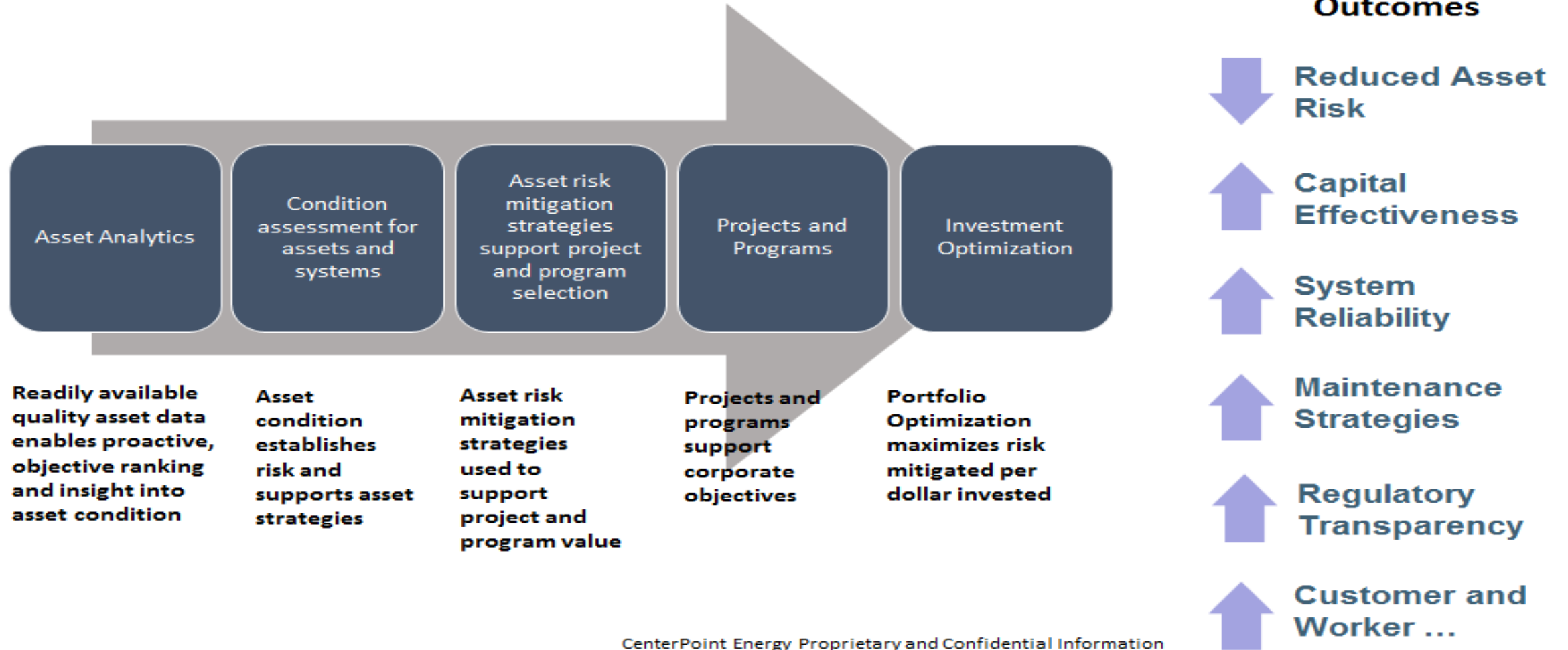
Natural Gas Distribution



Competitive Energy Businesses

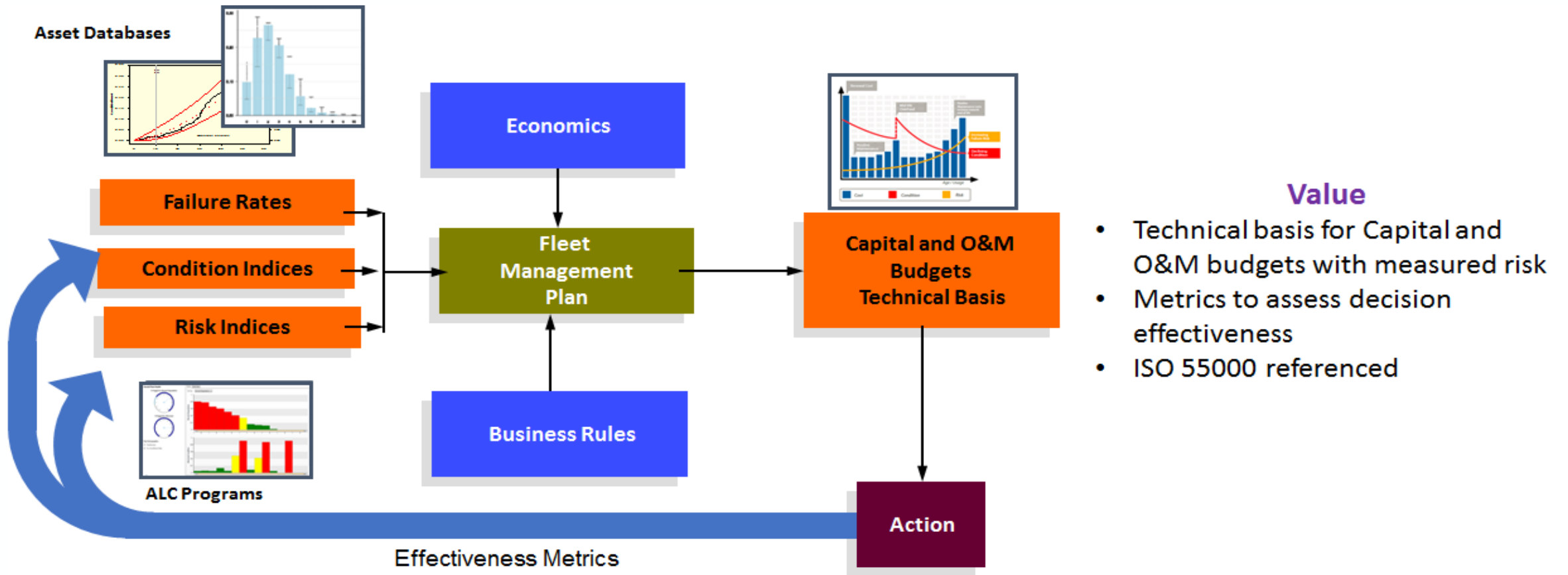


Asset Management Enables Us To Achieve Corporate Objectives



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Asset Management Process Strategy



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Business Value – SAP Predictive Maintenance and Service

Moving to an Asset Health Application shifts a historically reactive asset and outage management approach to a more proactive, predictable, efficient process for managing O&M and Capital.

PdMS on SAP HANA

- **Operational Efficiency** - Better Planning and Execution and optimizing field work
