

EVERSOURCE

Advanced Metering Functionality Feasibility Study for New Hampshire

Final Report

May 2024

 **westMONROE**



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Overview of Feasibility Study

OVERVIEW OF FEASIBILITY STUDY

The Settlement Agreement in Docket No. DE 19-057 from 2019 calls for an assessment of the feasibility of advanced metering functionality (AMF) for Eversource's New Hampshire electric customers

Docket No. DE 19-057 AMF Feasibility Study Requirements

- ◆ An outside consultant will perform the study, with ongoing collaboration between Eversource, the outside consultant, the New Hampshire Department of Energy (DOE), and the NH Office of the Customer Advocate (OCA)
- ◆ Considers at least 3 scenarios:
 1. Assumes that previously deployed analog meters remain in service and manually read
 2. Currently deployed meters and its current approach to meter reading
 3. Existing automated meter reading (AMR) meters are replaced with technologies capable of offering AMF, considering both full and partial (opt-in) meter deployment scenarios
- ◆ Examine existing telecom networks, AMF opt-in, and cybersecurity concerns
- ◆ Quantify life cycle costs to deploy and maintain new infrastructure over the expected useful life of the assets
- ◆ Document life cycle costs and benefits that can be quantified on a NPV basis, as well as those that may be characterized qualitatively
- ◆ Analyze the effects of all practicable deployment timeline
- ◆ Include sensitivity analysis on customer propensity to adopt opt-in time of use rates and New Hampshire geographic and demographic considerations for AMF deployment

Review of Meter Reading Technologies

Manual Meter Reading

- 1 Crews manually read meters for usage once per month. Eversource previously manually read meters until 2014 when it began deployment of AMR. One of the scenarios hypothetically assumes that Eversource never deployed AMR and is still performing manual meter reading

AMR

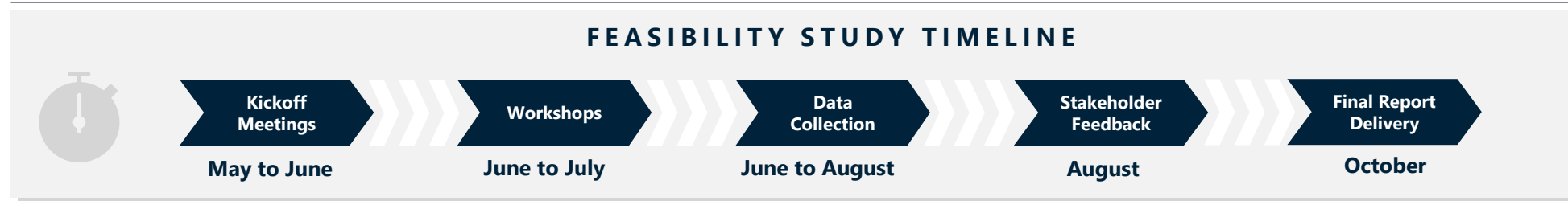
- 2 Current meter reading technology utilized by Eversource where drive-by crews more quickly collect electricity usage once per month. Eversource maintains specific equipment and technology to perform these meter reads

AMF

- 3 Metering system that records customer consumption hourly or more frequently and that provides for daily or more frequent transmittal of measurements over a communication network to a central collection point. Several investments are required to enable this meter reading technology

OVERVIEW OF FEASIBILITY STUDY

West Monroe’s scope of work for the AMF feasibility study for Eversource’s New Hampshire service territory includes the following areas



SCOPE

The settlement agreement in Docket No. DE 19-057 from 2019 between the DOE, OCA, and Eversource requires Eversource to conduct this feasibility assessment to provide an indicative view of the operational and financial considerations to deploy AMF in its electric service territory in New Hampshire. This feasibility study analyzes the comprehensive investments and benefits over a 20-year time horizon to determine the benefit-to-cost ratio (BCR) for three different scenarios while also documenting opportunities, constraints, and successful outcomes. As a next step, a business case would build upon these findings and provide a more comprehensive view by developing more extensive cost estimates for the major investment categories, performing additional scenarios, and expanding sensitivities.

SCENARIOS EVALUATED

Base	Optimized	No AMR Deployed
<i>Transition from AMR to AMF as soon as possible under most realistic, near-term timeframe</i>	<i>Optimize the AMF Base Scenario to maximize the benefits of transition from AMR to AMF</i>	<i>Hypothetical scenario that assumes AMR was never deployed and Eversource will transition from manual meter reading to AMF</i>

BY THE NUMBERS

50+ Workshops and Meetings Hosted	60+ Stakeholders Consulted
28 Functional Areas Leveraged	400+ Unique Data Inputs Gathered
13 Key AMF Investment Categories	10 Key AMR Benefit Categories

KEY QUESTIONS

1. Across several scenarios, what are the investments, benefits, and benefit-to-cost ratio for AMF in Eversource over a 20-year period?
2. What would be the investments, benefits, and benefit-to-cost ratio for AMF if Eversource never installed advanced meter reading (AMR) technology in 2014?
3. What are the top considerations unique to Eversource to incorporate?



OVERVIEW OF FEASIBILITY STUDY

West Monroe coordinated across nearly 30 functional groups that provided data points and additional context to inform the investments and benefits for each of the scenarios

Eversource Functional Areas Consulted					
Call Center	Billing	Information Technology	OMNI	Revenue Assurance	Revenue Requirements
Meter Operations	Plant Accounting	Meter Systems & Data Mgmt	Cybersecurity	Meter Engineering	Corporate Accounting
Field Operations	Grid Modernization	Budgets & Investment Planning	Customer Experience	Regulatory Affairs	Energy Efficiency
Credit and Collections	Reliability & Resiliency Planning	Communications and Infrastructure	Meter Reading	Customer Digital and Technology Strategy	Voice of the Customer & Customer Experience Strategy
	Data Analytics	Rates Department	Distribution Engineering	Electric Meter Operations	

AMF Investment Categories

1. AMF Electric Meters
2. Communication Network
3. Headend and Meter Data Management System (MDMS)
4. Customer Information System (CIS) Replacement and Integration
5. Digital Customer Experience
6. Advanced Analytics
7. Conservation Voltage Reduction (CVR) and Voltage / VAR Optimization (VVO) Implementation
8. Operational System Integrations and Enhancements
9. Cybersecurity
10. Customer Engagement
11. Contact Center and Theft
12. Unrecovered AMR Costs
13. Project and Change Management

AMF Benefit Categories

1. Time-Varying Rates
2. AMR Meter Replacement Avoidance
3. System Costs Avoidance
4. Theft Reduction & Remote Disconnect Energy Savings
5. No Trouble Found (NTF) Reduction
6. Meter Reading and Field Ops Benefit
7. Outage Restoration
8. Asset Analytics
9. CVR/VVO Benefit
10. Carbon Emissions Reduction
11. Other Qualitative and Societal Benefits

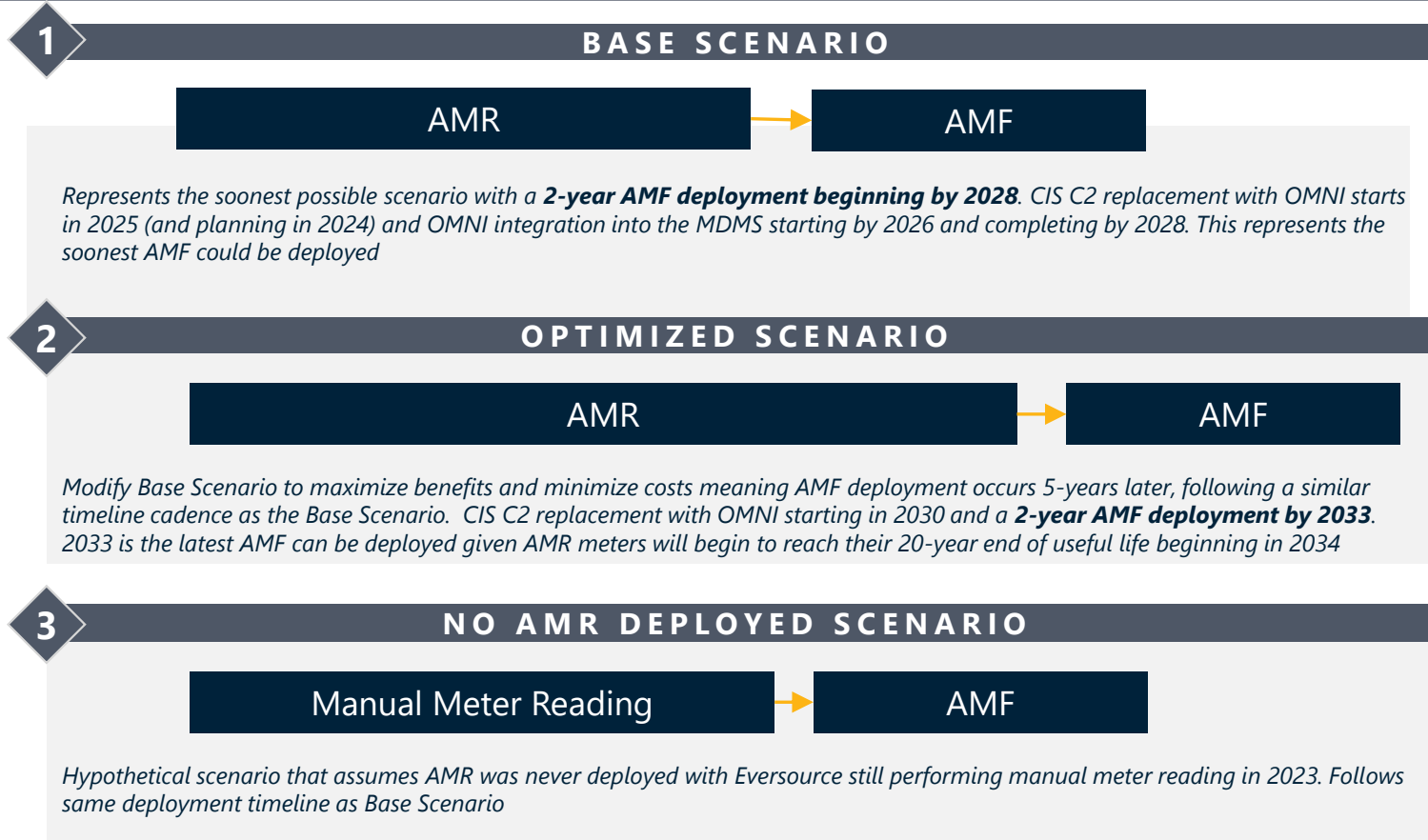
Manual Meter Reading Cost Categories

- Labor roles
- Labor rates
- Vehicle amounts and costs
- Clothing allowance
- Injury costs

Summary of Findings

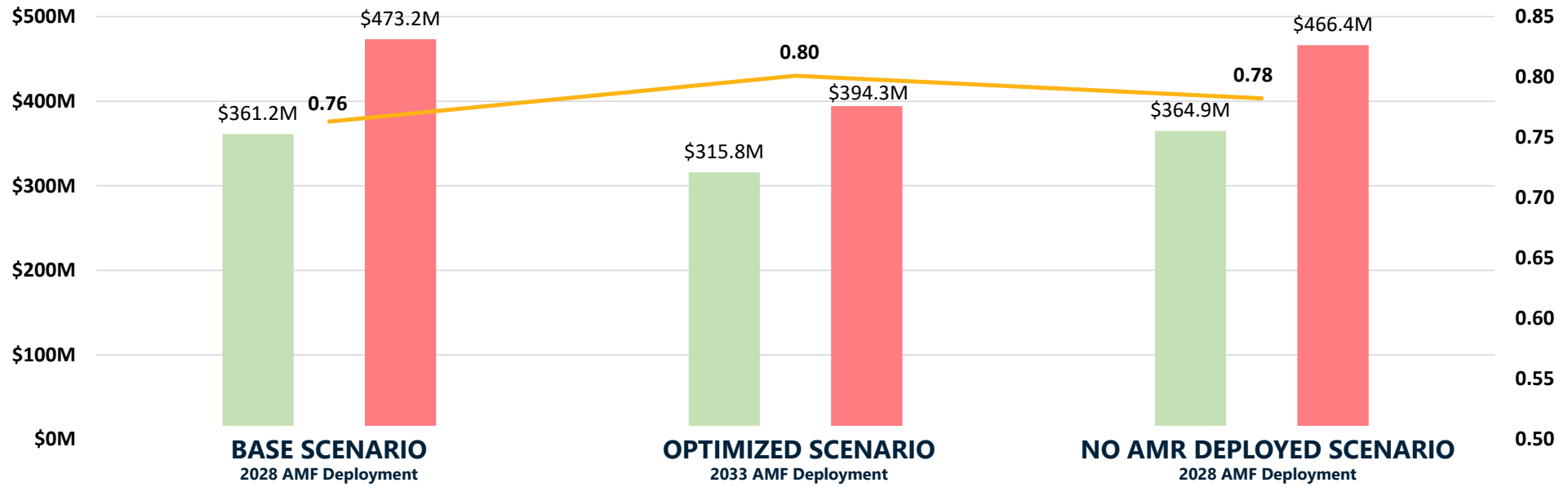
SUMMARY OF FINDINGS

In line with the settlement and to provide a comprehensive view of the investments and benefits, three scenarios were evaluated to compare various timelines and other considerations



SUMMARY OF FINDINGS

All three scenarios yield benefit-to-cost ratios (BCR) of less than 1.00, as the fixed costs of deployment exceed the expected total benefits; the Optimized Scenario yields the highest benefit



CIS C2 replacement with OMNI starting in 2025 and starting integration by 2026 to deploy AMF in 2028

CIS C2 replacement with OMNI starting in 2030 and starting integration by 2031 to deploy AMF by 2033, the latest possible date before AMR meters reach 20-year EOL

CIS C2 replacement with OMNI starting in 2025 and starting integration by 2026 to deploy AMF in 2028

Operational, Customer, and Environmental Benefits

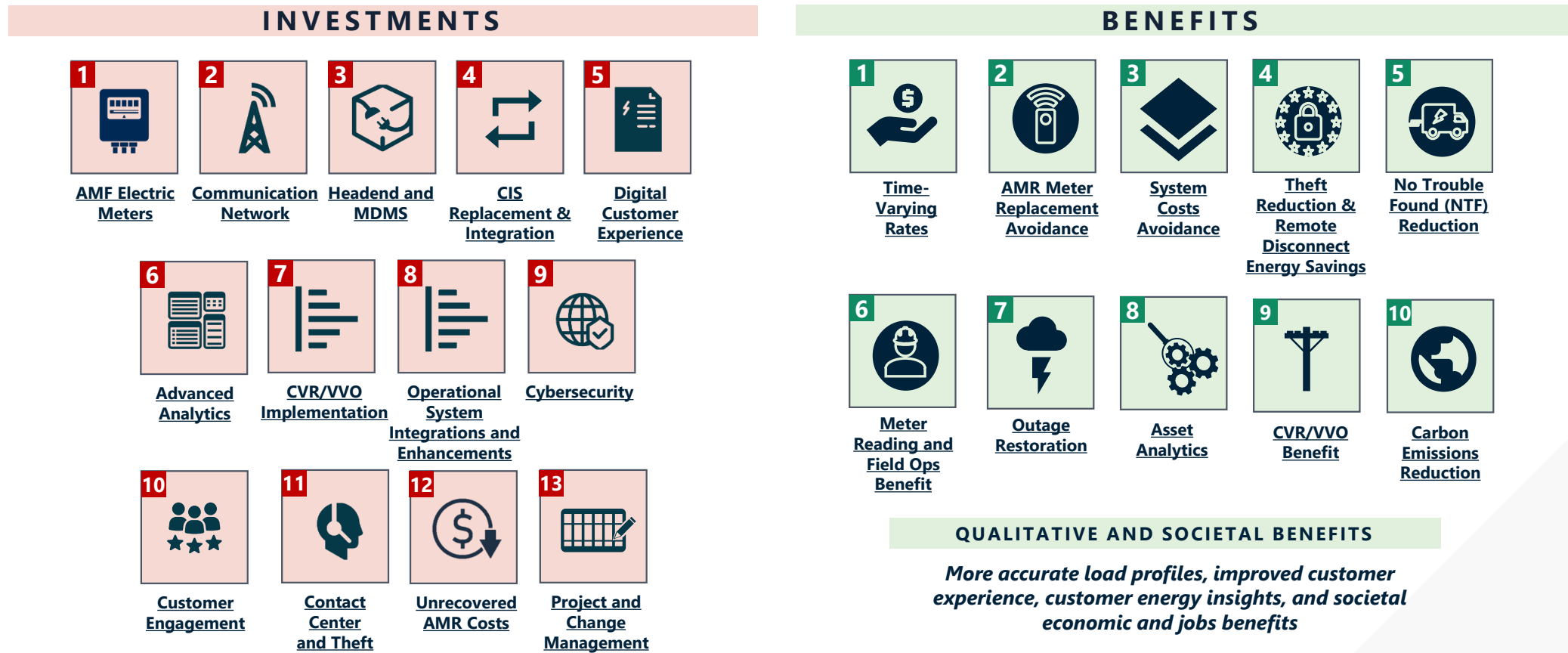
Capital and O&M Costs

Benefit to Cost Ratio



SUMMARY OF FINDINGS

To fully achieve the customer and operational benefits enabled by AMF, Eversource will need to make investments in operational assets, systems, and processes



	Base 2028 AMF Deployment	Optimized 2033 AMF Deployment	No AMR Deployed 2028 AMF Deployment
NPV \$M (2023 \$)			
Investments (Capital)			
AMF Electric Meters	102.1	88.6	102.1
Unrecovered AMR Costs	11.8	7.6	4.9
Communication Network	19.1	16.2	19.1
Headend and MDMS Integration	17.3	14.4	17.3
CIS Replacement and Integration	99.3	82.6	99.3
Digital Customer Experience	9.5	7.4	9.5
Advanced Analytics	13.6	11.3	13.6
CVR/VVO Implementation	52.5	43.7	52.5
Op. System Int. & Enhancements	2.0	1.6	2.0
Cybersecurity	3.0	2.5	3.0
Customer Engagement	0.0	0.0	0.0
PMO and CMO	9.9	8.4	9.9
Contact Center and Theft	0.2	0.1	0.2
Capital Total	340.2	284.4	333.4
Investments (O&M)			
AMF Electric Meters	0.0	0.0	0.0
Unrecovered AMR Costs	0.0	0.0	0.0
Communication Network	12.5	10.5	12.5
Headend and MDMS Integration	21.4	18.3	21.4
CIS Replacement and Integration	27.9	23.2	27.9
Digital Customer Experience	16.7	14.4	16.7
Advanced Analytics	5.4	4.5	5.4
CVR/VVO Implementation	0.9	0.8	0.9
Op. System Int. & Enhancements	1.0	0.8	1.0
Cybersecurity	21.4	15.9	21.4
Customer Engagement	5.5	4.5	5.5
PMO and CMO	2.5	2.1	2.5
Contact Center and Theft	17.9	15.0	17.9
O&M Total	133.0	109.9	133.0
Benefits			
Time-Varying Rates	6.4	4.8	6.4
No Trouble Found Reduction	0.7	0.6	0.7
AMR/Mechanical Meter Replacements Avoidance	56.8	57.0	33.5
Bad Debt Reduction	0.0	0.0	0.0
System Costs Avoidance	93.9	91.4	90.0
Theft Reduction & Remote Disconnect Energy Savings	8.1	7.0	8.1
CVR/VVO Benefits	73.2	54.5	73.2
Improved Outage Restoration	46.1	38.4	46.1
Asset Analytics	25.9	21.9	25.9
Reduced Energy Carbon Emissions	33.9	24.2	33.9
Meter Reading and Field Ops Benefit	16.1	16.0	47.0
Benefits Total (\$)	361.2	315.8	364.9
Total Benefits	361.2	315.8	364.9
Total Investments	473.2	394.3	466.4
Benefit-to-Cost Ratio	0.76	0.80	0.78
IRR	2.3%	1.6%	2.8%

COMPARISON TO BASE SCENARIO

- **Optimized** – benefits and investments lowered due to later deployment by 5 year impacting NPV to 2023 dollars and lower unrecovered AMR costs
- **No AMR Deployed** – unrecovered AMR costs and meter replacement benefit are less because assumes manually read meters are less costly than AMR and meter reading and field ops benefit is higher due to higher manual meter reading labor count and costs

SUMMARY OF FINDINGS

Qualitative and Societal Benefits Not Quantified Within BCA

Economic Benefit

AMF deployment could have a significant economic impact across New Hampshire. Under the Base Scenario, applying the annual spend across all investment categories against the applicable New Hampshire Regional Input-Output Modeling System (RIMS II) multipliers indicates that AMF could lead to \$1.005 billion (nominal) and \$614.6M (NPV 2023\$) over 20 years to 2044 in economic activity across output, earnings, employment, and value add.

RIMS Multiplier (Output per dollar)	RIMS Category	Spend Description	20-Year Total (Nominal)
1.4093	Electric power generation, transmission, and distribution*	Line and Socket Repairs, Residential/Commercial Meter Deployment	\$66.6
1.9919	Nonresidential structures	Comms Equipment Deployment, Tower Construction	\$5.5
1.86	Warehousing and storage	Warehousing Costs	\$0.0
1.7931	Computer systems design services	Internal/External Labor for MDM, Integrations, Cybersecurity	\$44.1
1.9206	Architectural, engineering, and related services	AP, Relay, and Tower Engineering	\$4.9
1.9042	Management consulting services	External PMO and CMO	\$26.2
1.982	Environmental and other technical consulting services	AMF Vendor Field Network Design, Project Management, Network Deployment Support, Field Network Support, Network Optimization, System Testing, Integration and Configurations, Environment Set-up	\$17.4
1.7117	All other miscellaneous professional, scientific, and technical services	Internal labor to support all investment categories	\$323.4
1.8729	Investigation and security services	Deployment Security	\$0.8
Total Regional Economic Impact			\$489.0
1.5966	Computer terminals and other computer peripheral equipment manufacturing	Hardware (MDM, Cyber)	\$0.0
1.5568	Broadcast and wireless communications equipment	Access Point, Relay, Battery Back-Up, Cellular Antenna, Cable, FSU, Comm Tester, Meter Comms Tester, Handheld	\$11.4
1.7597	Electricity and signal testing instruments manufacturing	AMF Electric Meters	\$282.9
1.6319	Software publishers	Software Implementation Services and Ongoing Licensing Across MDMS, OMS, CIS, Cybersecurity, Advanced Analytics, VVO, Asset Management, Digital Customer Experience, Headend, and Communication Network	\$222.5
Total Additional Broader Economic Impact			\$516.8
Total Economic Impact			\$1,005.8



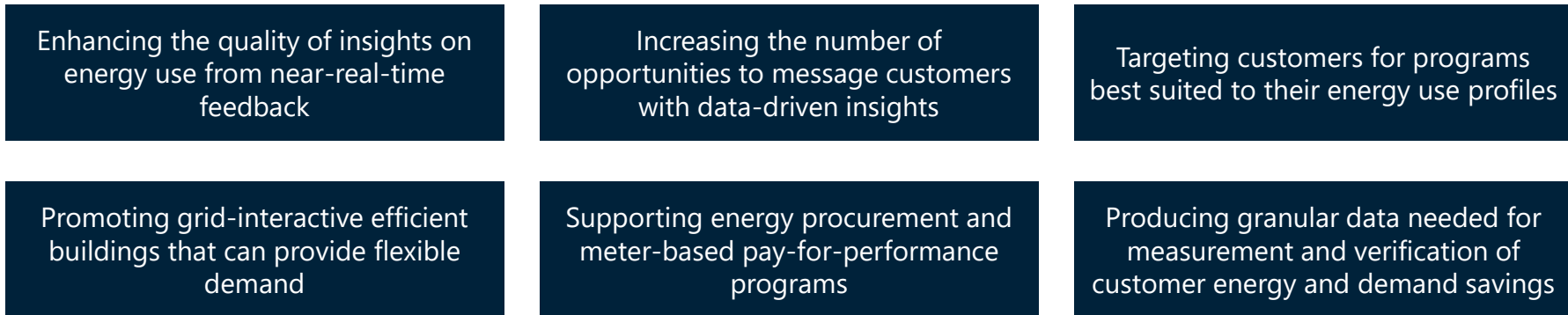
SUMMARY OF FINDINGS

Qualitative and Societal Benefits Not Quantified Within BCA **Customer Energy Insights Benefit**

Data provided through the implementation of AMF will provide more detailed information to target conservation and load management (“C&LM”) energy efficiency and demand response programs for specific customer needs. **Eversource can utilize granular AMF data to provide energy usage insights to demand response and energy efficiency customers.**

AMF data will also enable Eversource to group, segment, differentiate, identify, and target customers for C&LM programs based on customer propensities. AMF enables sub-hourly load profiles for customers with different daily or seasonal usage patterns to enable customized outreach and recruitment for energy efficiency and demand response programs.