- **Reliability** - More Effective Monitoring and Proactive Maintenance impacting employee utilization
- **Safety** - Understanding and Mitigating Hidden Risks providing enhanced field work management and crew preparation

- Integrating Multiple Sources of Data
- Flexible access to data closer to real time improves decision making
- The speed and flexibility to perform analysis whenever and as often as possible
- Predictive engine to compute Asset Health score
- Integration to SAP ECC allows work order creation based on insight

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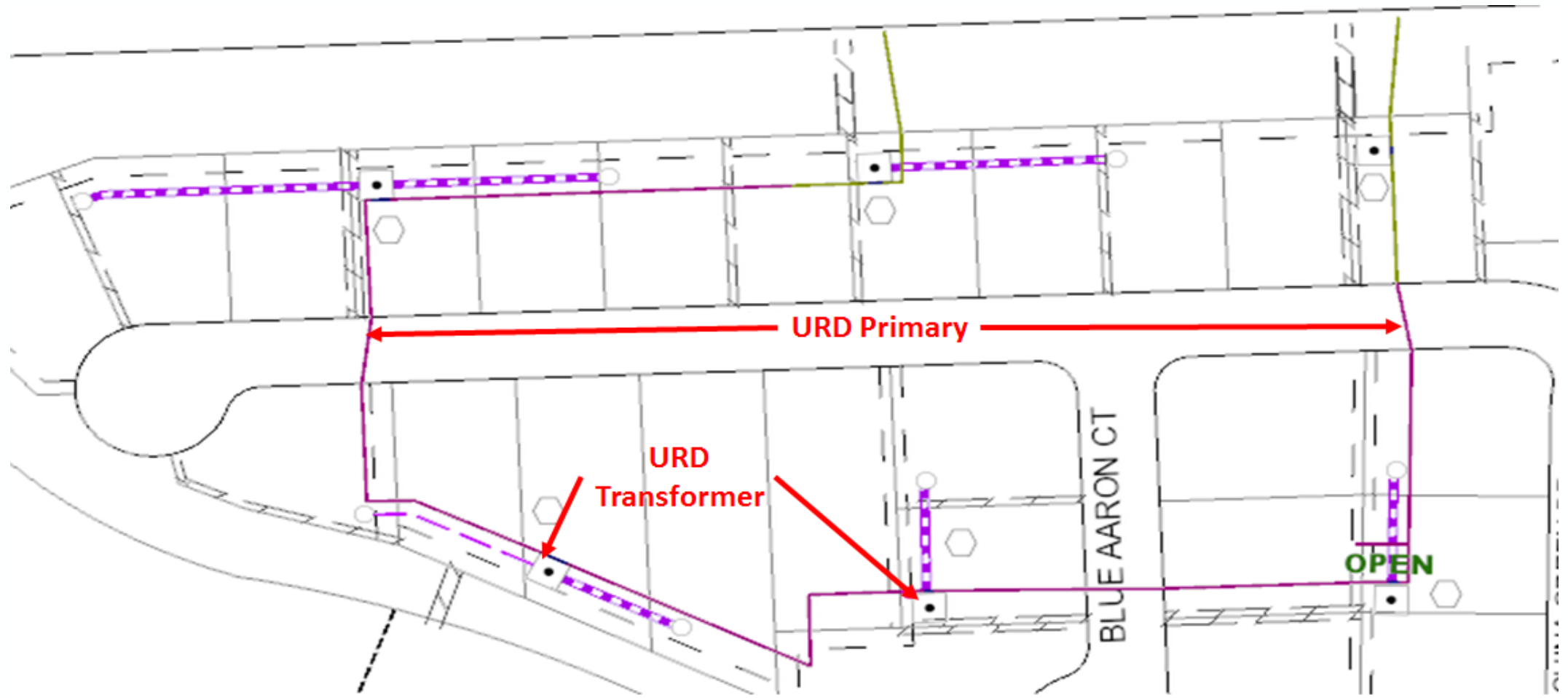
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Overview of Underground Residential Distribution (URD)



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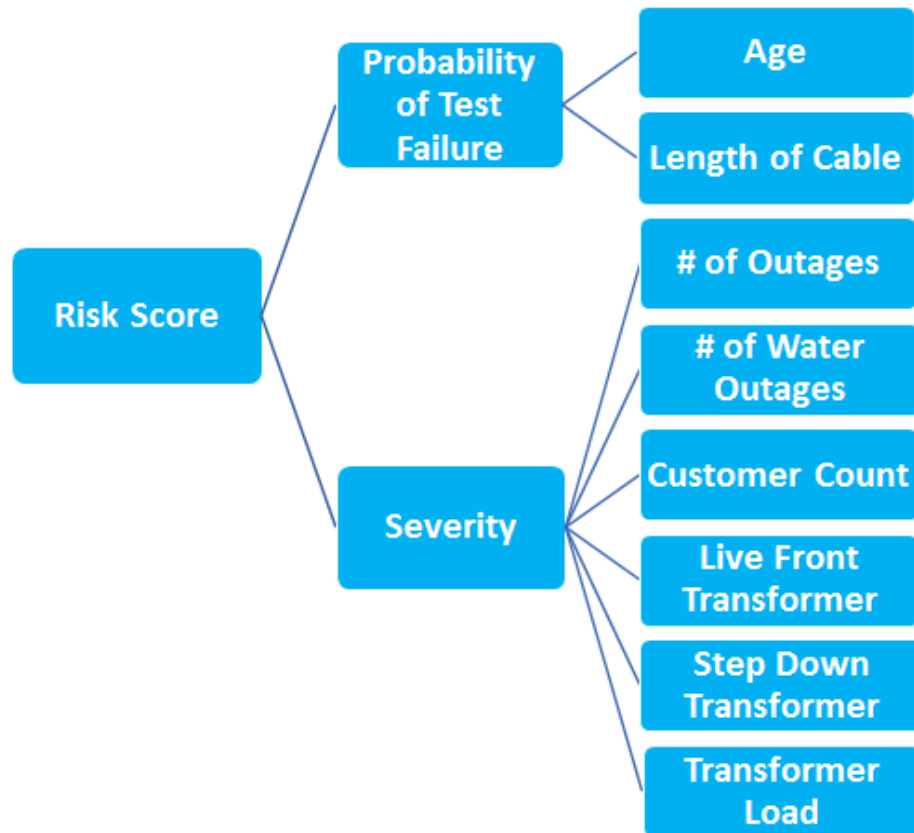


URD Population Characteristics

- 20,000+ URD loops
- 14,000+ miles of cable
- 200,000+ pad-mounted transformers
- Secondary pedestals, primary pull holes, terminal poles, terminators, elbows, splices and other equipment



Analytics Insights With PdMS



- Thorough analytics and statistical modelling has told us what factors are significant in determining risk of failure
- SME input was used to determine which severity factors are significant along with the weighting of those factors
- Through analytics and SME input we are able to determine the Risk Score of a URD loop