AMF data can enable strategic use cases with the intention of influencing customer energy use, including:



SUMMARY OF FINDINGS

Qualitative and Societal Benefits Not Quantified Within BCA Additional Customer and Operational Benefits

ADDITIONAL CUSTOMER BENEFITS		ADDITIONAL OPERATIONAL BENEFITS	
Benefit Category	Description of Benefits	Benefit Category	Description of Benefits
Rate options (including for electric vehicles)	Additional choices for customers to save money and incentives for behind-the-meter technologies or EVs	More accurate load profiles	Identifying opportunities for load-shifting, electric vehicle charging, and plant maintenance efficiencies
Streamlined internal operations	Internal productivity improvement such as fewer bill exceptions and estimation	Validating resilience/reliability	Validating switching schemes, protection measures, etc.
Savings on bill	Reduced energy and demand leading to bill savings	Storm restoration efficiencies	Reduced calls to call centers and reduced data traffic on web portals, integrated voice recorders, and other customer reporting channels
Increased customer convenience	Increasing number of self-service options	Accurate information for CSRs	Granular data visibility to CSRs enabling better service
Increased control over use	More online tools to increase control over usage	Momentary outage measurements and correlations	Potential opportunity to track and measure momentary outages (MAIFI) that is not currently tracked
Enhanced online portal	Improved customer engagement and satisfaction.	More effective marketing	Through load profiles and customer energy use data, better customer segmentation and targeted advertisement of relevant programs
Improved customer satisfaction	Empowered customers through availability of self-service channels increasing customer choices		
High bill alerts	Improved customer awareness of usage.		
Detailed billing data	Identify customer value (by customer type) with access to daily delivered and received power, monthly demand, and instantaneous power data (twice daily or every 5 minutes)		
Outage status	Meter pings to relay information to customers about current outage status		



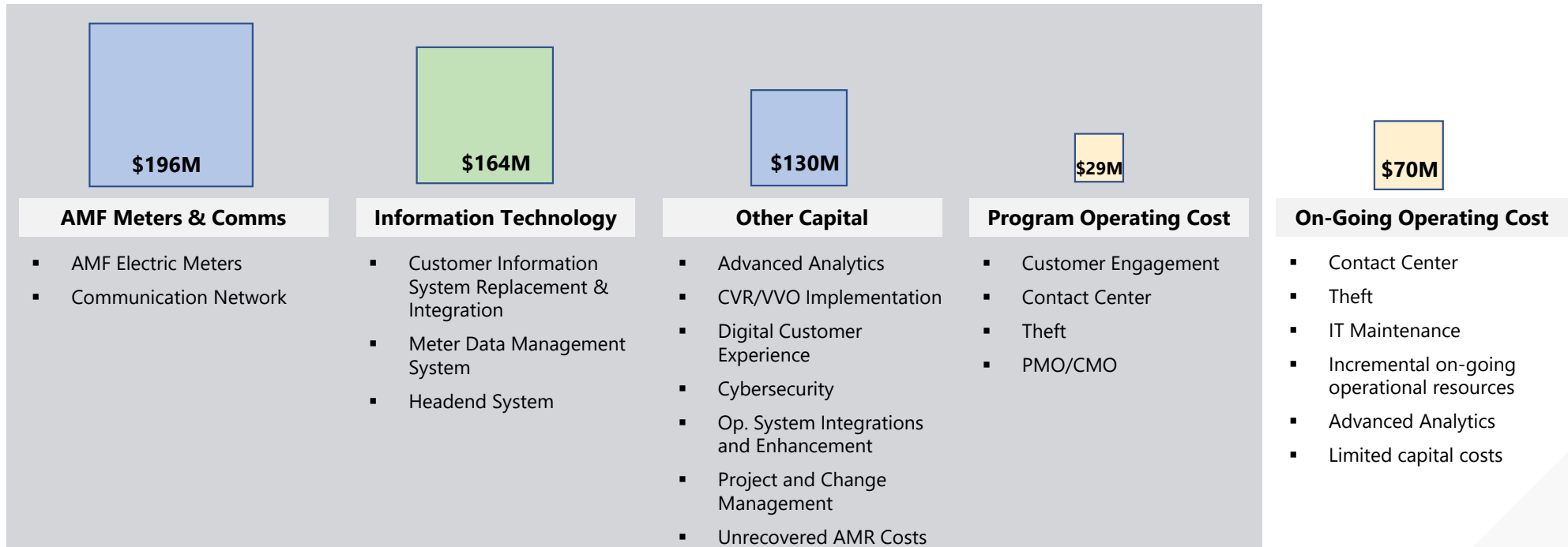
Scenario Review



Optimized Scenario

OPTIMIZED SCENARIO

In the Optimized Scenario, AMF program costs are concentrated in years 2030-2036, driven by the AMF electric meter deployment and communication network build-out

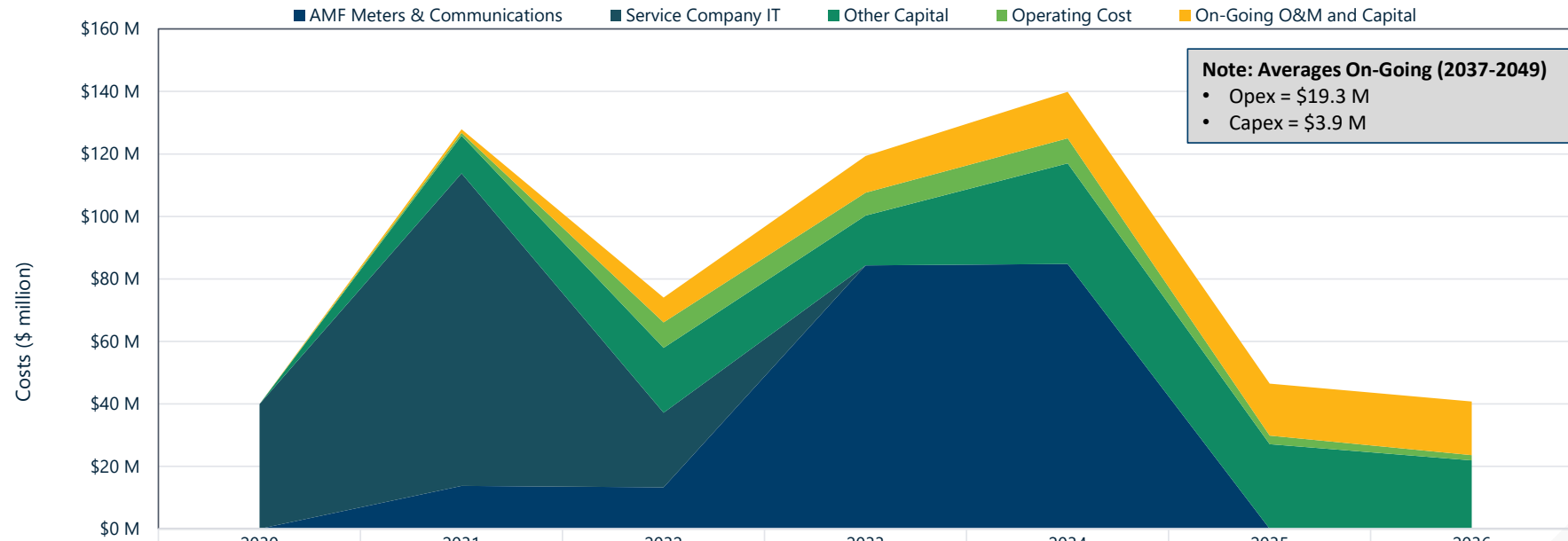


Total AMF build cost from 2030 to 2036 are estimated to be \$519 million, plus \$70 million in ongoing operating costs

OPTIMIZED SCENARIO

Eversource NH AMF program costs are estimated to peak in the years 2031 and 2034, driven by CIS replacement and integration in 2031 and AMF deployment and CVR/VVO implementation in 2034

All AMF Program Costs (2025-2031)

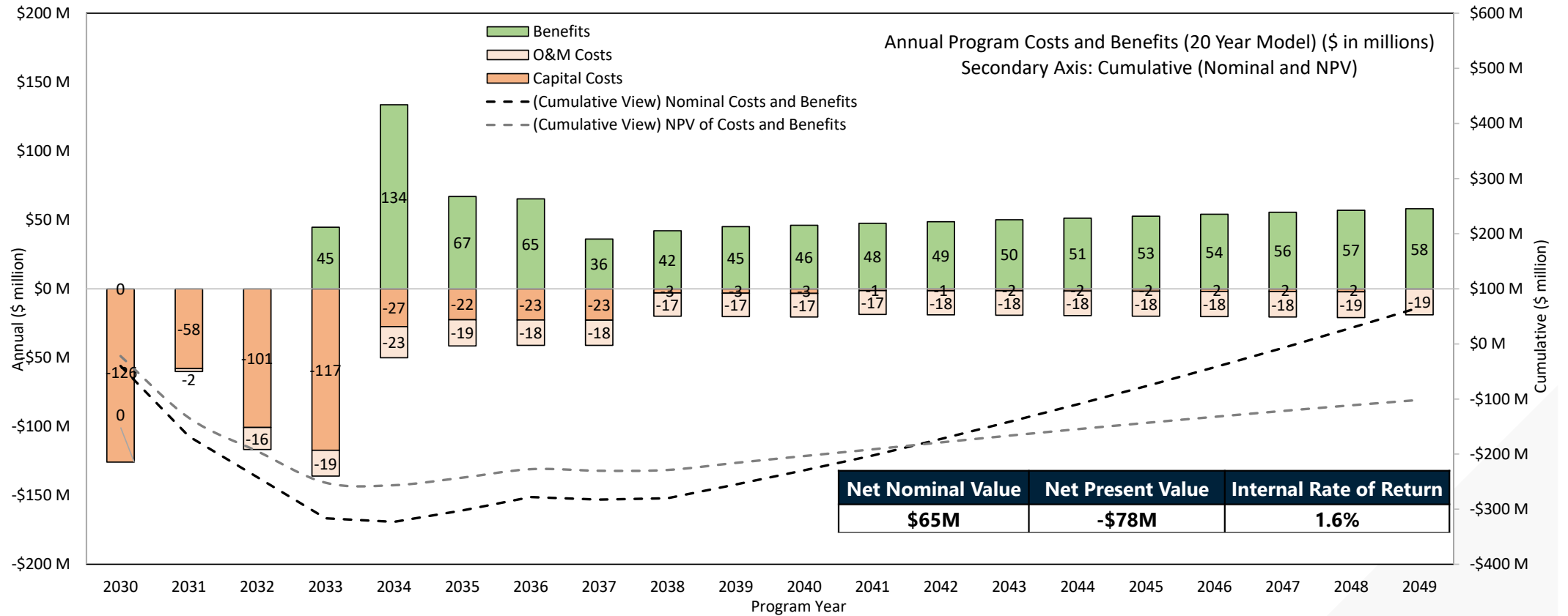


	2030	2031	2032	2033	2034	2035	2036
On-Going O&M and Capital	\$0.00M	\$1.14M	\$7.93M	\$11.69M	\$14.86M	\$16.70M	\$17.20M
Operating Cost	\$0.00M	\$0.93M	\$8.15M	\$7.33M	\$8.00M	\$2.75M	\$1.70M
Other Capital	\$0.00M	\$12.07M	\$20.81M	\$15.97M	\$32.23M	\$27.06M	\$21.87M
Service Company IT	\$39.92M	\$100.07M	\$23.88M	\$0.00M	\$0.00M	\$0.00M	\$0.00M
AMF Meters & Communications	\$0.00M	\$13.70M	\$13.25M	\$84.33M	\$84.78M	\$0.00M	\$0.00M



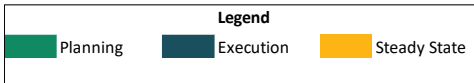
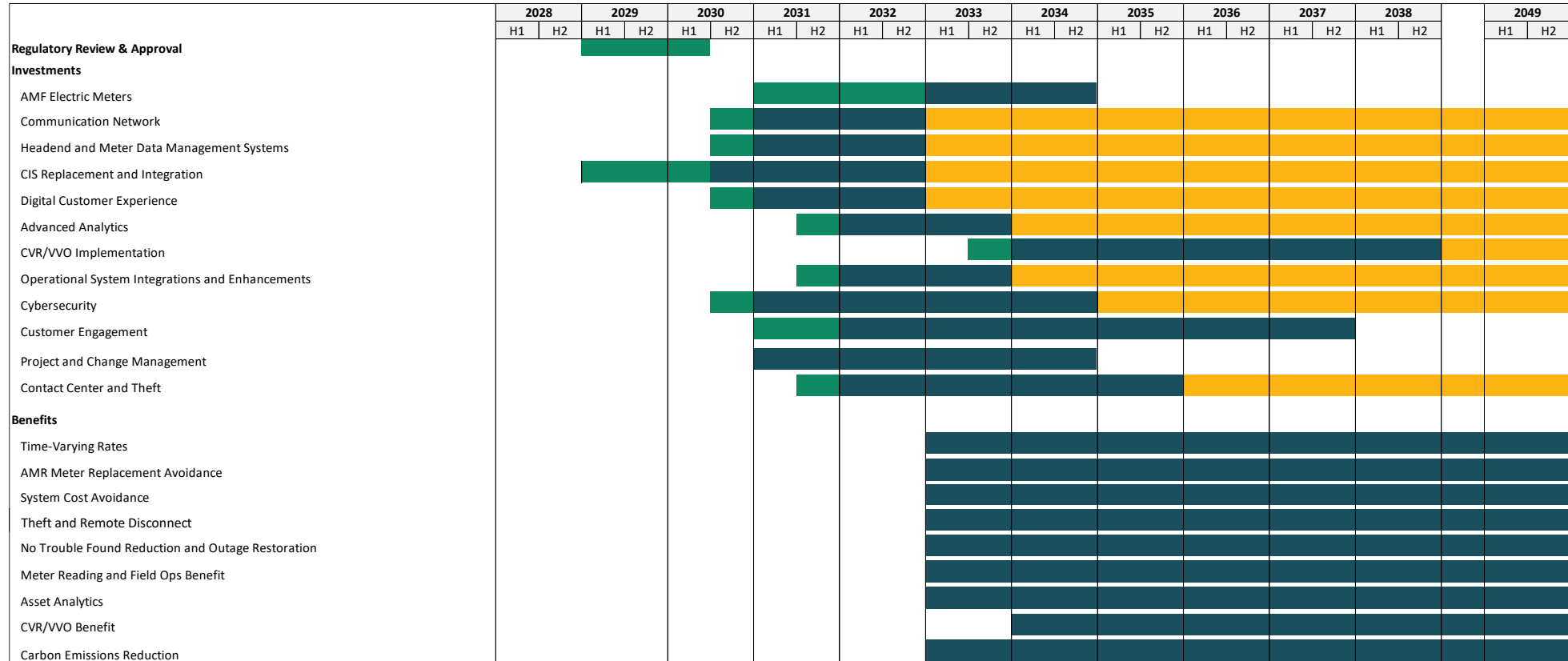
OPTIMIZED SCENARIO

Optimized Scenario costs and benefits over a 20-year timeline yields a positive net nominal and a negative present value



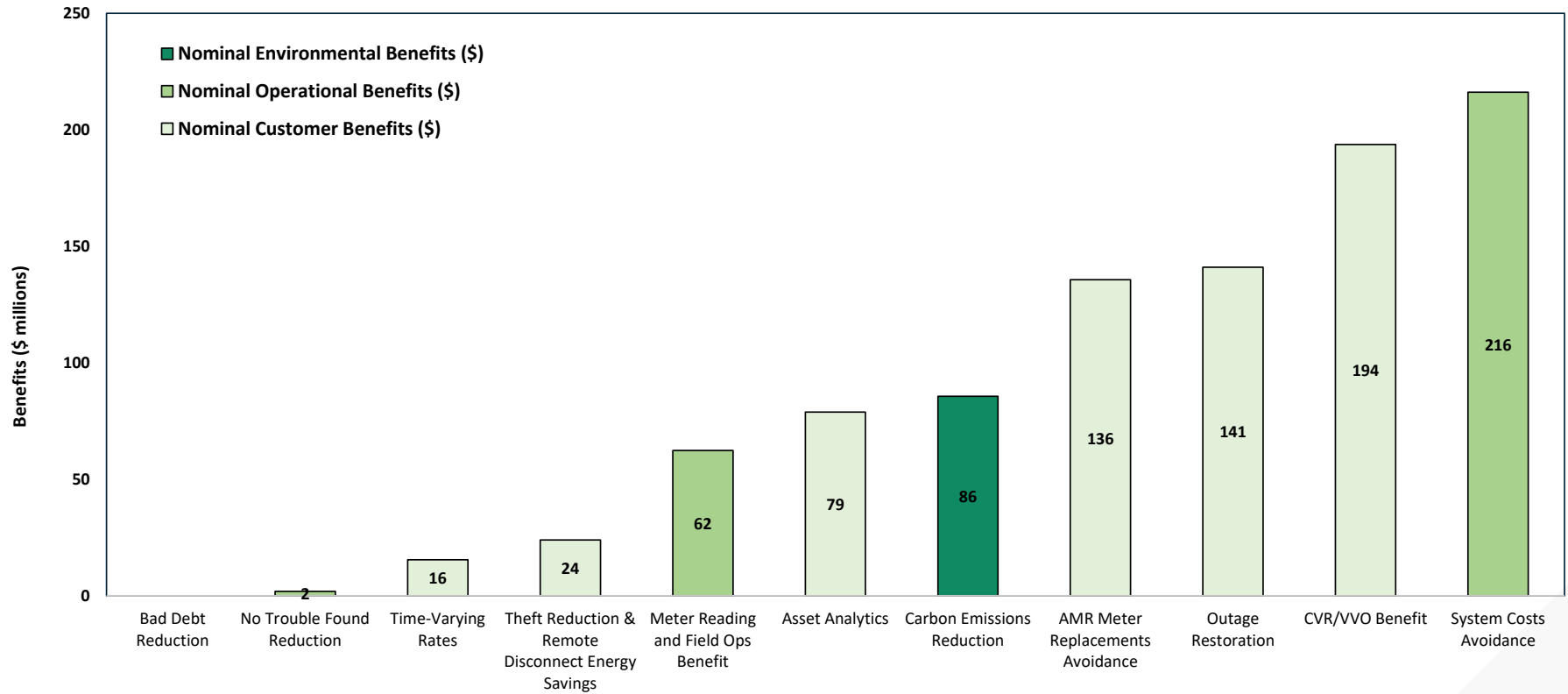
OPTIMIZED SCENARIO

The Optimized Scenario will begin meter deployment in 2033 with several key investments beginning as early as 2030



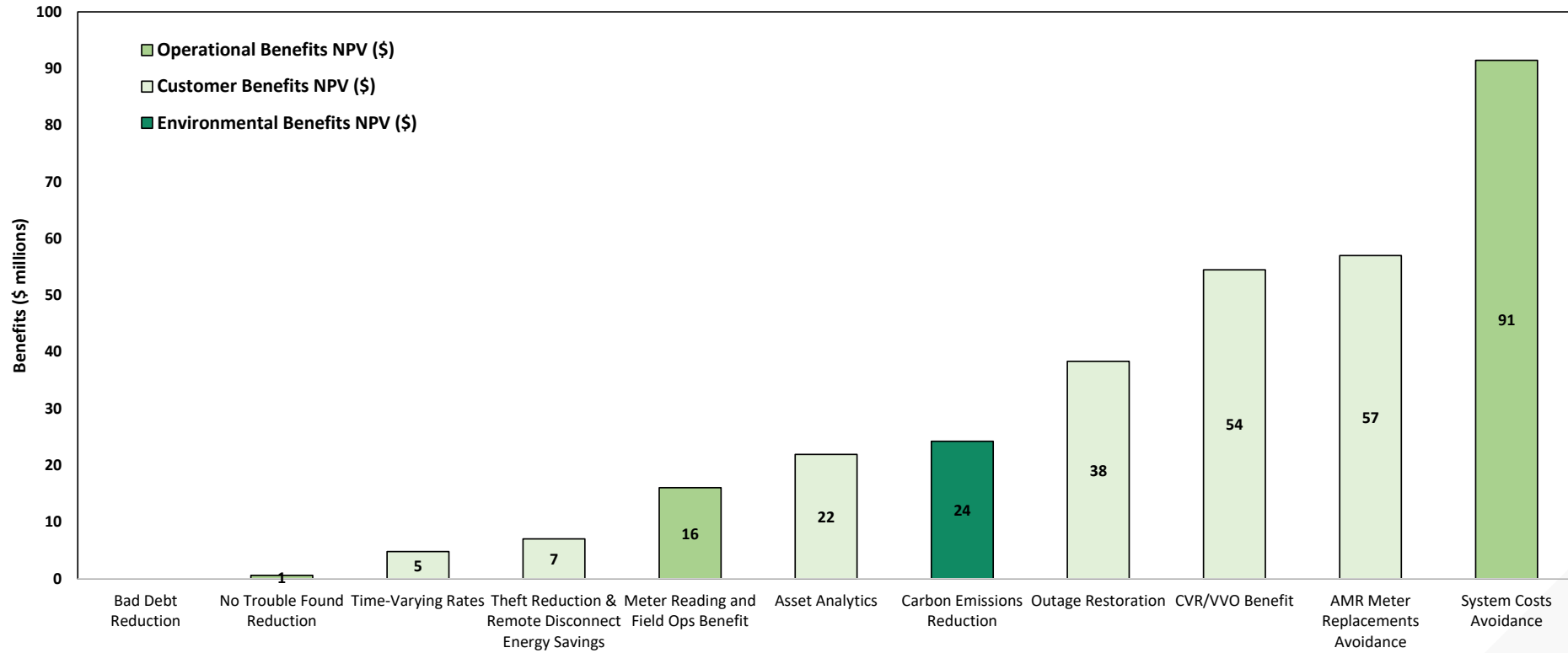
OPTIMIZED SCENARIO

The Optimized Scenario nominal benefits are driven by System Costs Avoidance, CVR/VVO Benefit, and Outage Restoration over a 20-year time horizon



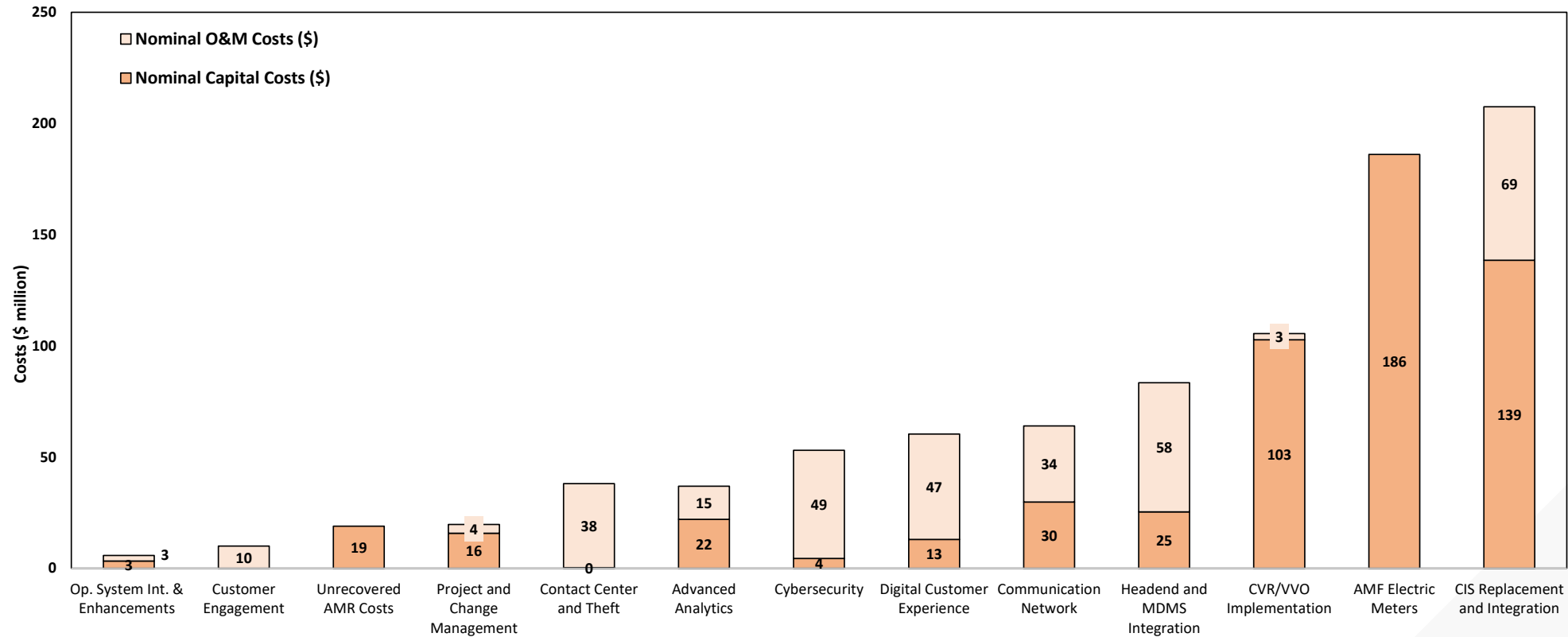
OPTIMIZED SCENARIO

The Optimized Scenario present value benefits are driven by System Cost Avoidance, AMR Meter Replacements Avoidance, and CVR/VVO Benefit over a 20-year time horizon