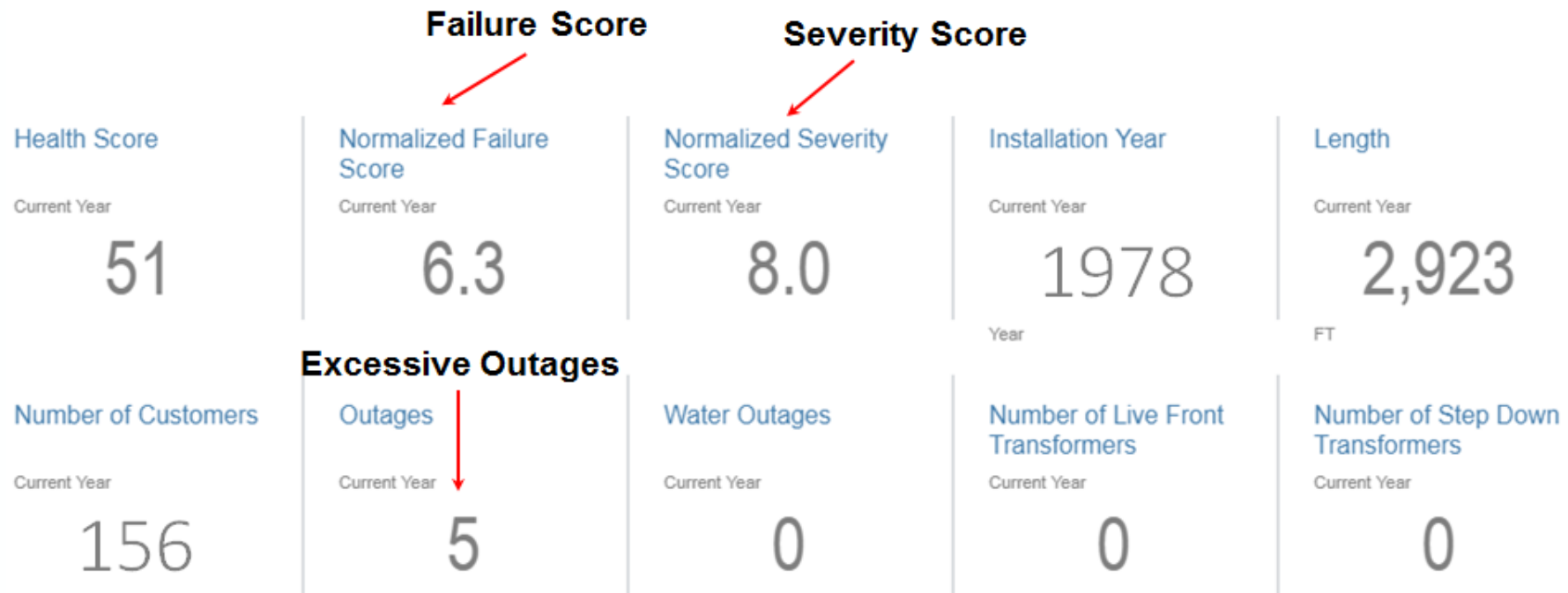
URD loops are the first asset to be incorporated into the PdMS environment as it will provide valuable insight into likelihood of failure for capital investment, resulting in increased reliability and reductions in reactive work.

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Integrated Asset & Risk Analytics Benefit

Summary details of the asset as well as the analytics components can be quickly accessed to understand the loop priority score

$$\text{Risk Score} = \text{Risk of Testing Failure} * \text{Severity}$$



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Data Integration Into Single Screen

PdMS allows for the user to understand work activity associated with a particular asset as well as outage information to better understand reason for potential risk. All this within a single location for more efficient decision making

Work Activities (3)



Work Activity ID	Type Code	Long Description	Root Equipment ID	Assigned To	Required Start Date	Required End Date
000080321748	HDC2	FUW_OSR_PRI_H73H_H...	14502437	SUG	Nov 27, 2016, 6:00:00 PM	Dec 19, 2016, 6:00:00 PM
000083949889	HDC2	CAPT_17_H73H_H72H_Q...	14502437	SUG	Oct 29, 2017, 7:00:00 PM	Dec 3, 2017, 6:00:00 PM
000085853169	HDC2	PSR_SPAN_H73H_H72H_...	14502437	SUG	Apr 11, 2018, 7:00:00 PM	Sep 3, 2018, 7:00:00 PM

Outages (4)

[Create Work Activity](#)

<input type="checkbox"/>	Thing ID	Code	Alert ID	Description	External ID	Created	Type
<input type="checkbox"/>	14502437	SPLICE	1714927914290	S.O. 6534 SPLICE OUT X ...	H73H	May 28, 2017, 8:12:00 PM	SPLICE
<input type="checkbox"/>	14502437	LIGHTNING	1710827647640	*TH* TRIED & HELDCUST...	H73H	Apr 18, 2017, 3:13:00 AM	NONE
<input type="checkbox"/>	14502437	UNKNOWN	1706427378210	*TH* TRIED & HELDNEED...	H73H	Mar 5, 2017, 10:43:00 AM	NONE
<input type="checkbox"/>	14502437	LIGHTNING	1706427376390	*TH* TRIED & HELD	H73H	Mar 5, 2017, 4:43:00 AM	NONE

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Executable Order Creation

PdMS not only provides valuable insight into asset condition but also provides a method to execute the appropriate task in order to reduce risk

The screenshot displays the PdMS interface for creating a work order. The main screen, titled 'Create Work Order Screen', shows asset details for ID 14497166, including 'Total Length: 1126.97ft', 'Circuit: RA46', 'Probability of Failure: 66.10%', and 'Spans Failed: 22.22%'. A 'Create Work Order' button is visible in the bottom right corner of the main screen. A modal window titled 'Create Work Activity' is open, showing a form with the following fields: 'Create Work Order' (dropdown), 'Equipment: 14497166', '*Username: 00025058', '*PM Activity Type: CAP', '*Work Order Type: HDC2', '*Order Text: CAPT_19_G77T_G79T_RA46_1975_SPANS_9', '*Start Date: 2/13/19', and '*End Date: 3/15/19'. A 'Close' button is at the bottom right of the modal.