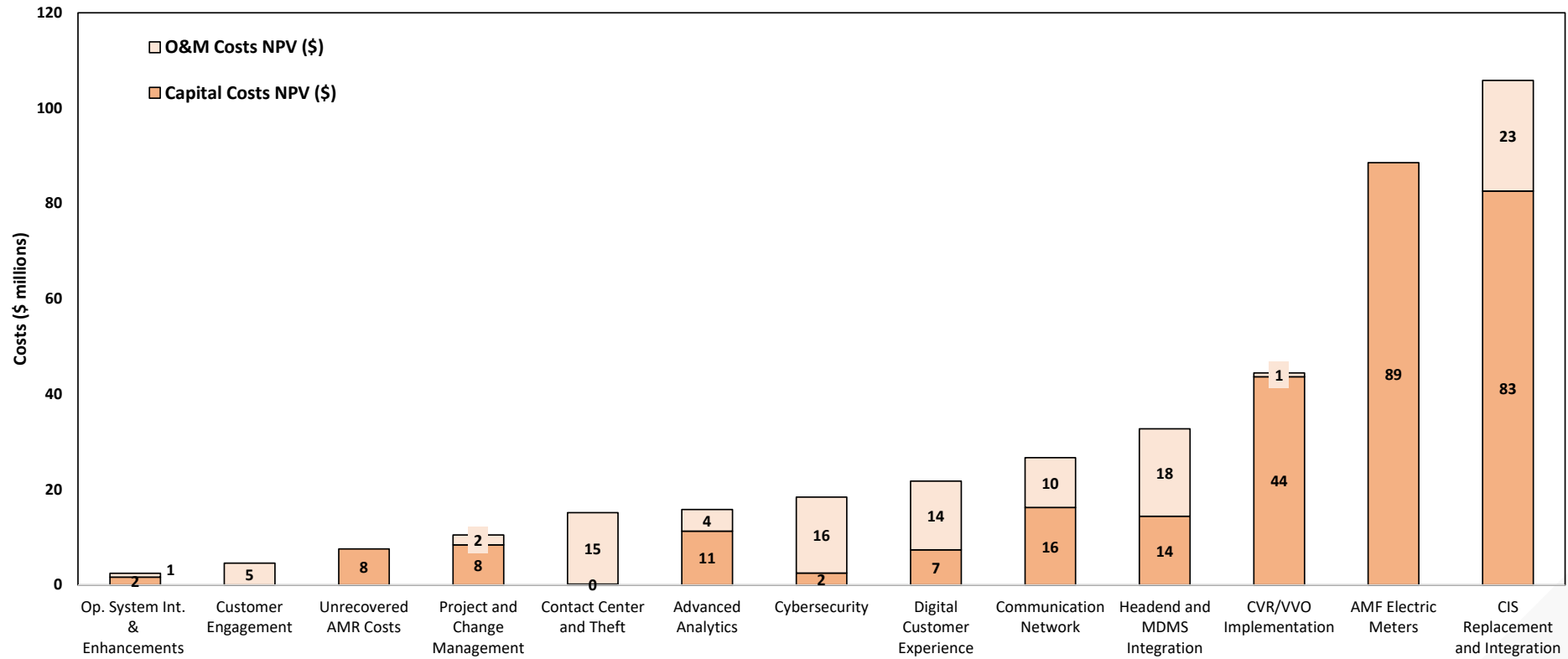
OPTIMIZED SCENARIO

The Optimized Scenario nominal costs are driven by CIS Replacement and Integration and AMR Electric Meter deployment



OPTIMIZED SCENARIO

The Optimized Scenario present value costs are driven by CIS Replacement and Integration and AMR Electric Meter deployment

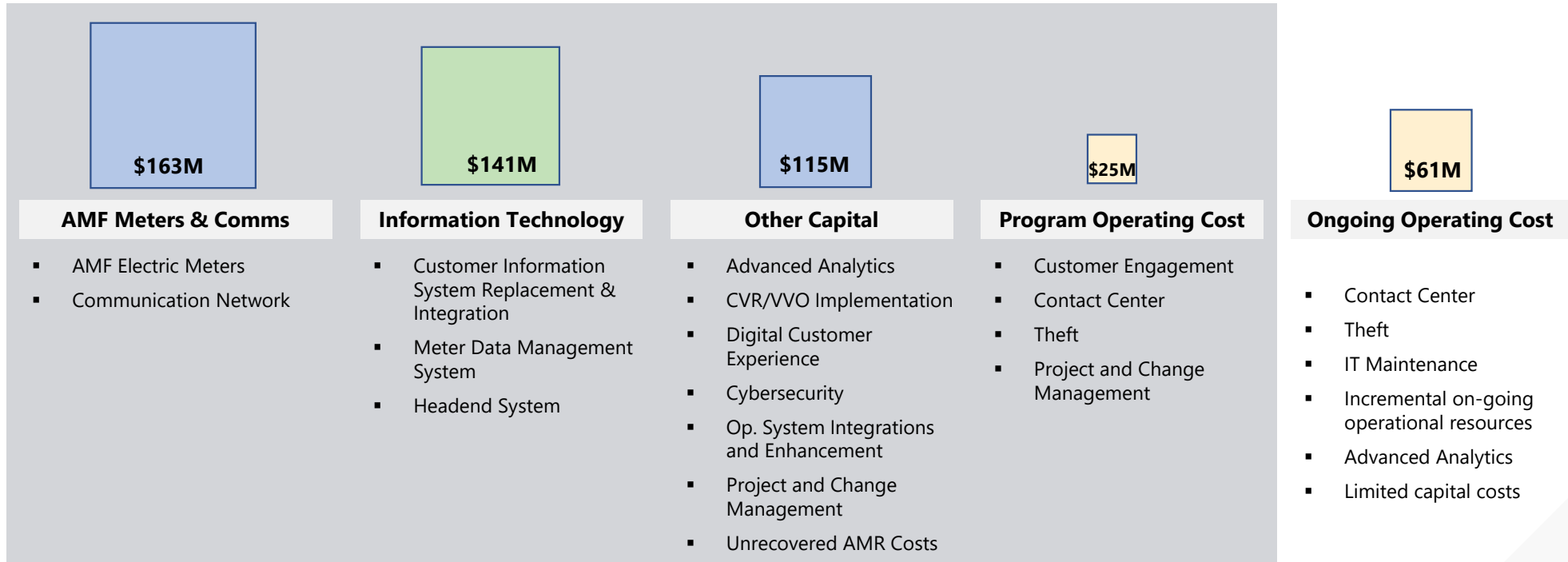


Base Scenario

Base Scenario Findings

BASE SCENARIO

In the Base Scenario, AMF program costs are concentrated in years 2025-2031, driven by the AMF electric meter deployment and communication network build-out

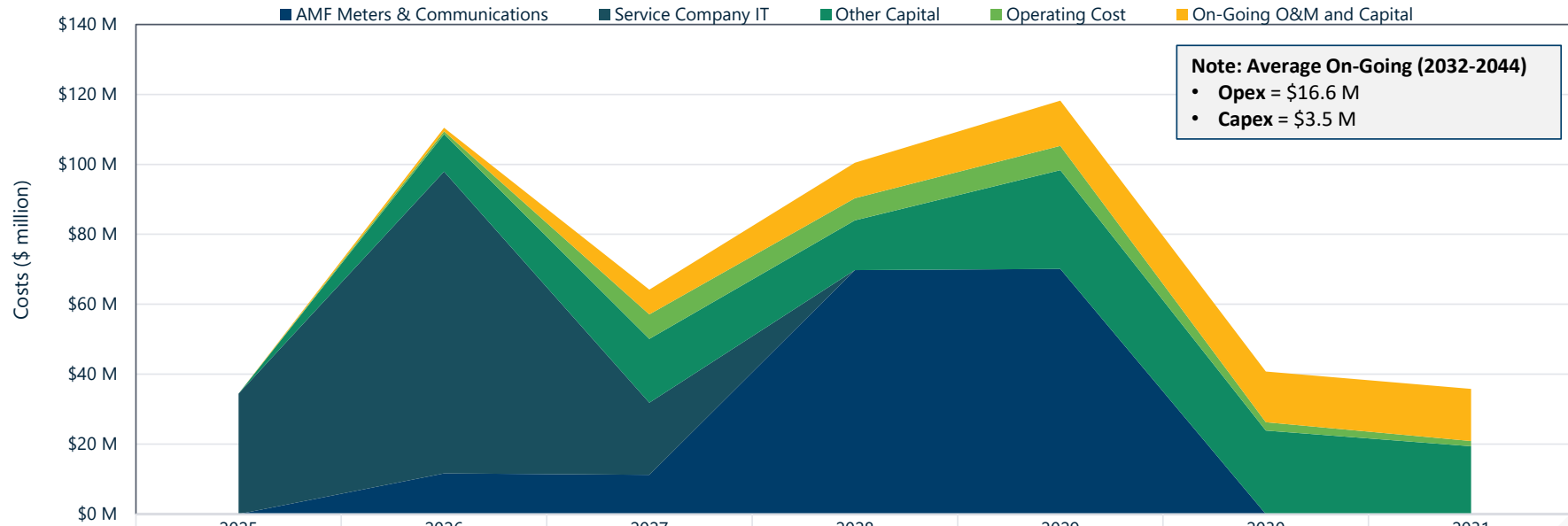


Total AMF build cost from 2025 to 2031 is estimated to be \$444 million, plus \$61 million in ongoing operating costs

BASE SCENARIO

Program costs are estimated to peak in the years 2026 and 2029, driven by CIS replacement and integration in 2026 and AMF deployment and CVR/VVO implementation in 2029

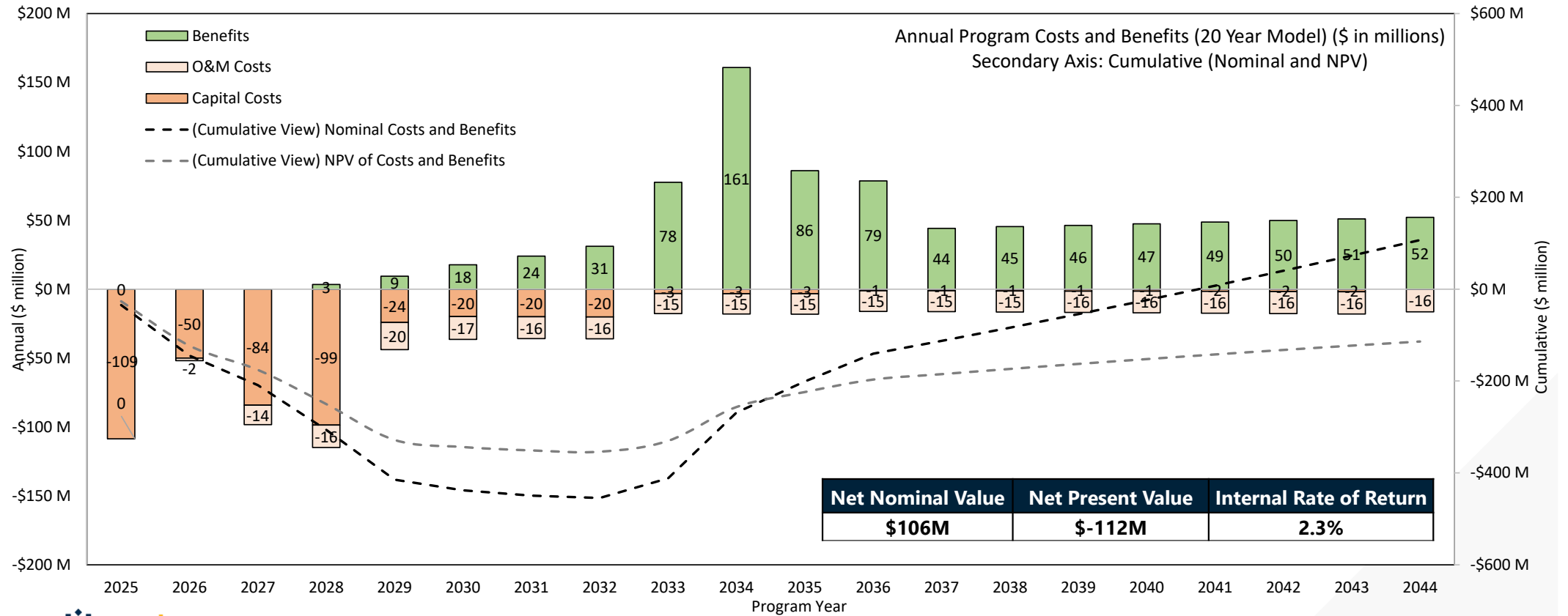
All AMF Program Costs (2025-2031)



	2025	2026	2027	2028	2029	2030	2031
On-Going O&M and Capital	\$0.00M	\$0.98M	\$7.09M	\$10.20M	\$12.94M	\$14.48M	\$14.90M
Operating Cost	\$0.00M	\$0.80M	\$7.03M	\$6.32M	\$6.90M	\$2.37M	\$1.47M
Other Capital	\$0.00M	\$10.72M	\$18.25M	\$14.23M	\$28.26M	\$23.87M	\$19.40M
Service Company IT	\$34.44M	\$86.32M	\$20.60M	\$0.00M	\$0.00M	\$0.00M	\$0.00M
AMF Meters & Communications	\$0.00M	\$11.60M	\$11.21M	\$69.73M	\$70.10M	\$0.00M	\$0.00M

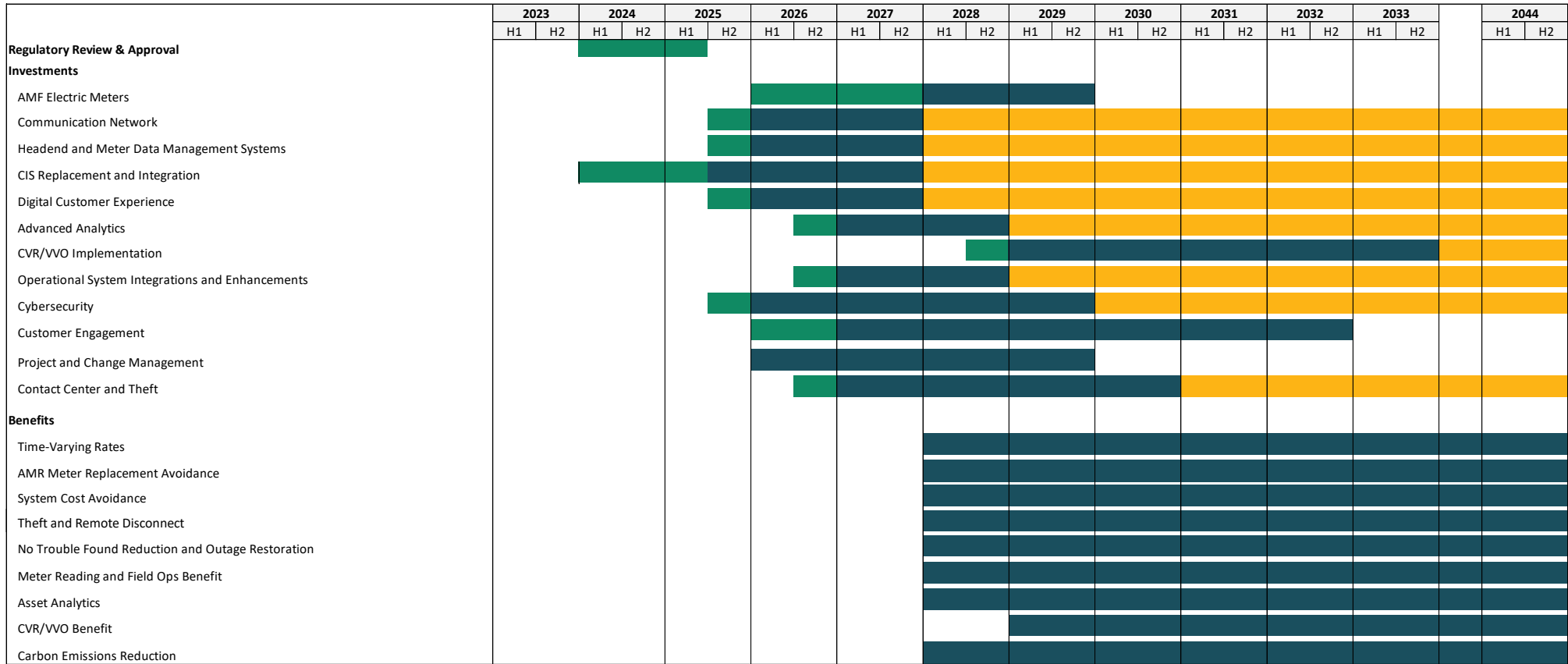
BASE SCENARIO

Base Scenario costs and benefits over a 20-year timeline yields a positive net nominal and a negative present value



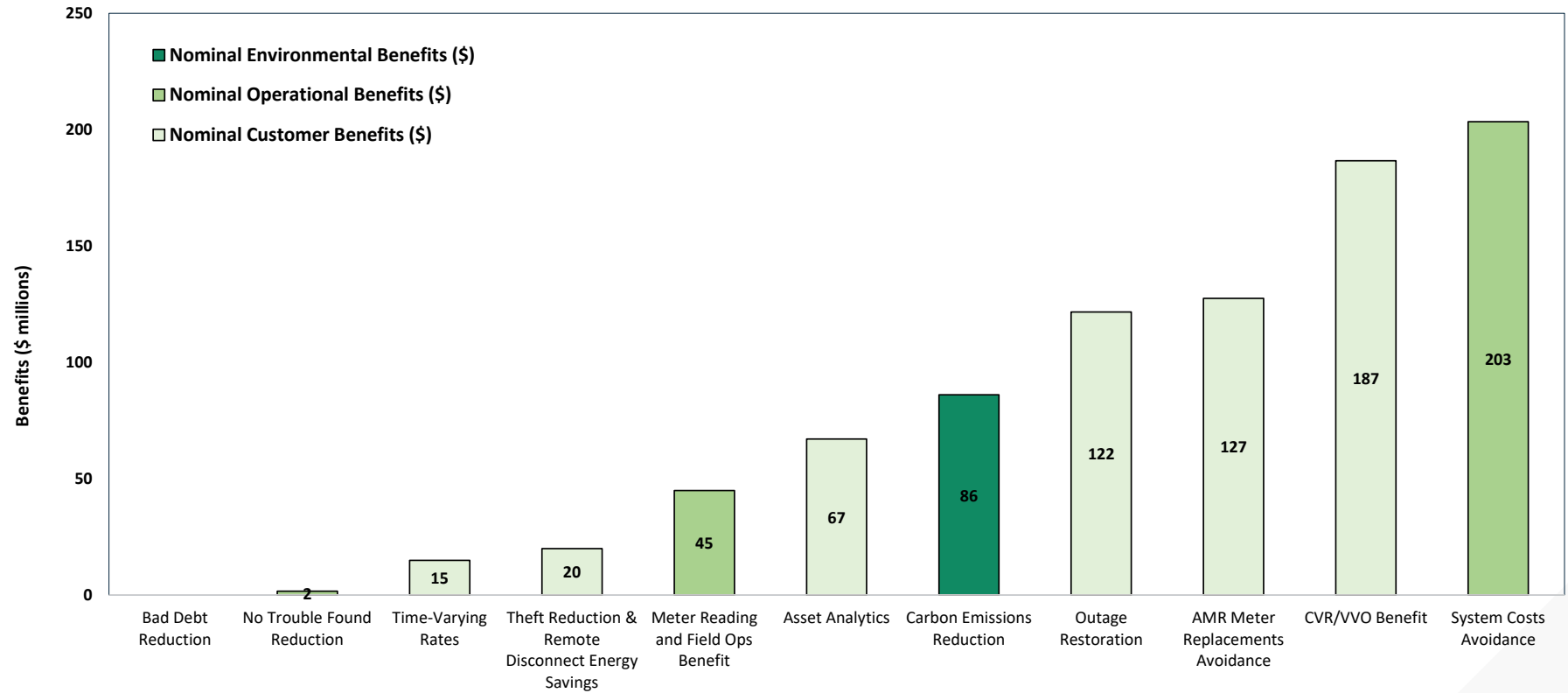
BASE SCENARIO

The Base Scenario will begin meter deployment in 2028 with several key investments beginning as early as 2025



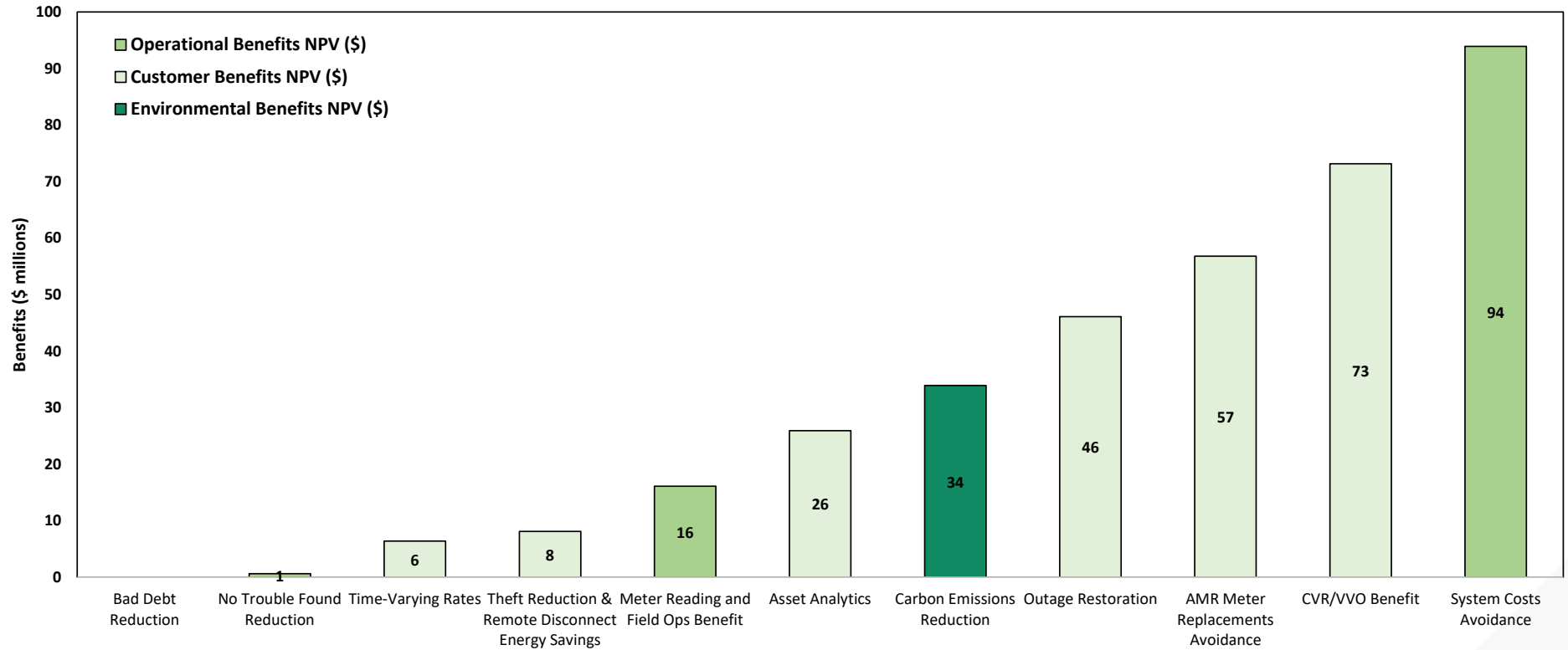
BASE SCENARIO

The Base Scenario nominal benefits are driven by System Cost Avoidance and CVR/VVO Benefit over a 20-year time horizon