Asset	Asset Type	Description	Health Indicator	Information	Probability of Failure
<input type="checkbox"/> 121202	Span	XFR96_RSRG77T, PSR_SPAN_G77T_G79T_PMT _96_G77T_RA46	<input checked="" type="checkbox"/> Guarantee	96ft	Passed

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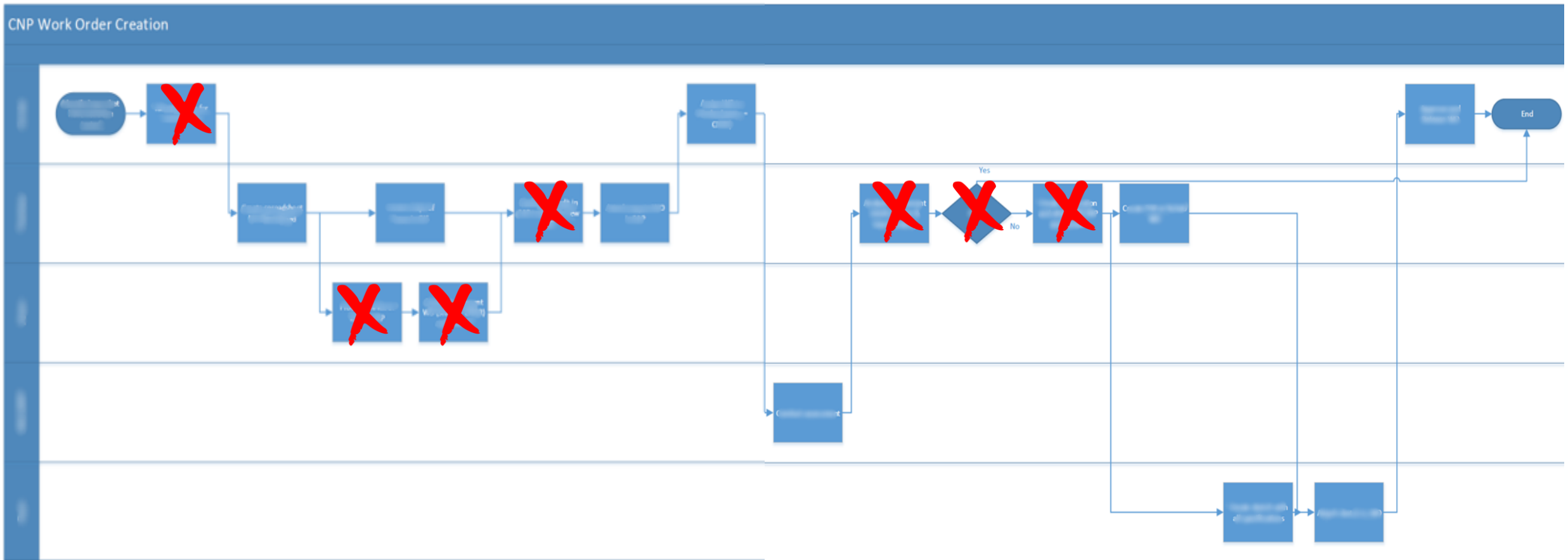
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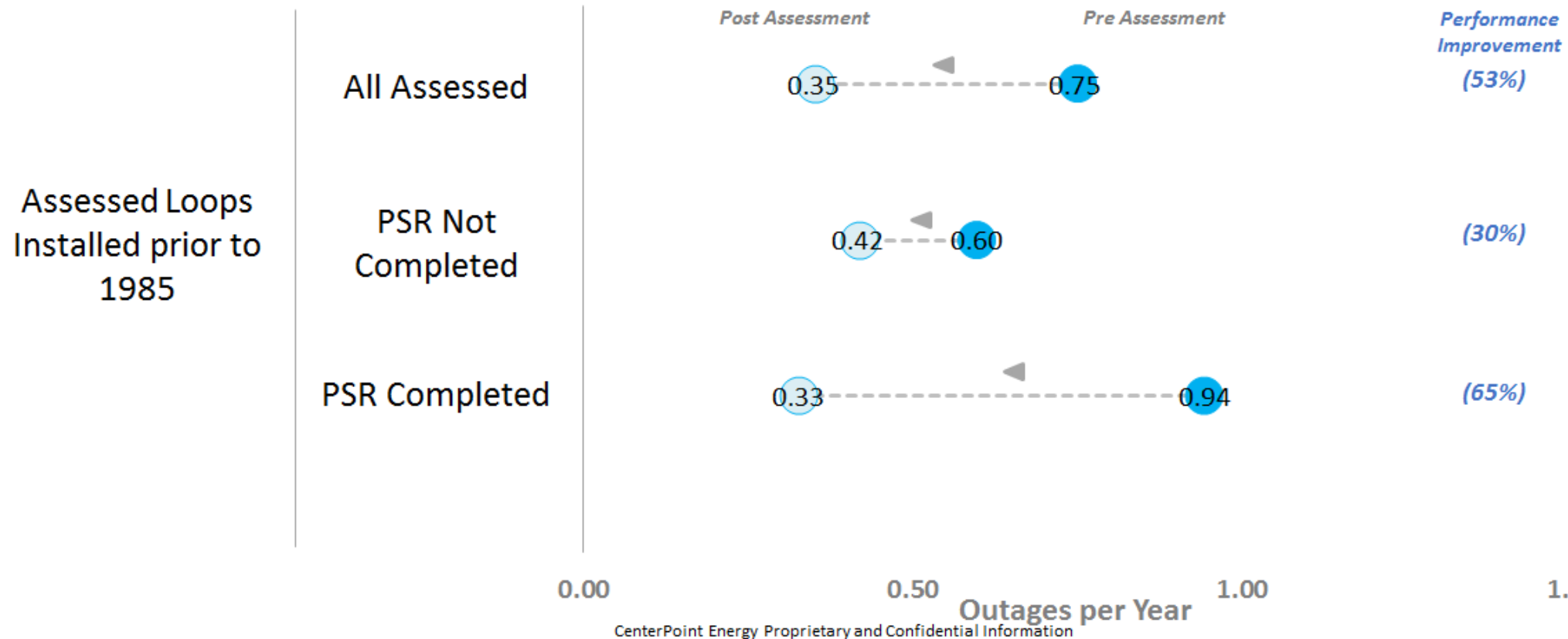
PdMS streamlined the overall work order creation process