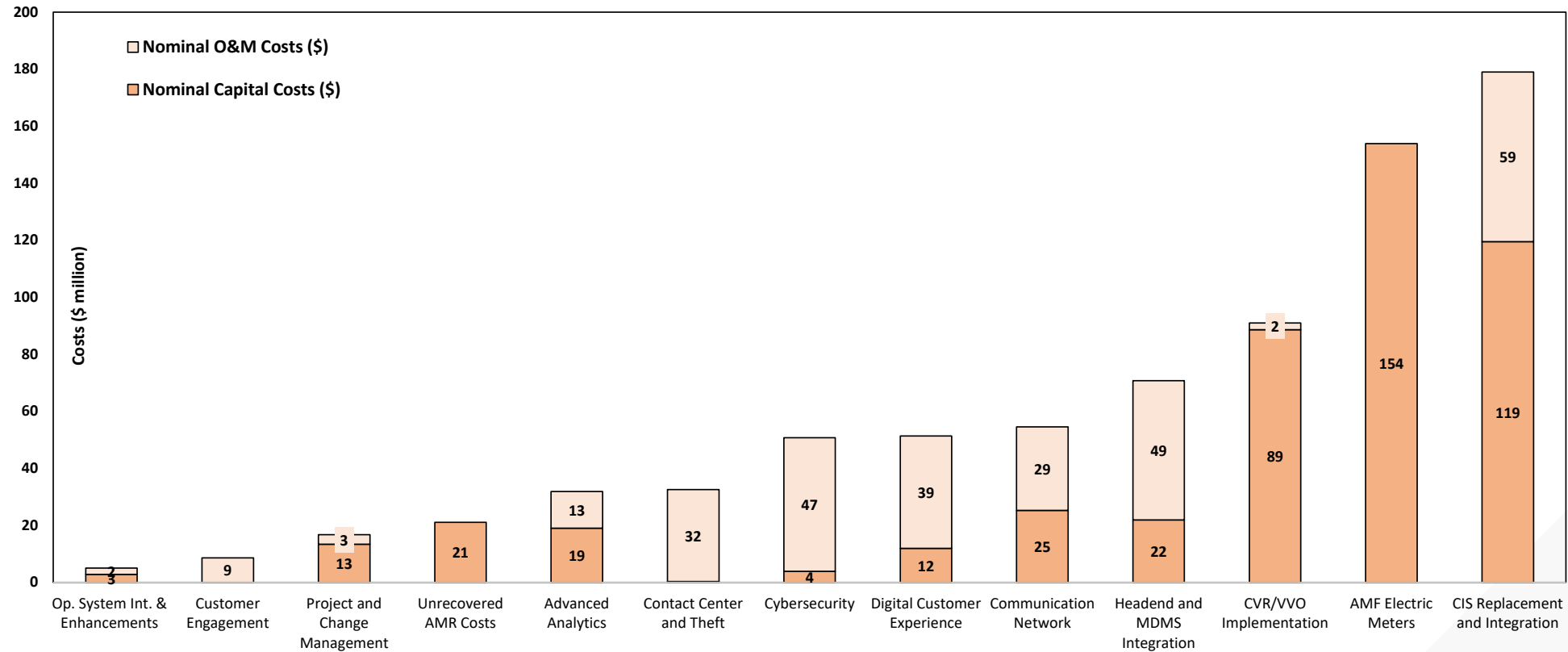
BASE SCENARIO

The Base Scenario present value benefits are driven by System Cost Avoidance and CVR/VVO Benefit over a 20-year time horizon



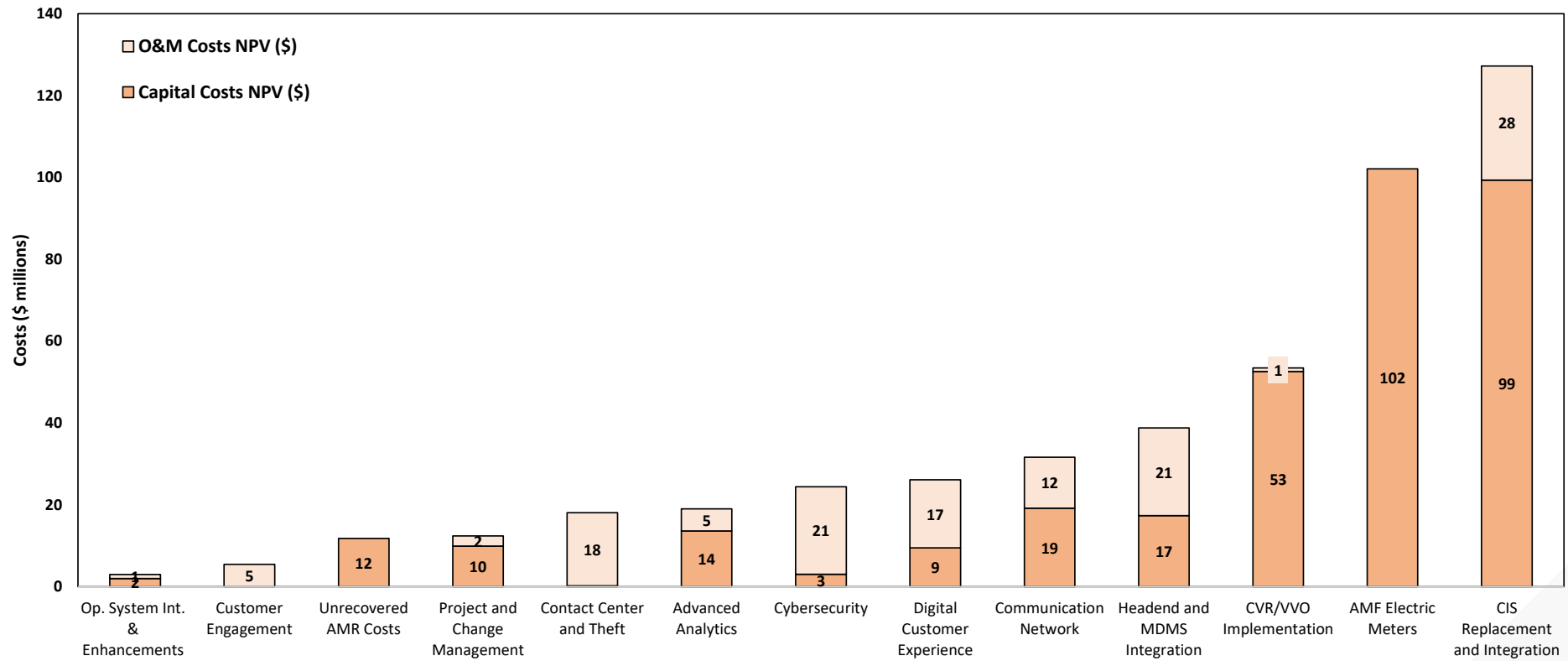
BASE SCENARIO

The Base Scenario nominal costs are driven by CIS Replacement and Integration and AMR Electric Meter deployment



BASE SCENARIO

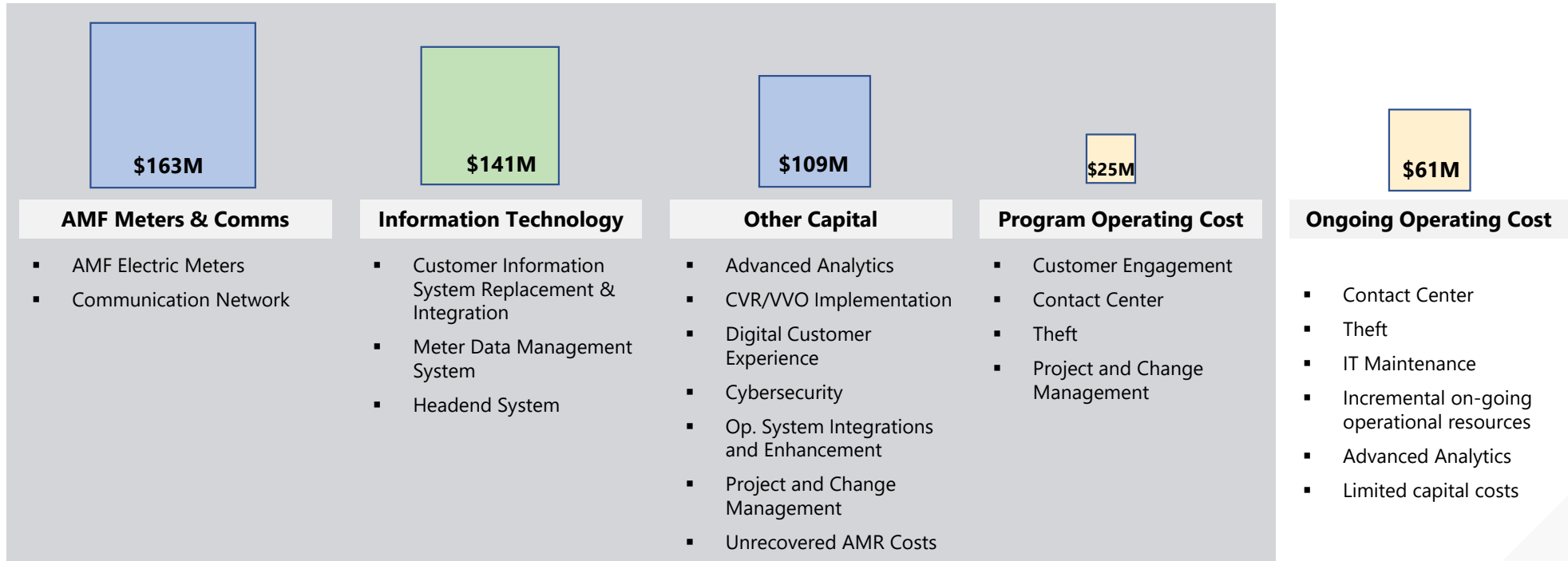
The Base Scenario present value costs are driven by and CIS Replacement and Integration and AMR Electric Meter deployment



No AMR Deployed Scenario

NO AMR DEPLOYED SCENARIO

In the No AMR Deployed Scenario, AMF program costs are concentrated in years 2025-2031, driven by the AMF electric meter deployment and communication network build-out

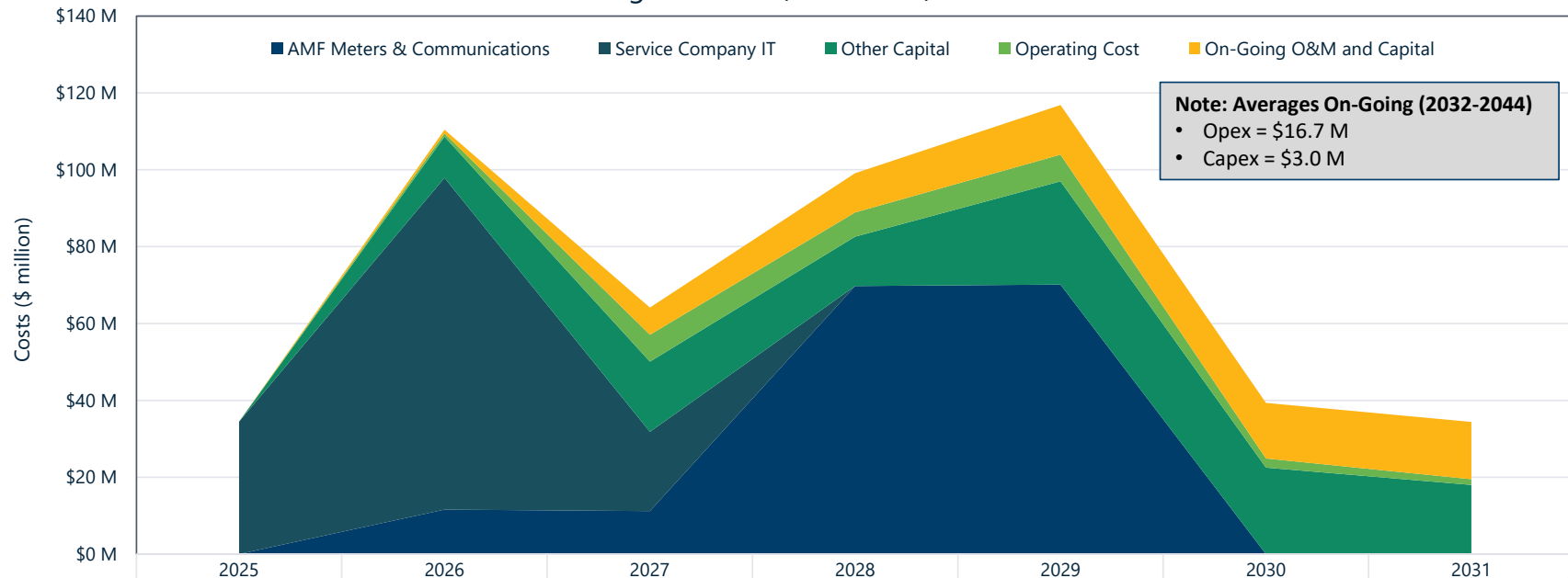


Total AMF build cost from 2025 to 2031 is estimated to be \$438 million, plus \$61 million in ongoing operating costs

NO AMR DEPLOYED SCENARIO

Eversource NH AMF program costs are estimated to peak in the years 2026 and 2029, driven by CIS replacement and integration in 2026 and AMF deployment and CVR/VVO implementation in 2029

All AMF Program Costs (2025-2031)

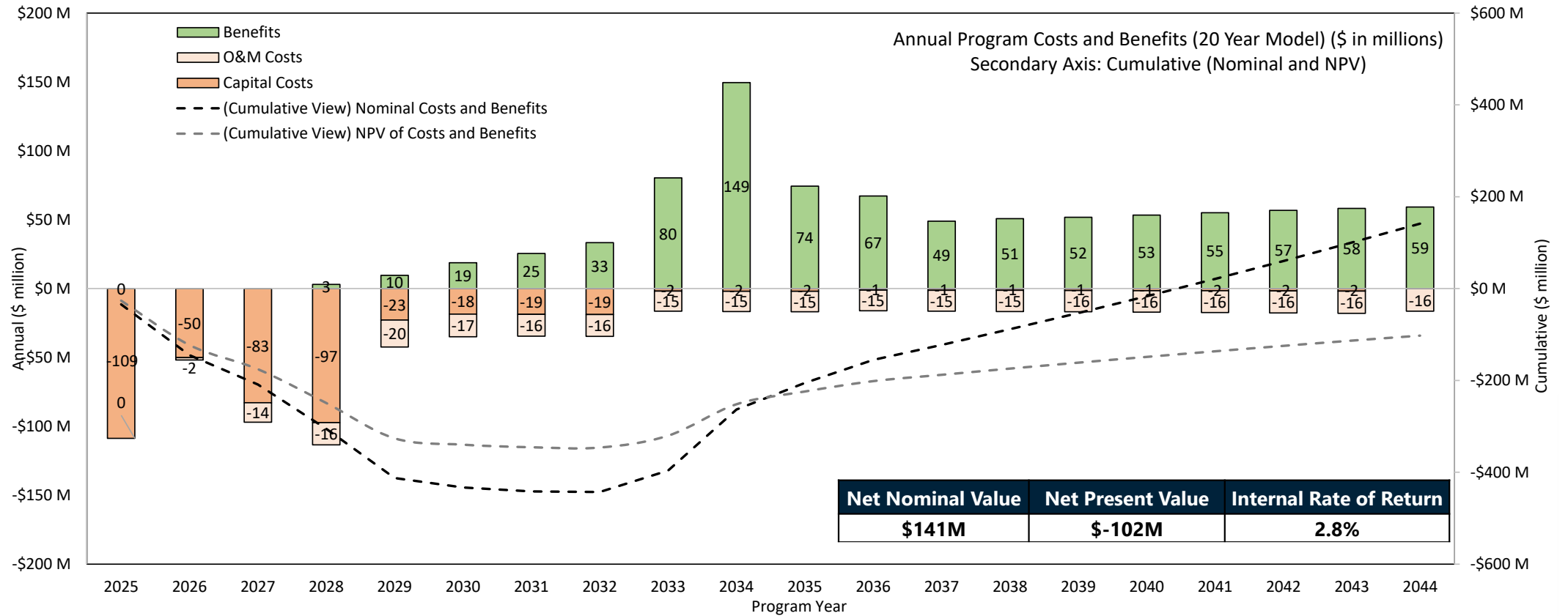


	2025	2026	2027	2028	2029	2030	2031
On-Going O&M and Capital	\$0.00M	\$0.98M	\$7.09M	\$10.20M	\$12.94M	\$14.48M	\$14.90M
Operating Cost	\$0.00M	\$0.80M	\$7.03M	\$6.32M	\$6.90M	\$2.37M	\$1.47M
Other Capital	\$0.00M	\$10.72M	\$18.25M	\$12.87M	\$26.90M	\$22.51M	\$18.03M
Service Company IT	\$34.44M	\$86.32M	\$20.60M	\$0.00M	\$0.00M	\$0.00M	\$0.00M
AMF Meters & Communications	\$0.00M	\$11.60M	\$11.21M	\$69.73M	\$70.10M	\$0.00M	\$0.00M



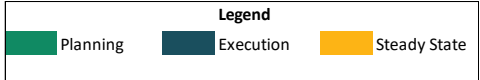
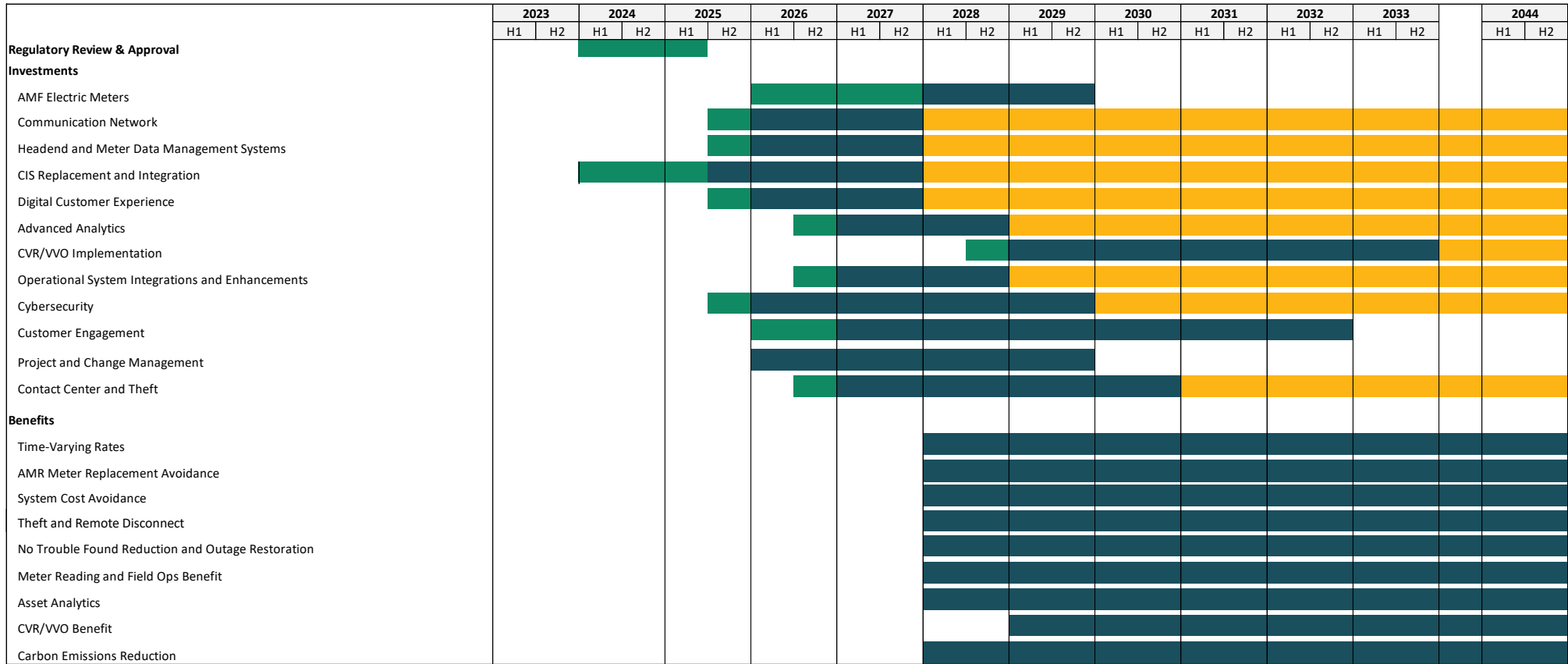
NO AMR DEPLOYED SCENARIO

No AMR Deployed Scenario costs and benefits over a 20-year timeline yields a positive net nominal and a negative present value



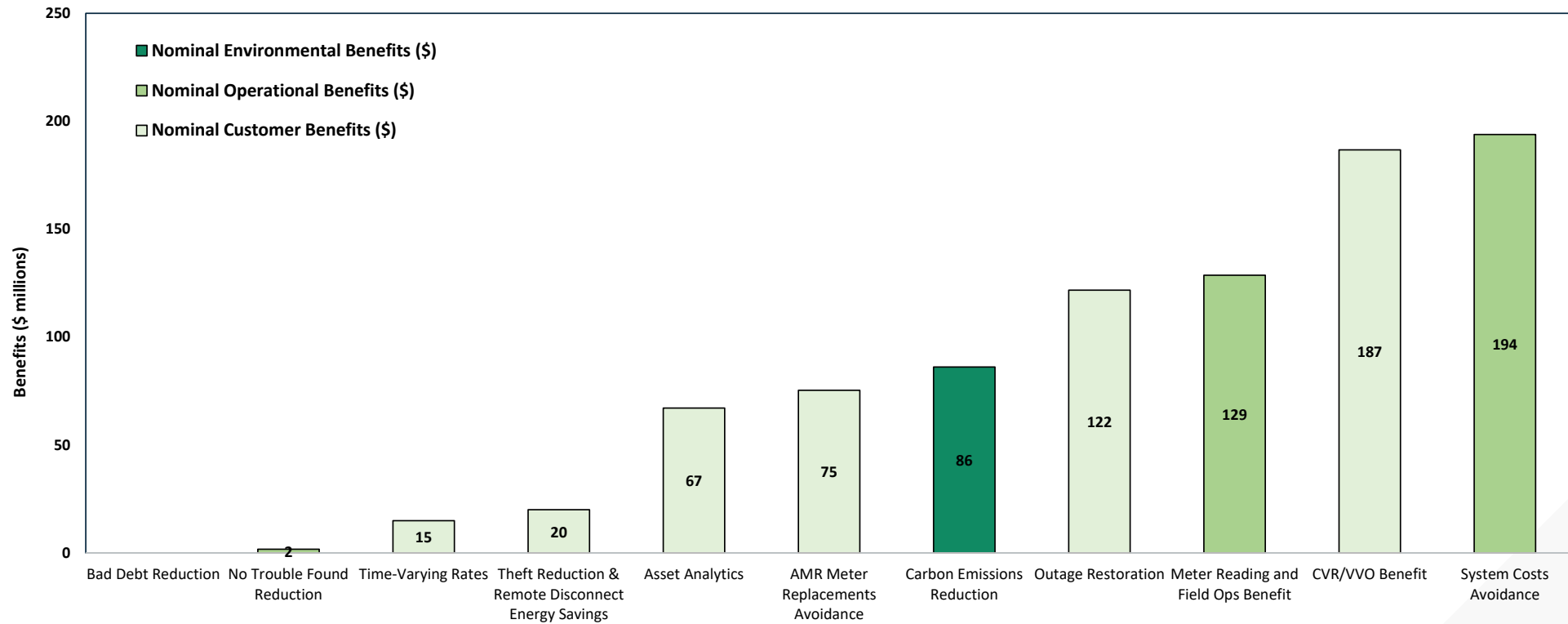
NO AMR DEPLOYED SCENARIO

The Base Scenario will begin meter deployment in 2028 with several key investments beginning as early as 2025



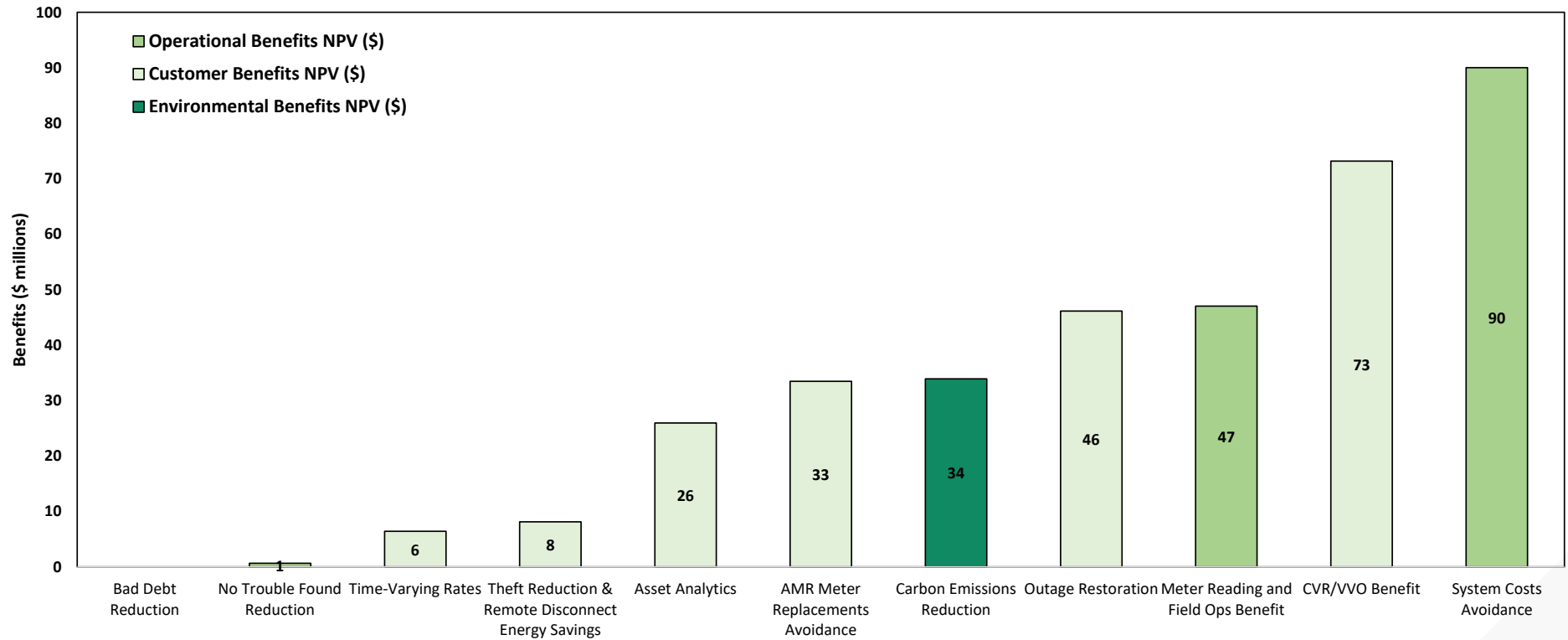
NO AMR DEPLOYED SCENARIO

The No AMR Deployed Scenario nominal benefits are driven by System Cost Avoidance and CVR/VVO Benefit over a 20-year time horizon