The business process requires multiple work orders to be created for various reasons across the process lifecycle. We are now able to reduce the time and communication required to execute this process through efficiencies created by PdMS



Reactive Outage Response Results

Loops older than 1985 experience more outages per year. Targeted assessment of these older loops provides a significant reduction in outages per year.



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PdMS: Results & Benefits

Insight to action	<ul style="list-style-type: none">• Merges EAM and APM by bringing system operations and analytics under one tool• End-to-end solution, which covers business process from assessment to work order creation
Capital investment optimization	<ul style="list-style-type: none">• Focus capital resources on high risk assets
Enhanced reliability	<ul style="list-style-type: none">• Enables easy identification of candidates for assessment/replacement, improving reliability and customer satisfaction
Quantitative predictive AM model	<ul style="list-style-type: none">• Integrates survival models and severity components to assign Health Score to assets
Ability to manage complete asset hierarchy	<ul style="list-style-type: none">• Data, visualization, linear assets (i.e., complete loops)
Disparate information under a unified framework	<ul style="list-style-type: none">• Outage data, IMCORP testing results, work orders, TLM w/ size recommendation, GIS information

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CenterPoint's Future For PdMS

- Currently going through a PdMS FP06 upgrade with additional functionality
 - Review additional functionality with Asset Management team and provide feedback and gap analysis
 - Complete PdMS FP06 upgrade
 - Test and validate new functionality within system using URD Loops
- Evaluate expert algorithms for additional assets
- Implement additional assets into PdMS system
 - 3-phase underground transformers
 - Intelligent Grid Switching Devices (Reclosers)
 - Substation Equipment
 - Transformers
 - Breakers