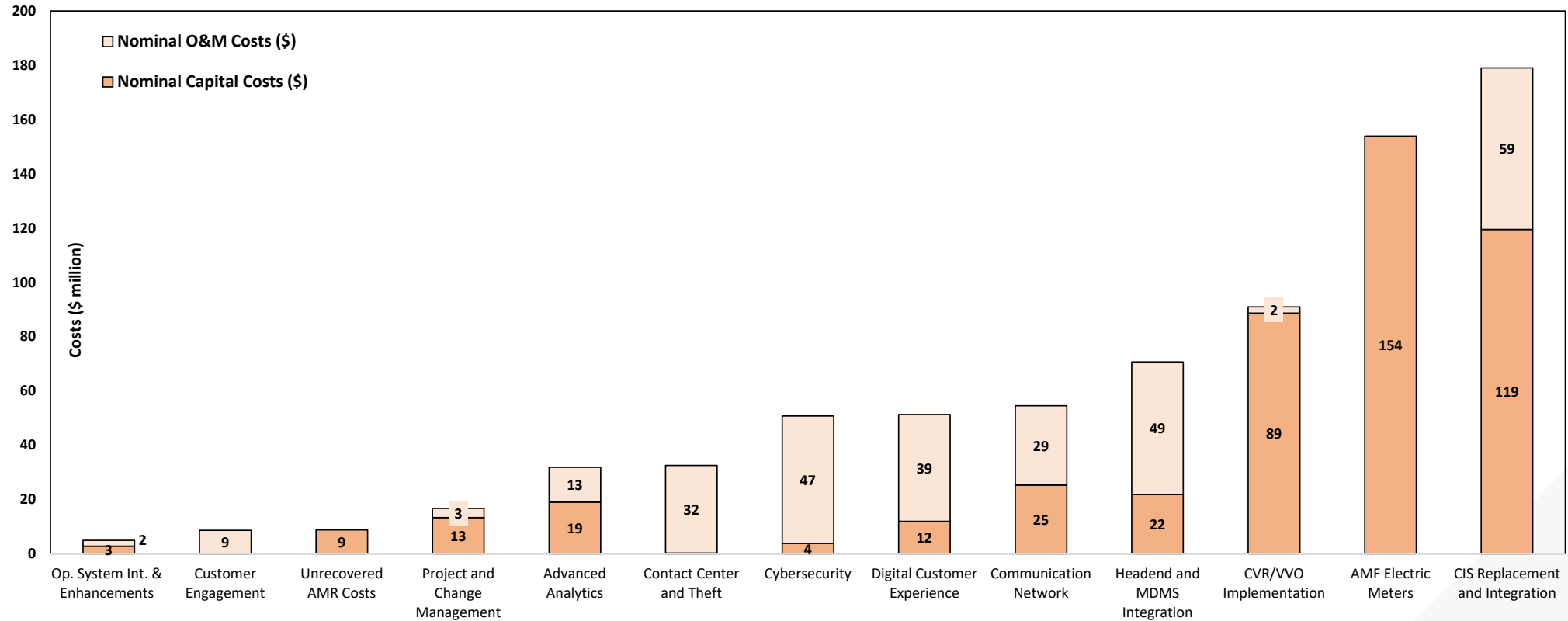
NO AMR DEPLOYED SCENARIO

The No AMR Deployed Scenario present value benefits are driven by System Cost Avoidance and CVR/VVO Benefit over a 20-year time horizon



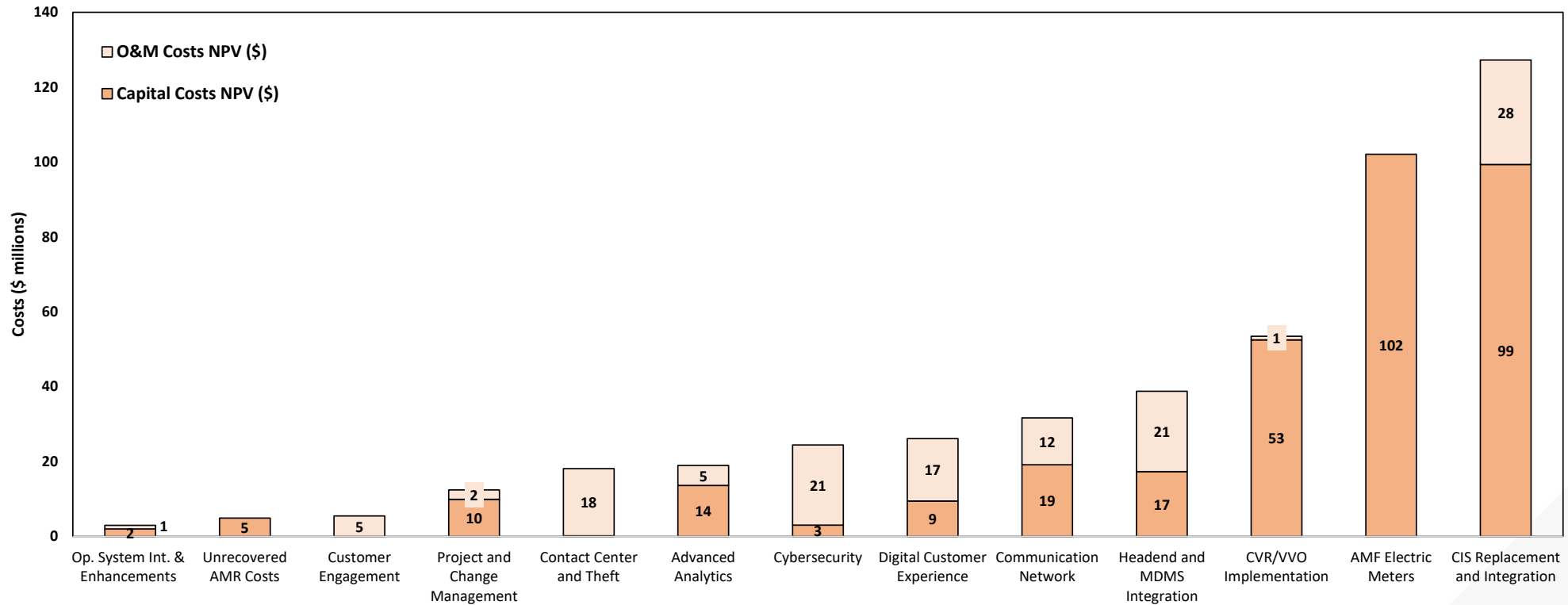
NO AMR DEPLOYED SCENARIO

The No AMR Deployed Scenario nominal costs are driven by CIS Replacement and Integration and AMR Electric Meter deployment



NO AMR DEPLOYED SCENARIO

The No AMR Deployed Scenario present value costs are driven by CIS Replacement and Integration and AMR Electric Meter deployment



Appendix

Base Scenario Investment and Benefit Details

AMF Overview



Appendix

Base Scenario Investment and Benefit Details

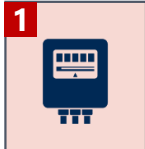


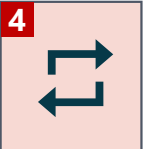
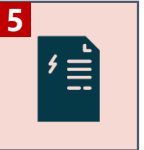





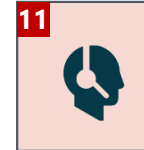


AMF Overview







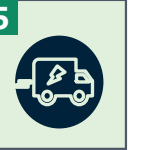



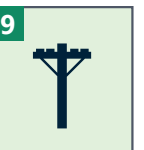

INVESTMENT AND BENEFIT OVERVIEW

To fully achieve the customer and operational benefits enabled by AMF, Eversource will need to make investments in operational assets, systems, and processes

INVESTMENTS

 1 <u>AMF Electric Meters</u>	 2 <u>Communication Network</u>	 3 <u>Headend and MDMS</u>	 4 <u>CIS Replacement & Integration</u>	 5 <u>Digital Customer Experience</u>
 6 <u>Advanced Analytics</u>	 7 <u>CVR/VVO Implementation</u>	 8 <u>Operational System Integrations and Enhancements</u>	 9 <u>Cybersecurity</u>	
 10 <u>Customer Engagement</u>	 11 <u>Contact Center and Theft</u>	 12 <u>Unrecovered AMR Costs</u>	 13 <u>Project and Change Management</u>	

BENEFITS

 1 <u>Time-Varying Rates</u>	 2 <u>AMR Meter Replacement Avoidance</u>	 3 <u>System Costs Avoidance</u>	 4 <u>Theft Reduction & Remote Disconnect Energy Savings</u>	 5 <u>No Trouble Found (NTF) Reduction</u>
 6 <u>Meter Reading and Field Ops Benefit</u>	 7 <u>Outage Restoration</u>	 8 <u>Asset Analytics</u>	 9 <u>CVR/VVO Benefit</u>	 10 <u>Carbon Emissions Reduction</u>

QUALITATIVE AND SOCIETAL BENEFITS

More accurate load profiles, improved customer experience, customer energy insights, and societal economic and jobs benefits

Investment Overviews

1 AMF Electric Meters

20-YEAR NPV (\$M)

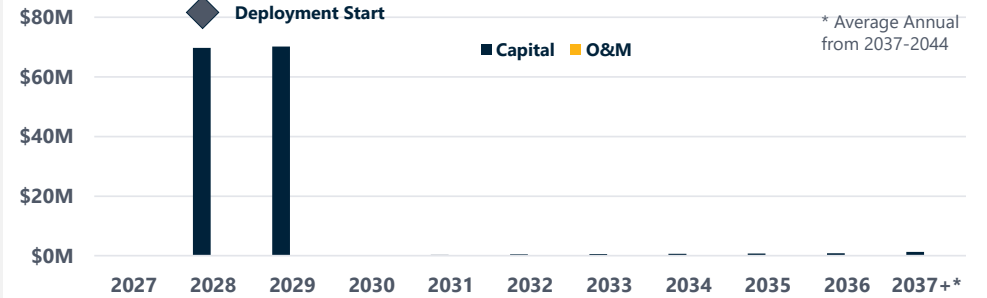
CAPITAL	O&M	TOTAL
\$102.09	\$0.00	\$102.09

Summary of Findings

OVERVIEW

AMF electric meters are the foundational investment needed to enable all associated use cases tied to AMF. It is also the largest cost component, which includes the installation cost. Eversource anticipates using a combination of internal and external crews to deploy around 608,000 meters over the two-year time frame, beginning in 2028 and concluding by the start of 2030. The detailed deployment schedule will be developed after coordinating with relevant internal and external stakeholders and advocacy groups. All 82k AMF-ready bridge meters (plus ~5k expected to be installed through 2030) will also be replaced. After deployment, an estimated total of 608k meters will leverage the AMF network. AMF deployment is dependent on the NH communications network installation and integrations of CIS, MDMS, and Headend. Planning begins in 2026 and meter deployment in 2028.

INVESTMENT TIMELINE (\$ M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE		Planning and AMF RFP Vendor Selections	Planning and AMF RFP Vendor Selections	Begin AMF Deployment	Complete AMF Deployment	AMF Steady State with ongoing replacements as needed				
DEPENDENCY	Begin CIS Imp	Begin Comm Network, Headend, and MDMS Comp. CIS Imp. & begin CIS Integration Begin Digital CX and Cybersecurity	Comp. Comm Network, Headend, and MDMS Complete CIS Integration Comp. Digital CX and Cybersecurity							

TOTAL INVESTMENT (\$ M)

DEPENDENCIES

	Capital	O&M	Total Cost		AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Meters During Deployment	\$114.90	\$0.00	\$114.90	75%	Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Meter Deployment Labor	\$24.93	\$0.00	\$24.93	16%	Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
On-Going Meter Replacement Capital	\$6.53	\$0.00	\$6.53	4%	Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
On-Going Meter Replacement Labor	\$7.49	\$0.00	\$7.49	5%	Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Total	\$153.85	\$0.00	\$153.85	100%	Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

1 AMF Electric Meters

INPUT NAME	ESTIMATE	SOURCE
Meter Growth Rate (%/year)	0.85%	Eversource
AMF Meter Replacement Rate (%/year)	0.50%	Eversource
Meter Socket, A-base, Weatherhead Repairs Needed (%)	0.05%	Eversource
Meters Needing Line Wiring Extensions (%)	0.05%	
Residential Meters		
Meters to be replaced (#) (as of 2023)	541,233	Eversource
Cost per AMF Meter (\$)	\$147	Eversource
Small C&I Meters		
Meters to be replaced (#) (as of 2023)	37,829	Eversource
Cost per Small C&I AMF Meter (\$)	\$212	
Large C&I Meters		
Small C&I Meters to be replaced (#) (as of 2023)	8,260	Eversource
Cost per AMF Meter (\$)	\$280	

20-YEAR NPV (\$M)		
CAPITAL	O&M	TOTAL
\$102.09	\$0.00	\$102.09

Summary of Findings

METER COSTS

$$\begin{array}{c}
 \text{Annual AMF Meters Deployed (\#)} \\
 \text{Res: 280k} \\
 \text{Small C\&I: 20k} \\
 \text{Large C\&I: 4k}
 \end{array}
 \times
 \begin{array}{c}
 \text{Meter Cost (\$)} \\
 \text{Res: \$147} \\
 \text{Small C\&I: \$212} \\
 \text{Large C\&I: \$280}
 \end{array}
 \times
 \begin{array}{c}
 \text{Annual General Inflation (\%)} \\
 3\%
 \end{array}
 =
 \begin{array}{c}
 \text{Annual AMF Deployed Meter Cost (\$)} \\
 \mathbf{\$52.2M}
 \end{array}$$

LABOR COSTS

$$\begin{array}{c}
 \text{Annual AMF Meters Deployed (\#)} \\
 \text{Res: 280k} \\
 \text{Small C\&I: 20k} \\
 \text{Large C\&I: 4k}
 \end{array}
 \times
 \begin{array}{c}
 \text{Meter Labor Contractor Cost (\$)} \\
 \text{Res: \$27} \\
 \text{Small C\&I: \$40} \\
 \text{Large C\&I: \$74}
 \end{array}
 \times
 \begin{array}{c}
 \text{Annual Labor Inflation (\%)} \\
 3\%
 \end{array}
 =
 \begin{array}{c}
 \text{Annual AMF Replacement Meter Cost (\$)} \\
 \mathbf{\$11.0M}
 \end{array}$$

ASSUMPTIONS

- Cost assumptions were based on average costs from the Eversource MA AMF RFP conducted in H1 2023 and MA RFI from 2021
- Similar to Eversource MA, warehousing and other overhead costs during installation are assumed to be included in vendor quote
- Meter growth continues through and after AMF deployment
- Each year during deployment, 0.05% of meters (304 meters) need additional repairs and wiring extensions, requiring an additional labor cost of \$112 per meter and resulting in an additional labor cost of \$35k/year

2 Communication Network

20-YEAR NPV (\$M)

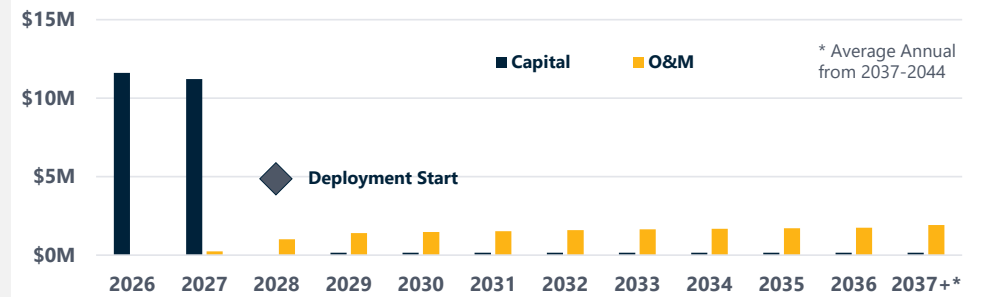
CAPITAL	O&M	TOTAL
\$19.14	\$12.48	\$31.63

Summary of Findings

OVERVIEW

The telecommunication network is the backbone and a foundational element needed to enable all AMF use cases. The network consists of end points on the meters that transmit the meter reads through a wireless network where the data is eventually received by the AMF headend which decrypts the meter read and makes it ready for consumption by other systems (namely MDMS). The technology used can vary and a formal request for proposal process will be performed to select a technology and vendor solution. It is assumed that 85% of the meters in the service territory (located in more densely populated areas) will connect and transmit data through a wireless Eversource-owned mesh network and 15% of the meters (located in less densely populated areas) will transmit data through an existing carrier's (e.g., Verizon, AT&T, etc.) network paying an ongoing monthly fee per meter connected.

INVESTMENT TIMELINE (\$ M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE		Begin Communications Equipment Install	Complete Network Optimization and Support							
DEPENDENCY		Begin MDMS and Headend Begin Cybersecurity	Complete and prepare MDMS and Headend	Begin AMF Deployment	Complete AMF Deployment					

TOTAL INVESTMENT (\$ M)

	Capital	O&M	Total Cost	
Network Fees	\$0.00M	\$11.43M	\$11.43M	21%
Manage, Design, Support, Testing	\$10.86M	\$0.00M	\$10.86M	20%
AMF IT/Tech Support/Eq.Repl.Labor	\$2.51M	\$17.84M	\$20.36M	37%
Physical Infrastructure, Installs & Replacement	\$11.28M	\$0.00M	\$11.28M	21%
Comms Tester Hardware, Other	\$0.61M	\$0.00M	\$0.61M	1%
Total	\$25.26M	\$29.28M	\$54.54M	100%

DEPENDENCIES

AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

2 Communication Network

20-YEAR NPV (\$M)

CAPITAL	O&M	TOTAL
\$19.14	\$12.48	\$31.63

Summary of Findings

CALCULATIONS AND OTHER METHODOLOGY

ASSUMPTIONS

	Cost Per Unit 2023\$	Number of Units	Year 1 Comm. Install (2026)	Year 2 Comm. Install (2027)	Annual Ongoing	20-Year Total (Nominal)
Mesh Network Labor Costs (\$)						
Access Point Installation	\$2,000 per access point	407 (only for mesh meters)	\$0.4M	\$0.5M		\$0.9M
Repeater Installation	\$2,000 per repeater	570 (only for mesh meters)	\$0.6M	\$0.6M		\$1.3M
AMF Ops Labor (Program)	\$111,700 per FTE	4	\$0.5M	\$0.5M		\$1.0M
AMF Technical Support Labor (Program)	\$111,700 per FTE	4	\$0.5M	\$0.5M		\$1.0M
AMF Ops Labor (Operations)	\$111,700 per FTE	2	-	-	\$0.3M-\$0.4M	\$5.6M
AMF Technical Support Labor (Operations)	\$111,700 per FTE	3	-	-	\$0.4M-\$0.6M	\$8.5M
Access Point Installation for Replacements	\$2,000 per access point	9/yr	\$0	\$0	\$21.5k-\$33.5k	\$0.4M
Repeater Installation for Replacements	\$2,000 per repeater	12/yr	\$0	\$0	\$28.7k-\$44.6k	\$0.6M
Comm Network Installation Engineering Design	2,712 per design	977 (relays and APs)	\$1.4M	\$1.5M		\$2.9M
Network Project Management	\$2,550,000	1	\$1.4M	\$1.4M		\$2.8M
Field Network Design	\$637,500	1	\$0.3M	\$0.4M		\$0.7M
Field Network Installation Support	\$2,805,000	1	\$1.5M	\$1.6M		\$3.1M
Other Costs (Training, Field Deployment Manager, Expenses)	\$255,000	1	\$0.1M	\$0.1M		\$0.3M
Mesh Network Material Costs (\$)						
Access Point	\$7,339	407	\$1.6M	\$1.6M		\$3.2M
Cell Antennas	\$50	407 (1 per AP)	\$10.8k	\$10.8k		\$21.6k
Relays	\$1,261	570	\$0.4M	\$0.4M		\$0.8M
Battery Back-Up	\$1,300	977 (relays and APs)	\$0.7M	\$0.7M		\$1.3M
Mounting Kit	\$275	977 (relays and APs)	\$0.1M	\$0.1M		\$0.3M
Cables (2)	\$125	1,954 (2 per AP and relay)	\$0.1M	\$0.1M		\$0.3M
Field Service Unit	\$2,500	4	\$10.6k			\$10.6k
Access Point Replacements	\$7,339	9/yr			\$70.1k	\$1.1M
Relay Replacements	\$1,261	12/yr			\$16.1k	\$0.3M
Battery Back-Up and Other Equipment Replacements	\$1,575	977 batt. + 977 mounting kits			\$35.1k	\$0.6M
Mesh Network IT Costs (\$)						
IOT Test Environment	\$500,000	1	\$0.5M			\$0.5M
Communications Tester	\$3,500 per tester	4	\$14.9k			\$14.9k
Handheld Configurator & Tester Software	\$2,500 per tester	4	\$10.6k			\$10.6k
Network Ongoing IT Costs (\$)						
Cellular Meters - Connectivity Fee	\$3 per meter/year	100k cellular connected meters			\$0.3M	\$5.0M
Backhaul - Cellular Connectivity Fee	\$540 per AP/year	407 APs			\$0.2M	\$4.2M
Regulator & Capacitor (CVR/VVO) Cellular Connectivity Fee	\$240 per eq./year	540 (30% of 1,800 total)			\$0.2M	\$2.2M

- Cost assumptions were based on average costs from the Eversource MA AMF RFP conducted in H1 2023 and MA RFI from 2021
- 85% of meters will be connected through a mesh network and 15% of meters will be connected through a cellular network
- 1,500 meters per AP and 1.4 repeaters per AP
- Network buildout based on total number of AMF meters installed over next 20 years
- Two-year network buildout and is completed before meter deployment begins
- Over-time the network solution provider will likely still provide support services to work with the expanded Eversource team consisting of an incremental 2 FTEs in AMF Ops and 3 in Network Technical Support roles

Data does not include contingency and overhead

3 Headend and Meter Data Management System (MDMS)

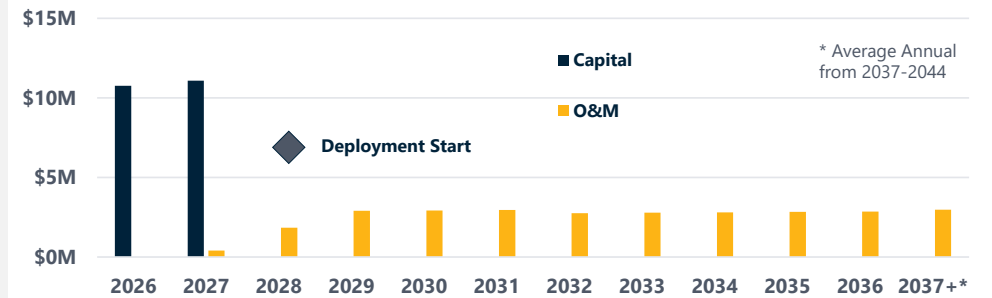
20-YEAR NPV (\$M)		
CAPITAL	O&M	TOTAL
\$17.32	\$21.43	\$38.75

Summary of Findings

OVERVIEW

The communications network vendor is the typical provider of the Headend software-as-a-service, which functions as the hub of all meter data gathered from field devices. It provides the pre-processing and security features to data retrieved by Eversource’s Meter Data Management System (MDMS), serving as the data repository of all granular meter data. Its core functionality includes validating, estimating, and editing (VEE) meter reads before the reads are passed to other systems. Usage data from the MDMS will then flow to other systems such as the new Customer Information System (CIS) to enable time varying rates and customer digital channels to provide usage insights and alerts to customers. The MDMS will also be connected to Eversource’s data analytics platform to enable the target use cases made possible through AMF data. Eversource NH will be integrated into the MDMS that is selected for Eversource MA AMF.

INVESTMENT TIMELINE (\$ M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE	Plan with selected Headend and MDMS vendors	• Begin MDMS and Headend install • Begin CIS integration with MDMS	• Complete MDMS and Headend • Complete CIS integration with MDMS	Network Optimization and Support						
DEPENDENCY	Begin CIS Replacement	• Complete CIS replacement • Begin Comm Network Install • Begin Cybersecurity	Complete Comm Network Install	Begin AMF Deployment	Complete AMF Deployment					

TOTAL INVESTMENT (\$ M)

DEPENDENCIES

	Capital	O&M	Total Cost					
Headend System, Integr., Config., and Testing	\$4.17M	\$6.51M	\$10.69M	15%	AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Headend Recurring Costs	\$0.09M	\$23.26M	\$23.36M	33%	Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
MDMS Annual Fees	\$0.00M	\$14.01M	\$14.01M	20%	Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
MDMS Implementation	\$15.51M	\$0.00M	\$15.51M	22%	Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
MDMS Interfaces and Other Costs	\$0.00M	\$0.00M	\$0.00M	0%	Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
MDMS Application Software	\$2.09M	\$0.00M	\$2.09M	3%	Asset Analytics	CVR/VVO Benefit	Carbon Reduction	
Exceptions and VEE	\$0.00M	\$5.06M	\$5.06M	7%				
Total	\$21.86M	\$48.85M	\$70.71M	100%				

3 Headend and Meter Data Management System (MDMS)

20-YEAR NPV (\$M)		
CAPITAL	O&M	TOTAL
\$17.32	\$21.43	\$38.75

Summary of Findings

CALCULATIONS AND OTHER METHODOLOGY

MDMS			
Input Name	Upfront Capital	Annual O&M	Total O&M
MDMS Application Software (\$)	\$1.7M	-	-
MDMS Implementation Services - SI/SV (\$)	\$5.8M	-	-
MDMS Consulting Services (\$)	\$2.5M	-	-
MDMS Internal Labor (\$)	\$3.9M	-	-
MDMS Annual Services Fees (\$)	-	0.4M-0.8M	\$14.0M
Total	\$13.8M	0.4M-0.8M	\$14.0M

HEADEND			
Input Name	Upfront Capital	Annual O&M	Total O&M
Business/IT	\$1.1M	-	-
System Testing	\$1.4M	-	-
Environment Setup (Prod, DR, DEV Test)	\$1.7M	-	-
Annual Product Support and Maintenance (O&M)	-	0.2M-0.4M	\$6.5M
Annual SaaS Fee (O&M)	-	0.7M-1.5M	\$23.3M
Total	\$4.1M	0.9M-1.9M	\$29.8M

Exception Processing	Annual AMF Meters (#)	Meters per FTE	Meter Growth (%)	Cost per FTE (\$)	Annual Labor Inflation	Annual Labor Spend for Exceptions and VEE
Annual Exceptions Costs During Deployment (2 years)	303k	156,000	N/A	74,000	3%	2 FTEs for ~\$172k
Validation, Estimation and Editing (VEE) of Deployed Meters During 2-year Deployment	303k	200,000	0.85%	74,000	3%	2 FTEs for ~\$177k
VEE 2 years Post-Deployment	618k-630k	200,000	0.85%	74,000	3%	4 FTEs for ~\$364k-\$375k
VEE Steady State Over 13 years	636k-718k	400,000	0.85%	74,000	3%	2 FTEs for ~\$193k-\$275k

Data does not include contingency, labor loaders, overhead, and other costs

ASSUMPTIONS

- MDMS forecasted using incremental costs and adjustments from MA AMF Business Case MDMS integration cost
- Headend costs based on average costs from the Eversource MA AMF RFP conducted in H1 2023 and also forecasted using incremental costs and adjustments from MA headend integration costs
- Costs for interim batch connect/disconnect process and sync to existing metering/billing systems are included in cost estimates
- 2% of all deployed meters result in an exception with a 30-minute average handle time per exception; therefore, 1 FTE (working 1,560 hours per year) is needed per 156k of deployed meters to handle exceptions. In second year of deployment, meters deployed in year 1 (2028) need 1 FTE per 200k meters for VEE. In years 3-4 (2030-2031), 1 FTE per 200k meters for VEE and from year 5 (2032) onward, 1 FTE per 400k meters for VEE

4

Customer Information System (CIS) Replacement and Integration

20-YEAR NPV (\$M)

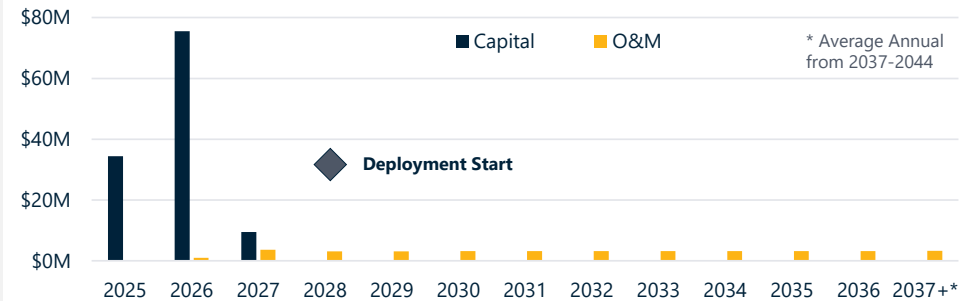
CAPITAL	O&M	TOTAL
\$99.34	\$27.88	\$127.22

Summary of Findings

OVERVIEW

A modern CIS is critical to support the full range of AMF benefits including billing time varying rates and providing rate-based information to customers such as high bill alerts. The current CIS is not capable of billing time varying rates at the scale required to support an AMF deployment and would be replaced as part of the AMF deployment, with all costs included in this feasibility study based on data from the MA and CT CIS replacement costs estimates. The legacy CIS system (C2) will be replaced with the new SAP CIS system with expected replacement starting by 2025, with AMF CIS integration to MDMS beginning in 2027 and AMF deployment starting in 2028. The current billing system (C2) cannot be configured or customized to support the use cases that Eversource and its customers desire out of AMF. Therefore, it is a critical path item for AMF deployment in NH so AMF cannot be deployed until the new SAP CIS system replaces the legacy C2 system. The new CIS system will enable time-varying rates and other advanced customer facing options as well as offer additional non-AMF related benefits such as streamlined billing, fewer exceptions, and faster error and issue resolution. It will also provide Eversource with a 360-view of operations and customers enabling Eversource to better serve its customers overall and increase customer satisfaction.

INVESTMENT TIMELINE (\$ M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE	Plan (in 2024 to 2025) and begin C2 replacement as part of OMNI program	Complete C2 replacement with SAP CIS; Begin CIS integration with MDMS	Complete CIS integration with MDMS							
DEPENDENCY		Begin MDMS and Headend install Begin Cybersecurity	Complete MDMS and Headend	Begin AMF Deployment	Complete AMF Deployment					

TOTAL INVESTMENT (\$ M)

	Capital	O&M	Total Cost	%
CIS Replacement	\$105.38M	\$0.00M	\$105.38M	59%
CIS Integration	\$14.12M	\$0.00M	\$14.12M	8%
CIS Recurring Costs	\$0.00M	\$54.14M	\$54.14M	30%
Billing Budget Increase	\$0.00M	\$5.34M	\$5.34M	3%
Total	\$119.50M	\$59.49M	\$178.99M	100%

DEPENDENCIES

AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

4

Customer Information System (CIS) Replacement and Integration

20-YEAR NPV (\$M)

CAPITAL	O&M	TOTAL
\$99.34	\$27.88	\$127.22

Summary of Findings

CALCULATIONS AND OTHER METHODOLOGY

Input Name	Upfront Capital	Annual O&M	Total O&M	Source
CIS Replacement Cost (\$)	\$79.0M	-		
CIS Licensing, Hosting, Support, and Admin Fees (\$)	-	\$3.0M	\$54.1M	
CIS Integration Labor - Utility Business (\$)	\$1.1M	-	-	
CIS Integration Labor - Utility Technical (\$)	\$1.1M	-	-	
CIS Integration Services - Third Party (\$)	\$8.9M	-	-	
Billing - Budget Increase (\$)	-	\$0.6M (First year after CIS implementation – 50% increase of current Billing Budget) \$0.2M-\$0.3M (Steady state – 15% increase of current Billing Budget)	\$4.5M	MA AMF Business Case
Total	\$90.1M	\$3.8M-\$3.9M	\$59.6M	

Data does not include contingency and overhead

ASSUMPTIONS

- The current C2 CIS must be integrated with the headend before AMF deployment can begin by 2027
- SAP CIS integration costs forecasted using incremental costs and adjustments from MA and CT SAP CIS integration costs
- SAP CIS replacement costs are based on an average of MA and SAP CIS replacements costs on a per meter basis - \$109 per meter in MA and \$138 per meter in CT, for an average of \$124 per meter and there are ~600k meters in NH
- Annual CIS Licensing, Hosting, Support, and Admin Fees are scaled from \$6.6M for MA (EMA and WMA) based on number of meters (43%), so \$2.8M annually in NH
- A new CIS is needed to enable Advanced Rate Options; existing CIS cannot bill on interval data at scale.
- Overall billing budget increase of 50% in the year following new CIS implementation in 2027, which follows assumption from MA AMF Business Case
- Billing Budget for increases by 15% annually starting in 2028 during steady state, which follows MA AMF Business Case
- 2023 NH Billing Budget is \$1,271,000

5 Digital Customer Experience

20-YEAR NPV (\$M)

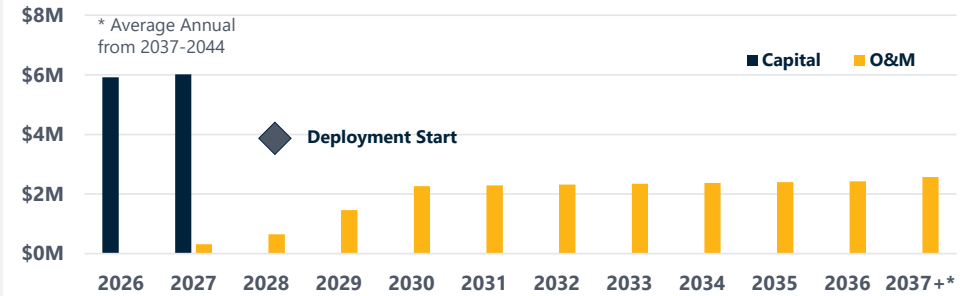
CAPITAL	O&M	TOTAL
\$9.46	\$16.65	\$26.11

Summary of Findings

OVERVIEW

Many existing digital channels will need updates to reflect changes due to AMF implementation. AMF will also enable new customer tools, usage insights & alerts, and energy efficiency/demand response program information. The insights and choices will be available across several channels (e.g., web, mobile, social, etc.). Part of this initiative is to provide call center representatives with more information to better answer customer calls, particularly around high bills and usage. This digital customer experience initiative will configure a standardized solution to allow 3rd parties and competitive suppliers to receive data access through a configured API, while also enabling the continuation of existing supplier services. New usage and high bill alerts will be enabled through the mobile and web-based channels. There are a few key dependencies. A digital customer experience will require completed MDMS and CIS integrations, while leveraging developed analytics and vendor solutions to maximize insights for customers.

INVESTMENT TIMELINE (\$ M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044	
MILESTONE		Begin Digital CX install	Complete Digital CX install								
DEPENDENCY	Begin CIS replacement	<ul style="list-style-type: none"> Complete CIS replacement Begin MDMS install and int. with CIS Begin Cybersecurity 	<ul style="list-style-type: none"> Complete MDMS Complete CIS integration with MDMS Begin customer Analytics use cases 	<ul style="list-style-type: none"> Begin AMF Deployment Begin customer Analytics use cases 	Complete AMF Deployment	Begin AMF Steady State					

TOTAL INVESTMENT (\$ M)

	Capital	O&M	Total Cost	%
Energy Insights Vendor Integration and Set Up	\$0.41M	\$26.46M	\$26.87M	52%
Incremental Resources for Alert and Insights	\$0.00M	\$2.26M	\$2.26M	4%
Web/App Development Visuals & Alerts	\$4.06M	\$5.58M	\$9.64M	19%
Creation of Data Sharing Solution	\$7.46M	\$5.09M	\$12.55M	24%
Total	\$11.93M	\$39.39M	\$51.32M	100%

DEPENDENCIES

AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

5 Digital Customer Experience

20-YEAR NPV (\$M)

CAPITAL	O&M	TOTAL
\$9.46	\$16.65	\$26.11

Summary of Findings

CALCULATIONS AND OTHER METHODOLOGY

Key Spend Categories	Upfront Capital	Annual O&M	O&M Total	Notes
Delivered Energy Insights	\$0.3M	\$0.7M-1.7M	\$24.3M	<i>Assuming worst case scenario i.e., starting from scratch without benefits from EE integrations). Annual O&M as \$2 per meter.</i>
Vendor Integration and Set Up and Ongoing Licensing	\$0.3M	\$0.7M-1.6M	\$22.4M	<i>Upfront Capital: Vendor solution through Oracle for "Delivered Insights" requires upfront capital setup costs of \$315,000 (before inflation). Annual O&M: Ongoing licensing costs at \$2 per meter per year</i>
Incremental On-Going FTEs	-	\$0.0M-0.1M	\$1.9M	<i>1 FTEs required to support alert and insight generation</i>
Usage Data Presentment and Visualizations (Web/App Configuration/Development Costs)	\$3.7M	-	-	<i>App/Web Dev Vendor for Fully Dedicated Year of Work, Product Owner Test/Support/Message File Dev, and Website</i>
Proactive Alerts for High Bills, Monthly Usage, and Outages	\$0.5M	\$0.2M-0.3M	\$5.6M	<i>Upfront capital: Implementing one new alert program and updating another, changes to data files, Annual O&M: based on Current Paperless enrollment volumes: Usage alerts are monthly, High Bill alerts are based 20% of enrolled customers receiving alerts 3 times per year. No annual impact from outage alerts</i>
Creation of Data Sharing Solution (Green Button Connect or Similar)	\$6.3M			<i>Estimated \$4-8 million based on Green Button Connect experience for API costs, vendor authorization, security/interfaces/ help desk.</i>
Cross Channel Hardware/Software - O&M	-	\$0.1M-0.3M	\$4.3M	<i>Annual O&M as 5% of upfront capital.</i>
Totals	\$10.8M	\$1.0M-2.3M	\$34.2M	<i>Data does not include contingency and overhead</i>

ASSUMPTIONS

- 1 FTE to support alert and insight generation, assuming efficiencies with MA digital customer experience platform
- Assume 5% O&M for ongoing O&M, assuming efficiencies with MA digital customer experience platform
- Vendor solution through Oracle for "Delivered Insights" requires upfront setup costs and an annual license cost of \$2 per meter
- 3rd Parties & competitive suppliers can receive data access through the configured API (Green Button or similar, no standard or solution selected), and EPO services can continue. 3rd Parties and Competitive Suppliers will leverage this information for value added services. API is built to the data analytics platform with source integrations included in the analytics budget
- Web & App dev/maintenance costs for data presentment and pushed insights/alerts were estimated based on Kubra experience
- All data from Eversource

6 Advanced Analytics

20-YEAR NPV (\$M)

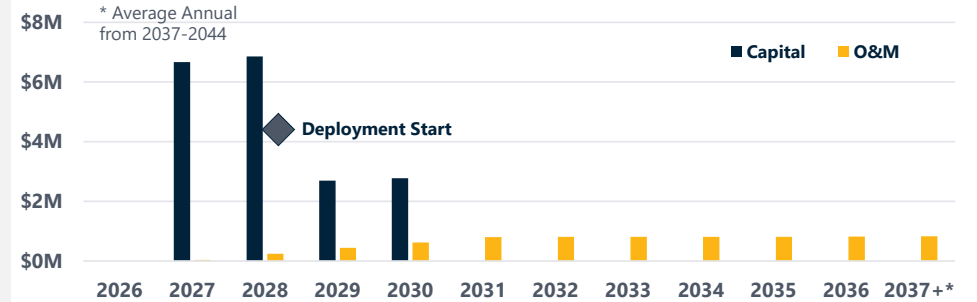
CAPITAL	O&M	TOTAL
\$13.58	\$5.40	\$18.98

Summary of Findings

OVERVIEW

With the abundance of data, Eversource will have the ability to perform descriptive and predictive analytics to enhance internal decision making and provide customers with additional insights and alerts. This initiative covers the development effort by Eversource’s internal analytics Center of Enablement (CoE) to develop BI based reporting and machine learning solutions for a target set of use cases. Eversource intends to use systems currently in place along with the integration of additional data sources such as the MDMS to enable these analytics. The cost estimate assumes “incremental build” to ensure gathered data fields are sufficient for future use case needs when an integration to the data analytics platform occurs. On-going support assumes 1 annual resource. Data will be drawn from 10 source systems and enable 7 use cases. Annual data costs are developed by estimating monthly data requirements with data gathering frequency requirements to estimate the costs of architecture and ongoing annual hardware/software.

INVESTMENT TIMELINE (\$ M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE			Begin outage mgmt., theft, load mgmt., TVR, and outage prediction use cases & analytics architecture	Complete use cases & analytics architecture	Begin EE/DR and CVR/VVO use case architecture	Complete EE/DR and CVR/VVO use case architecture				
DEPENDENCY	Begin CIS replacement	<ul style="list-style-type: none"> Complete CIS replacement Begin MDMS install and int. with CIS Begin Cybersecurity 	<ul style="list-style-type: none"> Complete MDMS Install CIS Data Available Begin OMS int. 	<ul style="list-style-type: none"> Begin AMF Deployment Comp. OMS Integrations 	Complete AMF Deployment	Begin AMF Steady State				

TOTAL INVESTMENT (\$ M)

DEPENDENCIES

	Capital	O&M	Total Cost	
Development Period Hardware/Software	\$0.58M	\$0.00M	\$0.58M	2%
Hardware/Software On-Going Costs	\$0.00M	\$11.08M	\$11.08M	35%
Development Labor	\$18.41M	\$0.00M	\$18.41M	58%
Ongoing Labor	\$0.00M	\$1.74M	\$1.74M	5%
Total	\$18.99M	\$12.82M	\$31.81M	100%

AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

6 Advanced Analytics

20-YEAR NPV (\$M)		
CAPITAL	O&M	TOTAL
\$13.58	\$5.40	\$18.98

Summary of Findings

CALCULATIONS AND OTHER METHODOLOGY

Use Cases Enabled	Use Case Description	Systems Involved	Unique Systems in order	Data Reporting Frequency	Back-End & Analytics Labor (One-time costs)	Annual Data Costs
Architecture	Before work on any of the use cases can begin, the architecture will be designed, implemented and productionalized to support all AMF analytics requested		N/A		\$0.9M	\$129.0k
Outage Management Response and Targeted Troubleshooting / Event Clearing	Use meter status data indicating power-lost and restored details, to identify outages and outage location, prevalence, and restoration status. Also identifies nested outages and clears uncertainties that cause prolonged damage assessments	MDMS, OMS	2	Streaming 0.86 TB	\$2.4M	\$51.6k
Theft/Fraud Detection	Links metering anomalies and theft instances to a customer leading to better leads/investigation success rate	MDMS, CIS	1	Monthly 0.086 TB	\$1.7M	\$0.5k
Targeted Demand Response and EE	Uses internal information such as load shape, network, feeder, generation, program participation, etc to group, segment, differentiate, identify, and target customers for EE/DR analysis, contact, marketing, etc.	MDMS, CIS, DRMS, SCADA	2	Monthly 0.086 TB	\$2.0M	\$0.5k
Transformer Load Management	Uses AMF data to inform updated algorithms and more granular and area-specific analysis to properly load transformers to avoid outages and decrease energy losses	MDMS, EAM, DMS	2	Monthly 0.086 TB	\$2.0M	\$0.5k
Conservation Voltage Reduction & Volt Var Optimization (CVR/VVO)	Adds AMF data enhancement to analysis of voltage across different assets on the grid to enhance visibility into the system by identifying voltage quality issues like voltage sags or swells outside of defined parameters at the meter, transformer, and feeder levels	MDMS, EAM, DMS, TBD	1	Streaming 0.86 TB	\$2.0M	\$51.6k
Advanced Rate Design	Leverage hourly data to provide advanced rate options and time varying rates to customers. Advanced rate options can be optimized by studying customer usage, system constraints, and generation mixes	MDMS, CIS, DMS, TBD	1	Monthly 0.086 TB	\$1.4M	\$0.5k
Outage Prediction / Open Neutrals / Other Monitoring	Strategically identify locations of plant growth to perform vegetation management and prevent failures or momentary outages	MDMS, OMS, DMS, SCADA, TBD	1	Monthly 0.086 TB	\$2.0M	\$0.5k
Total					\$14.4M	\$0.2M

Data does not include inflation, contingency and overhead

ASSUMPTIONS

- Assume 1 FTE across use cases for ongoing support, synergies with MA
- Estimates based on ES Center of Enablement team experience based on level of effort to build bi-reporting & machine learning solutions for the target set of use cases with cloud solution provider costs estimated based on hardware/software/data storage requirements for target use cases
- Frequency of data required estimated based on a streaming services in some cases and monthly data draws in others
- Streaming requirements scale from MA based on number of meters

7 CVR/VVO Implementation

20-YEAR NPV (\$M)

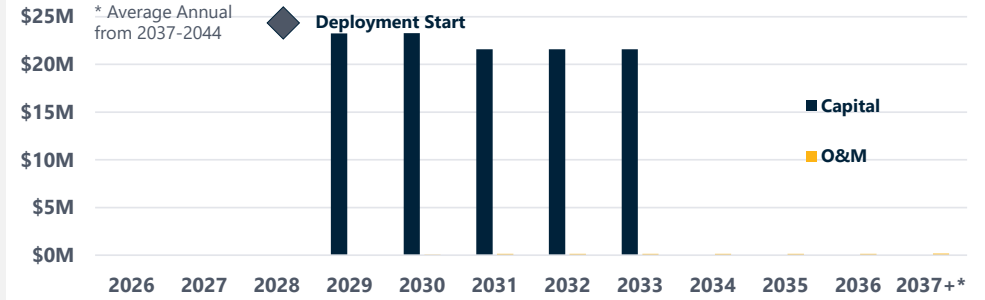
CAPITAL	O&M	TOTAL
\$52.53	\$0.92	\$53.44

Summary of Findings

OVERVIEW

CVR/VVO allows AMF data enhancement analysis of voltage across different assets on the grid to enhance visibility into the system by identifying voltage quality issues like voltage sags or swells outside of defined parameters at the meter, transformer, and feeder levels. This will allow Eversource to manage voltage levels to be managed and reduced to the minimum required for equipment operation, with resulting energy savings. The VVO program will allow Eversource to optimize voltage levels and manage reactive power in the electrical system to reduce energy consumption and improve overall system efficiency. This program will involve implementing software and line devices such as voltage regulators, capacitors, and LTC controllers at substations. The majority of these devices will leverage the AMF communications network and 30% will be connected through cellular connectivity. The enhancements also include VVO/SCADA integration with the AMF headend for sensor data, and load management equipment will be purchased to take advantage of the AMF voltage insights down the feeder to complement existing conservation voltage reduction and optimization designs.