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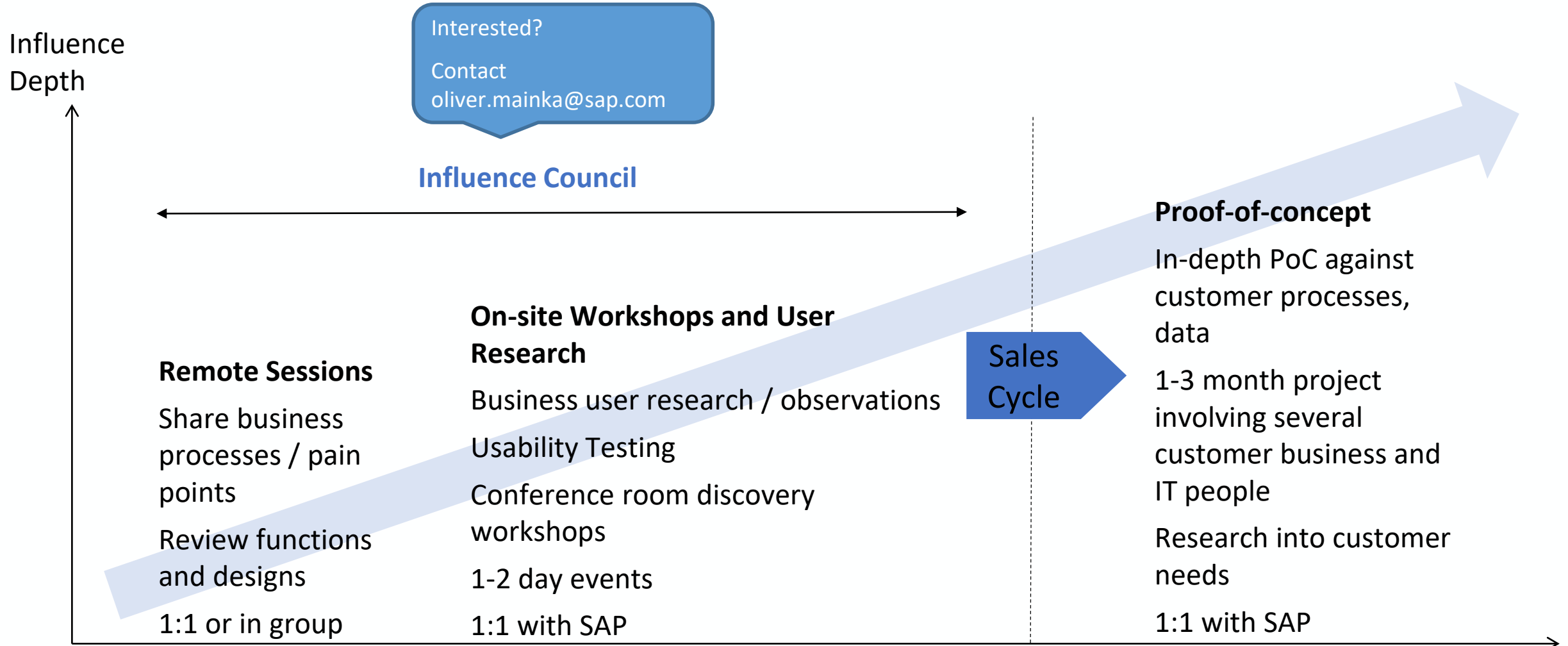
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Opportunities to Collaborate and Try



What the ASUG EAM SIG Does

Mission: help its members get more value from and learn about SAP EAM

Educate

- Organize webcasts ([calendar](#))
- [ASUG Annual Conference](#) EAM track
- Provide content for other ASUG [SIGs and local chapters](#)












Influence – foster and communicate EAM content in

- [Customer Connection program](#) (EAM focus)
- [Customer Engagement Initiative](#) program
- [Influence Councils](#) (currently none)

Network

- Collaboration [web site](#) for posting content and Q&As

MAR 27	EAM: Road Map: SAP Mobile Applications for Asset Management Hosted by Enterprise Asset Management (EAM) SIG This session content will include roadmap presentations for SAP Asset Manager, SAP's next...
APR 3	EAM: CenterPoint's "Insight-to-Action" Development with SAP PdMS Presented by: Enterprise Asset Management CenterPoint Energy, a leading electric utility, improved its process to select at-risk equipment for refurbishment/re...
APR 10	EAM: Intelligent Asset Management - Cross- Product Introduction Presented by: Enterprise Asset Management Get started with the next generation of asset management software from SAP today with minimum disruption to existing...
MAY 22	EAM: Transform Mobile Asset Management with SAP Asset Manager Hosted by Enterprise Asset Management (EAM) SIG Mobility is becoming a necessity for companies in asset intensive industries to a...
JUN 12	EAM: Intelligent Asset Management - SAP PdMS Deep-Dive Hosted by Enterprise Asset Management (EAM) SIG One of the high value use cases for the Internet of Things is in the area of predictive maintenance. ...
JUL 17	EAM: Drive Asset Management with a Map Presented by: Enterprise Asset Management Community Having a map-centric approach for dealing with mission-critical asset management processes is a best ...

Title	
 EAM Webcast: How to Success with Your Ariba/EAM Integration	 Four Keys to Success with Digital Supply Chain and IoT
 Find out which improvements have been released for SAP EAM Plant Maintenance	 Finding EAM information on the SAP Community
 "Stay Current" Material on Last S/4HANA EAM Releases	 SAP Customer Engagement Initiative projects now open for customer registration until March 15, 2019
 Adopting Risk Based Maintenance: Enabled by SAP Asset Strategy and Performance Management	 Introducing the "SAP Innovation and Optimization Pathfinder" for Asset Management
 "Schedule an Expert" now available for EAM as well	 Intelligent Asset Management (IAM) Solution One-Pagers
 MDG – Utopia Solution Extensions released for SAP S/4HANA 1809	