INVESTMENT TIMELINE (\$ M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE					Begin VVO System integration, install of Regulators, Capacitors, Substation LTCs	Complete VVO system integration			Complete install of Regulators, Capacitors, Substation LTCs	
DEPENDENCY	Begin CIS replacement	<ul style="list-style-type: none"> Comp. CIS replacement Begin MDMS install and int. with CIS Begin Comm install Begin Cybersecurity 	<ul style="list-style-type: none"> Complete MDMS Install CIS Data Available Begin OMS int. Complete Comm install 	<ul style="list-style-type: none"> Begin AMF Deployment Comp. OMS Integrations 	Complete AMF Deployment	Begin AMF Steady State				

TOTAL INVESTMENT (\$ M)

DEPENDENCIES

	Capital	O&M	Total Cost	%	AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
VVO System Integration Software	\$0.60	\$0.00	\$0.60	1%	Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
VVO System Integration Labor and O&M	\$2.76	\$2.37	\$5.12	6%	Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Regulators	\$18.19	\$0.00	\$18.19	20%	Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Capacitors	\$37.97	\$0.00	\$37.97	42%	Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Substations LTC Controllers	\$29.12	\$0.00	\$29.12	32%	Asset Analytics	CVR/VVO Benefit	Carbon Reduction	
Total	\$88.63	\$2.37	\$91.00	100%				

7 CVR/VVO Implementation

20-YEAR NPV (\$M)		
CAPITAL	O&M	TOTAL
\$52.53	\$0.92	\$53.44

Summary of Findings

CALCULATIONS AND OTHER METHODOLOGY

Key Spend Categories	Amount	Cost per Unit	Upfront Capital	Annual O&M	O&M Total
VVO System Integration			\$2.5M	\$0.1M	\$2.0M
Software			\$0.5M	-	-
Internal Labor			\$0.7M	-	-
External Labor			\$1.3M	-	-
Ongoing Cost			-	\$0.1M	\$2.0M
Material			\$66.8M	-	-
Regulators	950	\$15k	\$14.3M	-	-
Capacitors	850	\$35k	\$29.8M	-	-
Substation LTC Controller Upgrades	76	\$150k (x2)	\$22.8M		
Totals			\$69.4M	\$0.1M	\$1.0M

Data does not include inflation, contingency and overhead

ASSUMPTIONS

- 5-year timeline to deploy and install regulators, capacitors, and LTC controllers and a 2-year timeline for the integration
- Install 850 capacitors and 950 voltage regulators, and upgrade 2 LTC controllers per substation
- 45% of the 169 substations VVO capabilities
- Cellular connectivity fees for 30% of the capacitors and regulators are documented in the Communications Network investment category
- Headend to VVO/SCADA vendor costs, integration labor, and maintenance + incremental CVR/VVO equipment
- All data from Eversource

8 Operational System Integrations & Enhancements

20-YEAR NPV (\$M)

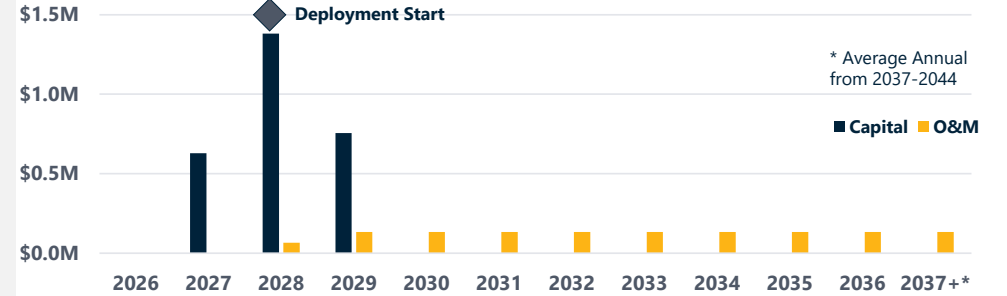
CAPITAL	O&M	TOTAL
\$1.98	\$0.96	\$2.94

Summary of Findings

OVERVIEW

Enhancements to OMS are needed to enhance system reliability and resiliency through AMF modules that can be enabled in the current solution. The Analytics CoE will also develop some operational reports to enhance outage prediction and restoration. These outcomes will also enable more accurate reporting and notification of outages and ETRs to customers, thereby increasing customer satisfaction. Lastly, asset management costs associated required to manage the new set of AMF meters and communications assets.

INVESTMENT TIMELINE (\$ M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE			Begin OMS integration	• Begin Asset Management Integration • Complete OMS integration	Complete Asset Management Integration					
DEPENDENCY	Begin CIS replacement	• Complete CIS replacement and begin integration with MDMS • Begin MDMS install • Begin Cybersecurity	• Complete MDMS • Complete CIS integration with MDMS • Begin advanced analytics use case arch.	Begin AMF Deployment	Complete AMF Deployment	Complete all advanced analytics use case arch.				

TOTAL INVESTMENT (\$ M)

	Capital	O&M	Total Cost	
Asset Management Software	\$0.00	\$0.00	\$0.00	0%
Asset Management Labor and O&M	\$1.49	\$0.00	\$1.49	30%
AMF to OMS Integration Software	\$0.00	\$0.00	\$0.00	0%
AMF to OMS Integration Labor and O&M	\$1.28	\$2.19	\$3.47	70%
Total	\$2.77	\$2.19	\$4.96	100%

DEPENDENCIES

AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

8 Operational System Integrations & Enhancements

20-YEAR NPV (\$M)		
CAPITAL	O&M	TOTAL
\$1.98	\$0.96	\$2.94

Summary of Findings

CALCULATIONS AND OTHER METHODOLOGY

Input Name	Capital Costs	Annual O&M	Total O&M
Asset Management (Meters and Comms) - External (\$)	\$0.4M	-	-
Asset Management (Meters and Comms) - Internal (\$)	\$0.8M	-	-
Asset Management (Meters and Comms) - Software/Hardware (\$)	\$0.0M	-	-
AMF to OMS Labor - External (\$)	\$0.9M	-	-
AMF to OMS Labor - Internal (\$)	\$0.2M	-	-
AMF to OMS - Software (\$)	\$0.0M	\$0.1M	\$1.9M
Total	\$2.1M	\$0.1M	\$1.9M

Data does not include contingency and overhead

ASSUMPTIONS

- Asset Management System Costs (Meters & Comms Infrastructure) potentially new solution rather than Power Track/Maximo upgrade & enhancements
- OMS AMF module enhancement, integrations labor, and maintenance
- All data from Eversource

9 Cybersecurity

20-YEAR NPV (\$M)

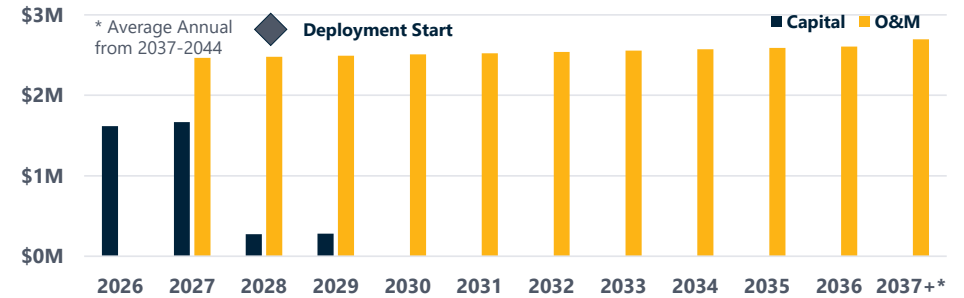
CAPITAL	O&M	TOTAL
\$2.99	\$21.42	\$24.41

Summary of Findings

OVERVIEW

Cybersecurity is also a foundational aspect of the AMF program ensuring standards for systems and integrations. With the prevalence of granular usage data and added access points on the network, it becomes critical that Eversource takes appropriate actions to enhance system and grid security through "defense in depth". Added layers of security will ensure that customer data is kept secure and measures to enhance confidentiality, integrity and availability of data are also part of this scope. Cybersecurity capital costs will incur during the deployment of the AMF meters and network and will occur also through the development of operational and customer-oriented analytics use cases. The bulk of the cost will consist of ongoing support needed for key management and monitoring and controlling cybersecurity for the AMF network.

INVESTMENT TIMELINE (\$ M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE		Hire cybersecurity resources across security arch., application security, security engineering	Begin ongoing expenses and ongoing labor (2 FTEs)	Begin Physical Security of AMF network						
DEPENDENCY	Begin CIS replacement	• Complete CIS replacement and begin integration with MDMS • Begin MDMS install	• Complete MDMS • Complete CIS integration with MDMS	Begin AMF Deployment	Complete AMF Deployment					

TOTAL INVESTMENT (\$ M)

	Capital	O&M	Total Cost	
Added On-Going Labor	\$0.00	\$9.22	\$9.22	18%
Deployment Labor	\$3.25	\$0.00	\$3.25	6%
Licensing and Fees	\$0.00	\$37.68	\$37.68	74%
Cyber Security Hardware	\$0.00	\$0.00	\$0.00	0%
Physical Security	\$0.59	\$0.00	\$0.59	1%
Total	\$3.84	\$46.90	\$50.74	100%

DEPENDENCIES

AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

9 Cybersecurity

20-YEAR NPV (\$M)		
CAPITAL	O&M	TOTAL
\$2.99	\$21.42	\$24.41

Summary of Findings

CALCULATIONS AND OTHER METHODOLOGY

	2 Years Before AMF Deployment (2026)	1 Year Before AMF Deployment (2027)	Year 1 Deployment (2028)	Year 2 Deployment (2029)	Annual Ongoing Post-Deployment	20-Year Total (Nominal)
Upfront Labor (Capital)	\$1.4M	\$1.4M	-	-	-	\$2.8M
Ongoing Labor (O&M)	-	-	\$0.4M	\$0.4M	\$0.4M-\$0.7M	\$9.2M
Ongoing Licensing and Fees (O&M)	-	-	\$2.0M	\$2.0M	\$2.0M	\$36.0M
Physical Security	-	-	\$0.2M	\$0.3M	-	\$0.5M
Total	\$1.4M	\$1.4M	\$2.6M	\$2.7M	\$2.4M-\$2.7M	\$48.5M

Data does not include contingency and overhead

ASSUMPTIONS

- Costs estimated by cybersecurity team in alignment with cybersecurity plan with particular attention to resources needed to be engaged in requirements gathering, vendor selection, and implementation while managing associated firewalls, penetration testing, and new hardware/software for key management.
- Costs assume end-to-end encryption for all new use cases, data paths, and system integrations and hardware for key management with on-going maintenance
- 2 additional FTEs providing ongoing support across security architecture management, security architecture, application security, and security engineering
- \$2 million ongoing annual fee for hardware, software, services, and licensing
- All data from Eversource

10 Customer Engagement

20-YEAR NPV (\$M)

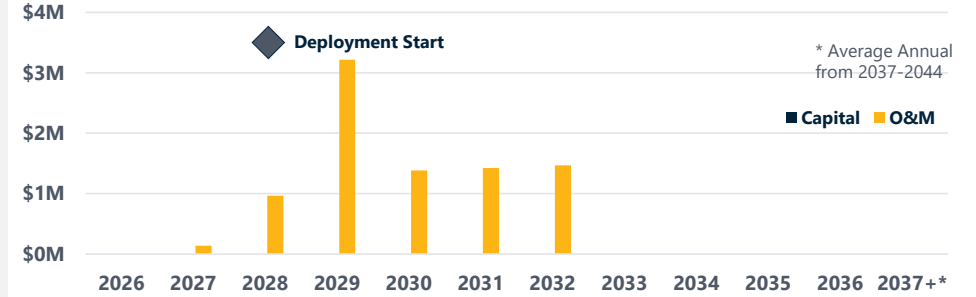
CAPITAL	O&M	TOTAL
\$0.00	\$5.46	\$5.46

Summary of Findings

OVERVIEW

Customer engagement involves educating and informing customers on the benefits of AMF. The objective is to minimize the number of eventual opt-outs to maximize operational and customer benefits. The initiative will involve multiple channels to educate the customer on changes coming, how those changes will help them save on their electric bill, and what to expect as their meters are being swapped out. These efforts will proactively address common concerns related to data privacy and health concern myths pertaining to AMF radio frequencies. Methods include 1) no cost outreach such as emails, digital customer updates, website updates, social media (non-paid), web videos, 2) paid outreach such as bill inserts, post cards with postage, direct mail, and door hangers, and 3) events such as webinars, town hall events, paid social media campaigns, and digital ad campaigns. Engagement will last beyond the AMF deployment and continue to inform customers of new displays of usage insights and alerts and benefits of new time varying rates.

INVESTMENT TIMELINE (\$ M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE			Begin early awareness campaign	<ul style="list-style-type: none"> Complete early awareness campaign Begin deployment communications 	<ul style="list-style-type: none"> Complete deployments comms Begin energy insights and TVR 	Complete energy insights		Complete TVR		
DEPENDENCY			<ul style="list-style-type: none"> Complete CIS Integration Begin customer analytics use cases 	<ul style="list-style-type: none"> Begin Deployment Comp. customer analytics use cases 	<ul style="list-style-type: none"> Complete Deployment 	<ul style="list-style-type: none"> Begin Steady State AMF 				

TOTAL INVESTMENT (\$ M)

DEPENDENCIES

	Capital	O&M	Total Cost	
Early Awareness	\$0.00	\$0.14	\$0.14	2%
Deployment Outreach	\$0.00	\$1.96	\$1.96	23%
Energy Insights and Ways to Save Outreach	\$0.00	\$0.89	\$0.89	10%
Time Varying Rates Outreach	\$0.00	\$5.61	\$5.61	65%
Total	\$0.00	\$8.59	\$8.59	100%

AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

10 Customer Engagement

20-YEAR NPV (\$M)

CAPITAL	O&M	TOTAL
\$0.00	\$5.46	\$5.46

Summary of Findings

CALCULATIONS AND OTHER METHODOLOGY

			Early Awareness Phase (1 Year)		Deployment (2 Years)		Energy Insight and Ways to Save (Concurrent)		Post-deployment (4 Years) (TVR Rates / Benefits)		Total Outreach / Acquisition Costs	
	Number of Customers	Cost Per Unit (\$)	Number of Engagements	Total Cost	Number of Engagements	Total Cost	Number of Engagements	Total Cost	Number of Engagements	Total Cost	Number of Engagements	Total Cost
Email (no cost)	587,322	\$ -	2	\$ -	3	\$ -	6	\$ -	6	\$ -	11	\$ -
Digital Customer Update (no cost)	587,322	\$ -	2	\$ -	18	\$ -	6	\$ -	12	\$ -	32	\$ -
Website Updates (no cost)	587,322	\$ -	1	\$ -	2	\$ -	1	\$ -	3	\$ -	6	\$ -
Social Media - Non Paid (no cost)	587,322	\$ -	1	\$ -	2	\$ -	1	\$ -	1	\$ -	4	\$ -
YouTube/Web Videos (no cost)	587,322	\$ -	1	\$ -	2	\$ -	1	\$ -	1	\$ -	4	\$ -
Press Release / Earned Media (no cost)	587,322	\$ -	2	\$ -	6	\$ -	\$ -	\$ -	5	\$ -	13	\$ -
Bill Insert*	587,322	\$ 0.02	2	\$ 19,969	-	\$ -	2	\$ 19,969	2	\$ 19,969	6	\$ 59,907
Post Card w/postage*	587,322	\$ 0.50	-	\$ -	1	\$ 295,423	\$ -	\$ -	3	\$ 886,269	4	\$ 1,181,692
Direct Mail letter w/postage*	587,322	\$ 0.60	-	\$ -	1	\$ 352,393	\$ -	\$ -	3	\$ 1,057,180	4	\$ 1,409,573
Door Hanger*	587,322	\$ 0.05	-	\$ -	1	\$ 29,366	\$ -	\$ -	-	\$ -	1	\$ 29,366
Webinar	\$ -	\$ -	2	\$ -	6	\$ -	\$ -	\$ -	3	\$ -	11	\$ -
Town Hall Events	\$ 10,000	\$ -	-	\$ -	12	\$ 120,000	6	\$ 60,000	-	\$ -	18	\$ 180,000
Paid Social Media Campaign	\$ 25,000	\$ -	\$ -	\$ -	7	\$ 175,000	6	\$ 150,000	24	\$ 600,000	37	\$ 925,000
Digital Ad Campaign Creative (BH)	\$ 30,000	\$ -	1	\$ 30,000	1	\$ 30,000	2	\$ 60,000	4	\$ 120,000	8	\$ 240,000
Digital Ad Campaign Deployment (BH) per Month	\$ 35,000	\$ -	2	\$ 70,000	5	\$ 175,000	6	\$ 210,000	24	\$ 840,000	37	\$ 1,295,000
Speakers Bureau (no cost)	\$ -	\$ -	1	\$ -	1	\$ -	\$ -	\$ -	-	\$ -	2	\$ -
Cost per 1 FTE	\$ 205,000	\$ -	0	\$ -	2	\$ 410,000	1	\$ 205,000	4	\$ 820,000	7	\$ 1,435,000
Total			^Years		^Years		^Years		^Years		^Years	
*Costs provided are estimated and may change due to both postage and vendor pricing changes												
Total			\$ 119,969		\$ 1,587,182		\$ 704,969		\$ 4,343,418		\$ 6,755,538	
			Total minus Labor -> \$ 119,969		Total minus Labor -> \$ 1,177,182		Total minus Labor -> \$ 499,969		Total minus Labor - \$ 3,523,418		Total minus Labor -> \$ 5,320,538	

Data does not include inflation, contingency, labor loaders, overhead, and other costs

ASSUMPTIONS

- Four phases of outreach starting one year before deployment in 2027: (1) Early Awareness Campaign (2) Deployment (3) Post-Deployment: Energy Insights and Ways to Save (4) Post-Deployment: Time Varying Rates
- Estimate 1 incremental FTE over each phase
- Costs in the time varying rates are currently on average \$50 per acquired customer for 10% target participation, with the high range being \$75 for 20% participation
- Time-Varying Rates would need separate docket for approval
- All data from Eversource

11 Contact Center and Theft

20-YEAR NPV (\$M)

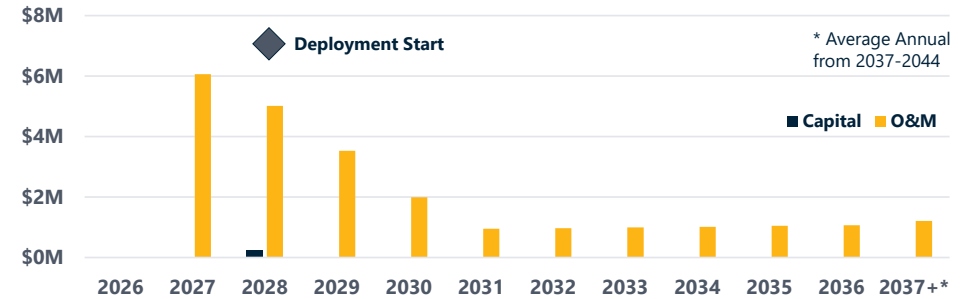
CAPITAL	O&M	TOTAL
\$0.18	\$17.90	\$18.08

Summary of Findings

OVERVIEW

This initiative includes costs associated with impacts to the contact center for increased calls during the AMF implementation period, increased duration of calls following the new CIS implementation, and customer calls pertaining to the new energy insights and time varying rate options. Furthermore, costs pertain to credit call handling as increases in notices and disconnects enabled through AMF related to non-pay take effect. For the overall increase in call volume in a particular year, there is also a corresponding budget increase in telephony in addition to a one-time Interactive Voice Record (IVR) optimization cost. Also, shown in this category is the cost of incremental FTE resources for theft investigation as leads are enhanced through AMF data and tamper alerts provided by the meters directly. Eversource New Hampshire currently has 1 theft investigator and will scale to 5 total investigators (4 incremental) immediately after AMF deployment and then 4 theft investigators at steady state (3 incremental)

INVESTMENT TIMELINE (\$ M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE			<ul style="list-style-type: none"> Add 49 incremental non-credit FTEs for CIS 	<ul style="list-style-type: none"> Remove 49 FTEs and add 35 non-credit FTEs for meters Add 9 credit FTEs 2 total theft invest. Implement IVR 	<ul style="list-style-type: none"> Remove 14 non-credit FTEs for meters leaving 21 FTEs Maintain 9 credit FTEs 3 total theft investigators 	<ul style="list-style-type: none"> Remove 21 non-credit FTEs for meters Add 7 non-credit FTEs for TVR Maintain 9 credit FTEs 5 tot. theft invest. 	<ul style="list-style-type: none"> Remove 7 non-credit FTEs for TVR Maintain 9 credit FTEs Maintain 4 total theft investigators 	<ul style="list-style-type: none"> Maintain 9 credit FTEs Maintain total 4 theft investigators 	<ul style="list-style-type: none"> Maintain 9 credit FTEs Maintain 4 total theft investigators 	<ul style="list-style-type: none"> Maintain 9 credit FTEs Maintain 4 total theft investigators
DEPENDENCY			<ul style="list-style-type: none"> CIS integration complete Begin relevant Analytics use cases Start OMS Integration 	<ul style="list-style-type: none"> Begin Deploy AMF Complete relevant Analytics use cases Complete OMS Integration 	Complete AMF Deployment	Begin Steady State AMF				

TOTAL INVESTMENT (\$ M)

DEPENDENCIES

	Capital	O&M	Total Cost		AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Contact Center (Non-Credit)	\$0.00M	\$13.57M	\$13.57M	42%	Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Credit Call Handling	\$0.00M	\$8.40M	\$8.40M	26%	Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Telephony	\$0.25M	\$1.74M	\$1.99M	6%	Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft	\$0.00M	\$7.36M	\$7.36M	23%	Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Disconnect Notices	\$0.00M	\$1.23M	\$1.23M	4%	Asset Analytics	CVR/VVO Benefit	Carbon Reduction	
Total	\$0.25M	\$32.30M	\$32.54M	100%				

11 Contact Center and Theft

20-YEAR NPV (\$M)

CAPITAL	O&M	TOTAL
\$0.18	\$17.90	\$18.08

Summary of Findings

CALCULATIONS AND OTHER METHODOLOGY

CONTACT CENTER

	Year 1 2025	Year 2 2026	Year 3 2027	Year 4 2028	Year 5 2029	Year 6 2030	Year 7 2031	Year 8 2032	Year 9 2033	Year 10-20 2034-2044
Non-Credit FTE										
Meter Deployment	0	0	0	35	21	0	0	0	0	0
New CIS Completed	0	0	49	0	0	0	0	0	0	0
Time Varying Rates available	0	0	0	0	0	7	0	0	0	0
Total number of Non-Credit FTEs needed	0	0	49	35	21	7	0	0	0	0
Non-Credit Unloaded Rate										
Non-Credit FTE Cost (\$)	\$0	\$0	\$2.7	\$1.9	\$1.2	\$0.4	\$0	\$0	\$0	\$0
Credit FTE										
Meter Deployment	0	0	0	9	9	9	9	9	9	9
Total number of Credit FTEs needed (#)	0	0	0	9	9	9	9	9	9	9
Non-Credit Unloaded Rate										
Credit FTE Cost (\$)	\$0	\$0	\$0	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3
Total Contact Center FTE Cost (\$)	\$0	\$0	\$2.7M	\$2.3M	\$1.5M	\$0.7M	\$0.3M	\$0.3M	\$0.3M	\$0.3M

Data does not include inflation, contingency, labor loaders, overhead, and other costs

THEFT

Incremental Steady State Theft Investigator FTE (#)	×	Annual Unloaded Salary	×	Annual Labor Inflation	=	Annual Labor Spend for Theft
3		\$85k		3%		\$322k-\$474k

Data does not include contingency, labor loaders, overhead, and other costs

ASSUMPTIONS

- All data from Eversource
- Additional resources driven mainly by new CIS system and program offerings pertaining to rates
- Reduction in CSR requirements over time as the new system is stabilized and customers become adjusted
- Telephony budget increase scales with increases in customer call volume (same as CT estimate)
- Training costs assumed to be low enough to be covered by CMO and existing budget (same as MA estimate)
- An increase in call volume, and back-office support is expected as new CIS is put in place along with new meters leading to extensive change within Eversource for the year after CIS (validated by EY) while resources will return to normal levels by 2030 in order to also enable calls related to time varying rates.
- In the first year of AMF deployment (2028), because every meter will be visited, there is potential for increased theft identification; therefore, 1 incremental theft investigator is added for 2 total
- Incremental theft resources based on scaling current revenue protection levels and staff. Process change and change management will be needed to enable team with data. Followed similar methodology as MA estimate
- Contact Center Budget Annual Increase: 15%
- Telephony budget: \$2.2 M (MA scaled by number of meters)
- \$215k one-time IVR optimization (MA scaled by number of meters)
- Non-Credit Call Center**
 - Meter Exchange: 8% increase in call volumes due to short/long billing cycle that month (informed from past AMR deployment)
 - Meter Exchange: 50% of meters exceptions from exchanges will result in a call deployment
 - New CIS System: 25% increase in call volume w/ 130% increase in handle time
 - Time Varying Rates: 10% increase in call volume w/ 50% increase in handle time yields **150%** increase for new calls
- Credit Call Center**
 - 38% increase of disconnects

12 Unrecovered AMR Costs

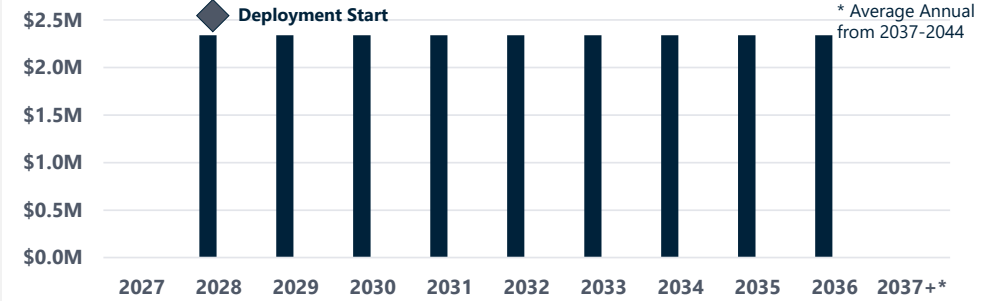
Summary of Findings

20-YEAR NPV (\$M)		
CAPITAL	O&M	TOTAL
\$11.75	\$0.00	\$11.75

OVERVIEW

AMR meters installed from 2014-2016 will not reach their 20-year end of useful until 2034-2036. The current book value of these AMR meters and associated equipment as of 12/31/2020 is \$77.7M. As per the Settlement Agreement in October 2020, this amount depreciates over 9 years. Eversource adds around \$1.8M in new AMR activity every year replacing AMR meters and associated equipment due to damage. This additional annual activity will inflate each year by 3% and depreciate over 18 years. With AMF deployment beginning in 2028, there will be \$21.1M in AMR book value remaining. Starting in 2034, it is assumed that the AMR meters will reach end of useful life and will need to be replaced meaning that AMF deployment must occur by 2033 to avoid a 3-year AMF replacement schedule from 2034-2036. Additionally, as of 2023, there are nearly 82k AMR bridge meters that make up \$3M in unrecovered AMR costs and as a non-quantified benefit these bridge meters could be repurposed in CT.