EAM Solutions in our Community

Product Category	Product	Marketing Link	Road Map Link	Help Link
ERP / Back-end	Plant Maintenance (PM)			Link
	S/4HANA EAM, cloud and on-prem	Cloud On-prem	Link (slides on Maintenance Planning, Scheduling, Execution)	Cloud On-Prem
	Add-on for MRO by HCL for SAP S/4HANA			Link
	Multi-Resource Scheduling (MRS)	Link	n/a	Link
	SAP Master Data Governance, enterprise asset management extension by Utopia	Link		Link
Mobile	Work Manager	Link	Link (webinar)	Link
	Asset Manager	Link	See above	iOS Android
Intelligent Asset Management (IAM)	Asset Intelligence Network (AIN), cloud	Link	Link	Link
	Asset Strategy and Performance Management (ASPM), cloud	Link	Link Webinar	Link
	Predictive Maintenance and Service (PdMS), cloud and on-prem	Link	Cloud On-Prem	Cloud On-Prem
	Predictive Maintenance and Service, add-on for Utilities			Link
	Predictive Engineering Insights (PEI), cloud	Link	Link	Link
General IoT	Edge Services	Link	n/a	Link
	IoT Services	n/a	n/a	n/a
Other	Linear Asset Management (LAM)	Link	n/a	n/a
	Geographic Enablement Framework (GEF)	Link	n/a	Link

[Details and Links](#)

Your ASUG EAM SIG Volunteer Team

Customer Volunteers

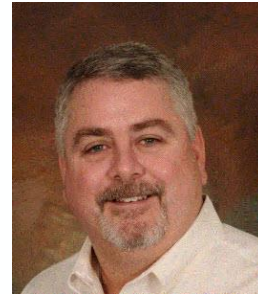
Organizing the EAM SIG

Listening to your suggestions for a better EAM community

[Details and contacts](#)



Linda Dietzel /
The Hershey
Company



Bob Pennington
/ CITGO
Petroleum



Jeff Smith /
Fairfax Water

SAP Point of Contact



Oliver Mainka /
SAP

ASUG Advocates



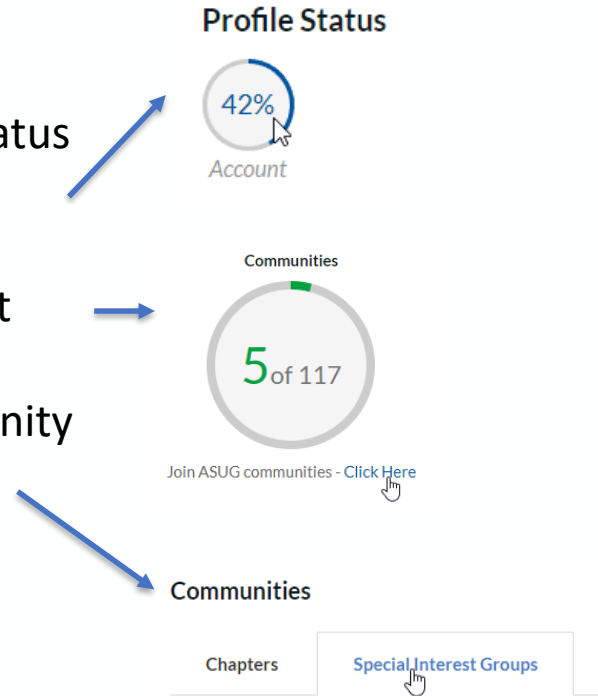
Paul Kurchina /
ASUG



Andrea
Pennington /
ASUG

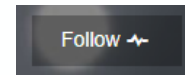
How to Become a Member

1. Register for the EAM SIG
Go to your [member dashboard](#)
Select your Profile Status
Select to Join ASUG Communities
Select Special Interest Group
Join the EAM community



2. Follow the content on the SIG community website

- Go to the [site](#)
- Select Follow



- Select all options

FOLLOW IN

Connections Stream

Inbox

- Select Profile Preferences

[Preferences](#)

- Select email options

Email Preferences:

Decide what activity you'd like to get email notifications about.

Receive email?

3. Engage!

- Post content
- Ask and answer questions
- Make your desires known to the volunteer team

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Key Outcomes/Objectives

1. CenterPoint Energy applied SAP Predictive Maintenance & Service to determine Underground Residential Distribution equipment in need of proactive mitigation, and create work orders to remediate and reduce risk
2. A number of procedural and operational benefits were gained by using the product
3. CenterPoint Energy plans to expand the use of SAP Predictive Maintenance & Service to other asset types
4. SAP invites customers and partners to influence the future direction of SAP Predictive Maintenance & Service

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Take the Session Survey.

We want to hear from you! Be sure to complete the session evaluation on the SAPPHIRE NOW and ASUG Annual Conference mobile app.



Q&A

For questions after this session, contact us at richard.greenwood@centerpointenergy.com and oliver.mainka@sap.com.

Presentation Materials

Access the slides from 2019 ASUG Annual Conference here:

<http://info.asug.com/2019-ac-slides>

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