INVESTMENT TIMELINE (\$ M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE		\$35M in unrecovered AMR costs	\$28M in unrecovered AMR costs	\$21M in unrecovered AMR costs	\$14M in unrecovered AMR costs	\$15M in unrecovered AMR costs	\$17M in unrecovered AMR costs	\$18M in unrecovered AMR costs	\$19M in unrecovered AMR costs	N/A
DEPENDENCY				Begin AMF Deployment	Complete AMF Deployment					

TOTAL INVESTMENT (\$ M)

	Capital	O&M	Total Cost	
Unrecovered AMR Costs	\$21.06	\$0.00	\$21.06	100%
Total	\$21.06	\$0.00	\$21.06	100%

DEPENDENCIES

AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

12 Unrecovered AMR Costs

Summary of Findings

20-YEAR NPV (\$M)		
CAPITAL	O&M	TOTAL
\$11.75	\$0.00	\$11.75

CALCULATIONS AND OTHER METHODOLOGY

Ave. Ann. Activity	Ann. Depreciation		Unrecovered AMR Costs													
			2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
N/A	\$8.6M	2020	\$77.7	\$69.1	\$60.5	\$51.8	\$43.2	\$34.6	\$25.9	\$17.3	\$8.6	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
\$1.9	\$0.1M	2021		\$1.9	\$1.8	\$1.7	\$1.6	\$1.5	\$1.4	\$1.3	\$1.2	\$1.1	\$1.0	\$0.9	\$0.8	\$0.6
\$1.0	\$0.1M	2022			\$1.0	\$1.0	\$0.9	\$0.8	\$0.8	\$0.7	\$0.7	\$0.6	\$0.6	\$0.5	\$0.5	\$0.4
\$1.9	\$0.1M	2023				\$1.9	\$1.8	\$1.7	\$1.6	\$1.5	\$1.4	\$1.3	\$1.2	\$1.0	\$0.9	\$0.8
\$1.9	\$0.1M	2024					\$1.9	\$1.8	\$1.7	\$1.6	\$1.5	\$1.4	\$1.3	\$1.2	\$1.1	\$1.0
\$2.0	\$0.1M	2025						\$2.0	\$1.9	\$1.8	\$1.7	\$1.6	\$1.4	\$1.3	\$1.2	\$1.1
\$2.1	\$0.1M	2026							\$2.1	\$1.9	\$1.8	\$1.7	\$1.6	\$1.5	\$1.4	\$1.3
\$2.1	\$0.1M	2027								\$2.1	\$2.0	\$1.9	\$1.8	\$1.6	\$1.5	\$1.4
\$2.2	\$0.1M	2028									\$2.2	\$2.1	\$1.9	\$1.8	\$1.7	\$1.6
\$2.3	\$0.1M	2029										\$2.3	\$2.1	\$2.0	\$1.9	\$1.8
\$2.3	\$0.1M	2030											\$2.3	\$2.2	\$2.1	\$1.9
\$2.4	\$0.1M	2031												\$2.4	\$2.3	\$2.1
\$2.5	\$0.1M	2032													\$2.5	\$2.3
\$2.5	\$0.1M	2033														\$2.5
		TOTAL	\$77.7	\$71.0	\$63.3	\$56.4	\$49.4	\$42.4	\$35.4	\$28.2	\$21.1	\$13.8	\$15.2	\$16.5	\$17.7	\$18.9

ASSUMPTIONS

- Deployment of AMF will occur before 2034 to avoid AMR meters reaching 20-year end of life and triggering mass AMR replacement over 3 years
- Initial AMR meter and equipment book value in 2020 is \$77.7M as per EY "Analysis of Meters in the Distribution Rate Base" report, Oct 4, 2021. A 9-year AMR book value depreciable life starts in 1/1/2021, meaning 11% annual depreciation rate
- In 2021, there is \$1.9M in additional activity and in 2022 there is \$1.0M in additional activity
- There is \$1.9M in annual additional activity from 2023 to 2033, increasing at 3% annually due to inflation and depreciating over 18 years
- The amount of unrecovered AMR costs at year 1 of deployment in 2028 is then included as a cost spread over the next 9 years
- **For the No AMR Deployed Scenario**, it is assumed manually read meters are 42% of the cost of AMR meters, so under that scenario all of the unrecovered manually read meter costs are 42% of the numbers shown in the table above

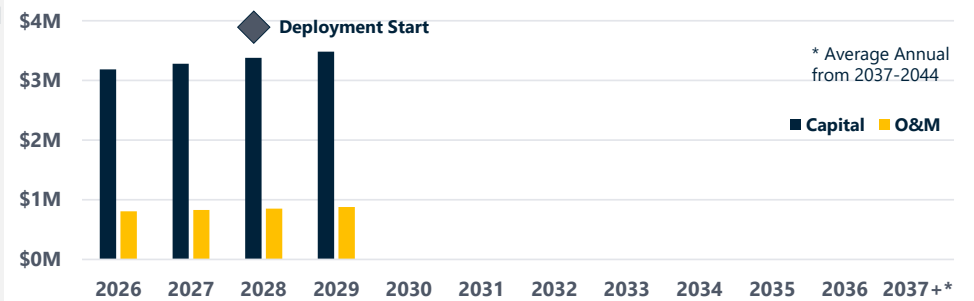
13 Project and Change Management

20-YEAR NPV (\$M)		
CAPITAL	O&M	TOTAL
\$9.89	\$2.49	\$12.38

Summary of Findings

OVERVIEW INVESTMENT TIMELINE (\$ M)

This initiative includes Project Management Office (PMO) and Change Management Office (CMO) for the overall programs. As this is a transformational program for Eversource, dedicated resources and tools will be required for both the PMO and CMO. PMO will manage risks, ensure adherence to budget and timeline, monitor quality, report on progress, track benefits realization and control scope changes across the AMF Program. CMO will ensure that leadership and employees are aligned with the overall program vision, manage resistance, perform employee training and coach and identify stakeholders across the organization. The team will be made up of both Eversource and contractor resources. Early efforts will be utilized to support RFP development for solutions, overall implementation planning, and will support the training/stand-up of new roles needed for on-going operations. Overall perspective on AMF program objectives will ensure disparate workstreams are coordinated and dependencies are managed with best practices from the in-flight MA AMF deployment.



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE		<ul style="list-style-type: none"> Stand up Internal PMO Conduct Project Planning and Kick off for AMF project Support Implementation Planning with ES & Vendors 		Monitor and Control Project, Facilitate Organizational Change Management	Conduct Project Close and Shift to Operations					
DEPENDENCY				Begin AMF Deployment	Complete AMF Deployment					

TOTAL INVESTMENT (\$ M) DEPENDENCIES

	Capital	O&M	Total Cost	
PMO and CMO	\$8.47	\$0.00	\$8.47	51%
Change Management / Training	\$4.86	\$2.92	\$7.78	47%
RFP Development	\$0.00	\$0.44	\$0.44	3%
Total	\$13.33	\$3.36	\$16.69	100%

AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

13 Project and Change Management

20-YEAR NPV (\$M)		
CAPITAL	O&M	TOTAL
\$9.89	\$2.49	\$12.38

Summary of Findings

CALCULATIONS AND OTHER METHODOLOGY

INTERNAL LABOR

Internal Resource	Number	FTEs				Average 4-Year Annual Capital Cost	Average 4-Year Annual O&M Cost
		Year 1	Year 2	Year 3	Year 4		
Director	1	0.1	0.1	0.1	0.1	\$21.2k	\$3.0k
Senior Project Manager	1	1	1	1	1	\$127.7k	\$19.1k
Assistant PM/Project Engineer	1	1	1	1	1	\$113.3k	\$26.2k
Analyst - IT	3	3	3	3	1.5	\$295.2k	\$80.5k
Vendor Management	1	1	1	1	1	\$139.5k	\$0.0k
Training	2	2	1.5	1.5	0.5	\$116.8k	\$75.0k
Subject Matter Specialists	30	6	6	6	3	\$745.3k	\$341.6k
Total Internal	39	14.1	13.6	13.6	8.1	\$1.6M	\$0.6M

EXTERNAL LABOR

External Resources	Contract Length	Average 4-year Capital Cost	Average 4-year O&M Cost
PMO	4	\$1.0M	\$0.1M
CMO	4	\$0.5M	\$0.2M
Total External		\$1.5M	\$0.3M

Data does not include inflation, contingency, labor loaders, overhead, and other costs

ASSUMPTIONS

- Includes both PMO and CMO Eversource internal resources and external contractors
- QA/QC is included in the PMO estimate
- Internal PMO FTE estimates were derived from similar methodology that was completed as part of the Eversource MA AMF business case assessment
- External PMO and CMO costs were derived from the recent Eversource MA RFP for AMF PMO services and proportioned for Eversource NH AMF deployment timeline and number of meters
- PMO/CMO costs are approximately 10% of the total implementation costs excluding MDM/CIS as project management is budgeted in these areas
- Responsibilities for PMO include upfront planning, RFP production, vendor evaluation, training, deployment oversight, metrics and reporting

Benefit Overviews

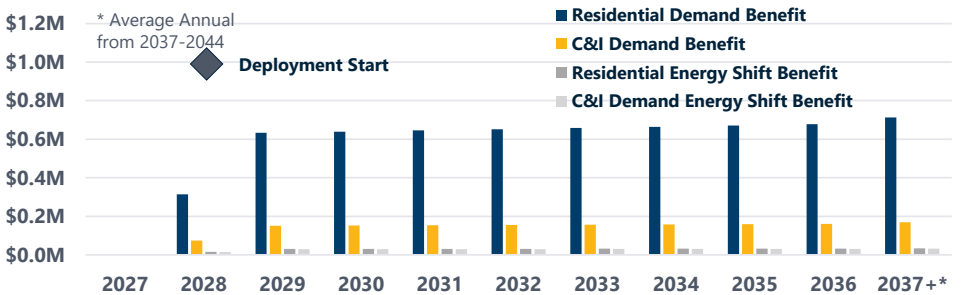
1 Time-Varying Rates (TVR)

20-YEAR NPV (\$M)				
RES DEMAND	C&I DEMAND	RES SHIFT	C&I SHIFT	TOTAL
\$4.82	\$1.14	\$0.23	\$0.22	\$6.42

Summary of Findings

OVERVIEW BENEFIT TIMELINE (\$M)

The interval data made available by AMF meters and enabled through a new CIS can be leveraged to expand customer choice by providing advanced rate options including Time-Varying Rates (“TVR”) to customers. TVRs encourage customers to reduce or shift electricity use from high-demand peak hours to lower demand off-peak hours and can result in savings on customer electric bills. TVR will be designed based on AMF data detailing actual customer use and load profiles, system constraints, and generation mixes. Different types of TVRs can be offered and targeted to different customer segments. Eversource will gather input from customers and other stakeholders, as well as findings at other utilities, to determine the desired rate types and structures to implement. The quantitative benefit of TVRs to customers is calculated based on expected customer adoption of TVRs and the expected reduction and shifting of load across those customers (based on previous pilots and industry benchmarks). Sharing AMF data with 3rd parties will also enable 3rd party suppliers to offer TVRs to their customers, as well as provide data to other 3rd parties such as renewable energy suppliers for additional value-added services to customers.



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE				Begin benefit from TVR						
DEPENDENCY	Begin CIS replacement	<ul style="list-style-type: none"> Complete CIS replacement Begin MDMS install 	<ul style="list-style-type: none"> Complete MDMS Complete CIS integration with MDMS Begin analytics use case 	<ul style="list-style-type: none"> Begin AMF Deployment Complete analytics use case 	<ul style="list-style-type: none"> Complete AMF Deployment Begin TVR customer engagement 	Begin Steady State AMF		Complete TVR customer engagement		

TOTAL BENEFIT (\$M) DEPENDENCIES

Residential Demand Benefit	\$11.22	AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
C&I Demand Benefit	\$2.66	Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Residential Energy Shift Benefit	\$0.54	Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
C&I Demand Energy Shift Benefit	\$0.51	Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Total	\$14.93	Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
		Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

1 Time-Varying Rates (TVR)

20-YEAR NPV (\$M)				
RES DEMAND	C&I DEMAND	RES SHIFT	C&I SHIFT	TOTAL
\$4.82	\$1.14	\$0.23	\$0.22	\$6.42

Summary of Findings

DATA INPUTS CALCULATIONS AND OTHER METHODOLOGY

INPUT NAME	ESTIMATE	SOURCE
Demand Reduction		
Residential Participating Customers (% of Total)	8%	EIA Form 861
Capacity Cost (\$/kW)	\$30.07	AESC Study
T&D Capacity Cost (\$/kW)	\$45.13	
C&I Participating Customers (% of Total)	6.3%	Eversource
Demand Reduction per Residential Participant (%)	12%	
Demand Reduction per C&I Participant (%)	3.6%	
Residential Peak Load (kW)	832,534	
C&I Peak Load (kW)	835,261	
Energy Shift		
Participating Customers (% of Total)	8%	EIA Form 861
Residential Energy Shift per Participant (%)	3.1%	Eversource
C&I Energy Shift per Participant (%)	2.8%	
Residential On-Peak Energy Consumption (MWh)	865,206	
C&I On-Peak Energy Consumption (MWh)	1,157,841	
On-Peak Wholesale Energy Price (\$/MWh)	94.0	
Off-Peak Wholesale Energy Price (\$/MWh)	80.6	

DEMAND REDUCTION

	Capacity Cost (\$/MW)	+ T&D Capacity Cost (\$/MW)	× Peak Demand (MW)	× Participation (%)	× Demand Reduction Rate (%)	× Meters Deployed (%)	× Meter Growth (%)	= Annual Demand Reduction (\$)
Residential	\$30,070	\$45,130	832.5	8%	12%	0-100%	0.85%	\$0.31M-\$0.73M
C&I	\$30,070	\$45,130	835.3	6.3%	3.6%	0-100%	0.85%	\$0.07M-\$0.17M

ENERGY SHIFT

	On-Peak Energy Price (\$/MWh)	- Off-Peak Energy Price (\$/MWh)	× Peak Consumption (MW)	× Participation (%)	× Energy Shift (%)	× Meters Deployed (%)	× Meter Growth (%)	= Annual Energy Shift (\$)
Residential	\$94.00	\$80.60	865,205	8%	3.1%	0-100%	0.85%	\$15k-\$35k
C&I	\$94.00	\$80.60	1,157,840	6.3%	2.8%	0-100%	0.85%	\$14k-\$33k

ASSUMPTIONS

- For demand shifted, the estimated financial benefit is calculated by the average difference between on and off-peak energy prices using the estimated demand shift from the pilot and industry data.
- For the reduced demand benefit, the AESC 2022 capacity savings rate (\$/kW) was used to calculate the savings.
- OMNI will be used to build time-varying rates and will need to be implemented before benefit can be realized
- Demand shift, energy shift, and energy reduction are estimated for Residential and C&I participants
- No incremental costs beyond system investments, analytics, PMO/CMO labor, and customer education

2

AMR Electric Meter Replacement Avoidance

20-YEAR NPV (\$M)

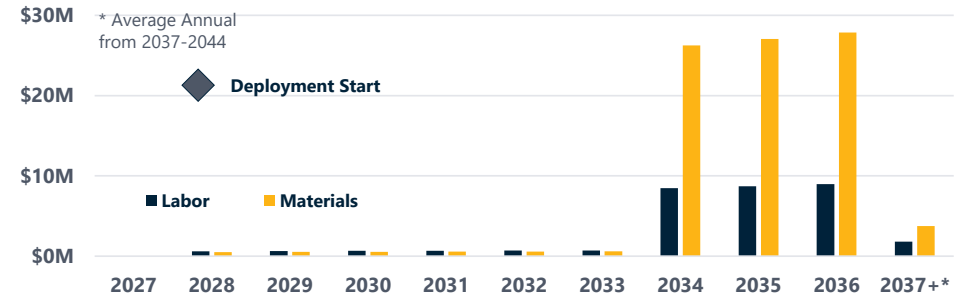
LABOR	MATERIALS	TOTAL
\$16.42	\$40.38	\$56.80

Summary of Findings

OVERVIEW

Eversource replaces around 5k AMR meters every year due to damage and the meters reaching their end of useful life. However, by 2034 and 2036, the AMR meters that were deployed from 2014-2016 will reach their 20-year end of useful life. Without a full AMF deployment, these AMR meters would be replaced over 3 years with new AMR meters starting in 2034. These avoided ongoing AMR replacements and full replacement in 2034-2036 as well as the associated labor are a benefit to Eversource. However, the offsetting component of this benefit is AMF deployment and ongoing replacement of damaged AMF meters as well as the unrecovered AMR costs which are accounted for in the Investments section.

BENEFIT TIMELINE (\$M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037-2044
MILESTONE				Begin AMR Meter Replacement Avoidance Benefit Replace 5k AMR meters	Replace 5k AMR meters	Replace 5k AMR meters	Replace 5k AMR meters	Replace 5k AMR meters	Replace 5k AMR meters	Mass Replacement of AMR – Replace 220k meters	Mass Replacement of AMR – Replace 220k meters	Mass Replacement of AMR – Replace 220k meters	Replace 5k AMR meters
DEPENDENCY				Begin AMF Deployment	Complete AMF Deployment	Begin AMF Steady State							

TOTAL BENEFIT (\$M)

Labor	\$37.23M
Materials	\$90.27M
Total	\$127.49M

DEPENDENCIES

AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

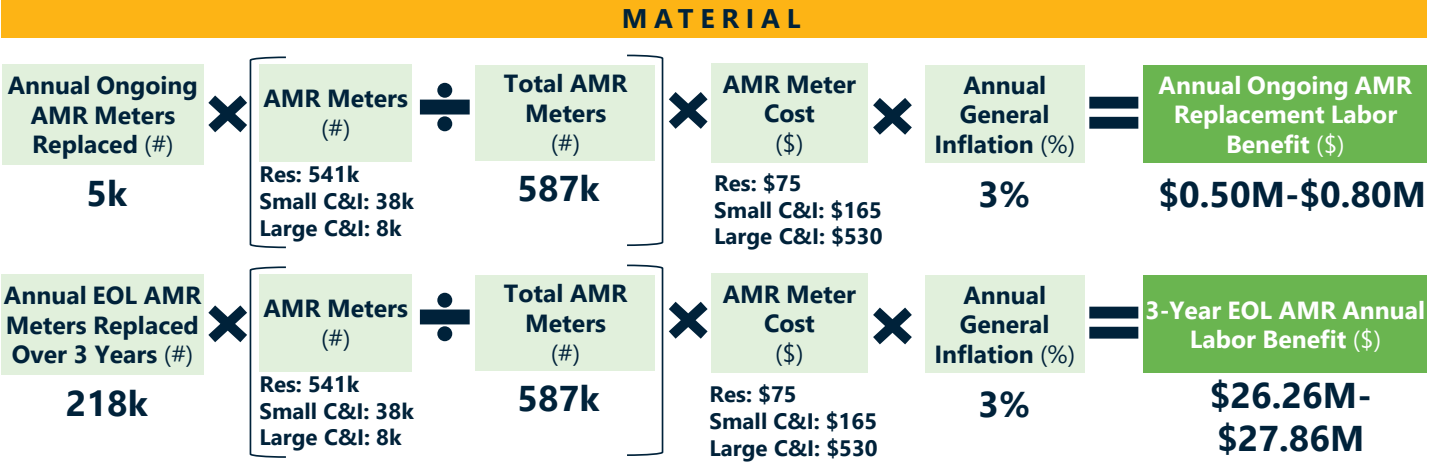
2 AMR Electric Meter Replacement Avoidance

20-YEAR NPV (\$M)		
LABOR	MATERIALS	TOTAL
\$16.42	\$40.38	\$56.80

Summary of Findings

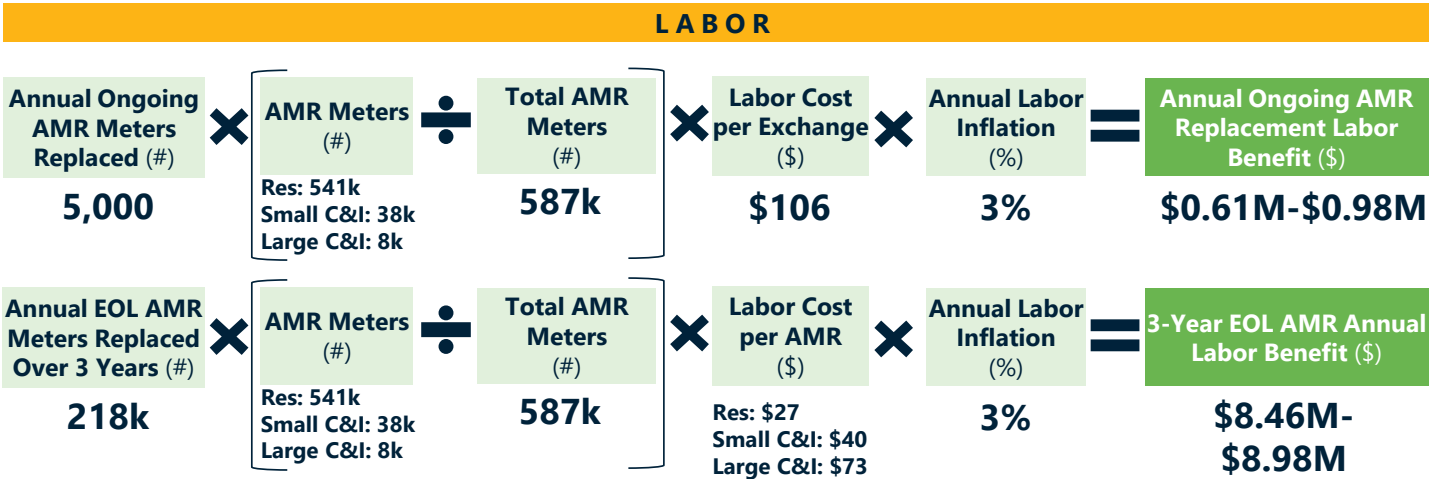
DATA INPUTS CALCULATIONS AND OTHER METHODOLOGY

INPUT NAME	ESTIMATE	SOURCE
AMR Meters Replaced Annually	5,000	EY Report
Number of AMR Meters (in 2023)	587,322	Eversource
Number of Residential AMR Meters (in 2023)	541,233	Eversource
Number of Large C&I AMR Meters (in 2023)	8,260	Eversource
Number of Small C&I AMR Meters (in 2023)	37,829	Eversource
Labor		
Labor Cost per Exchange	\$106	Eversource
Cost per AMF Residential Meter Deployment	\$27	Eversource
Cost per AMF Small C&I Meter Deployment	\$40	Eversource
Cost per AMF Large C&I Meter Deployment	\$73	Eversource
Material		
Cost of Residential AMR Meter	\$75	Eversource
Cost of Small C&I AMR Meter	\$165	Eversource
Cost of Large C&I AMR Meter	\$530	Eversource



ASSUMPTIONS

- 5,000 AMR meters are replaced each year by either reaching end of useful life or due to damage with a \$106 cost per exchange
- AMR meters were deployed in 2014-2016 and will reach their 20-year end of useful life starting in 2034. These 655k AMR meters will be replaced over a 3-year replacement period starting in 2034-2036 with a labor deployment costs varying by meter type
- Bridge meters will be replaced
- Benefit applied in terms of existing meter costs and COFI values



3 System Cost Avoidance (MDMS, CIS, Survey Meters & FCS)

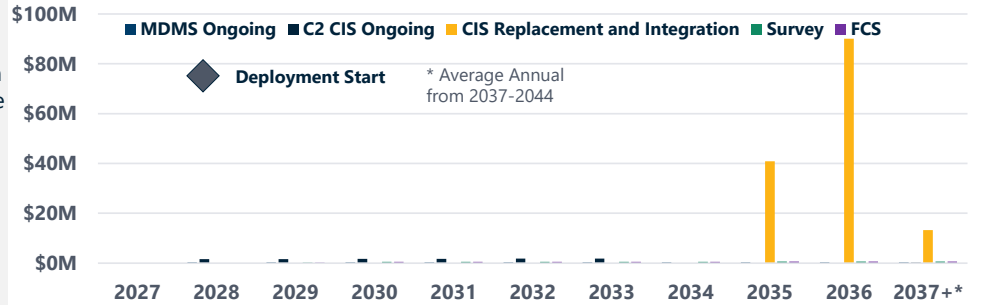
20-YEAR NPV (\$M)					
MDMS	C2 CIS ONGOING	CIS REPLACE	SURVEY	FCS	TOTAL
\$2.42	\$6.18	\$81.41	\$0.04	\$3.86	\$93.91

Summary of Findings

OVERVIEW

There are several systems that will be replaced as part of the AMF implementation including the MDMS, CIS, survey meter charges, and AMR Field Collection System (FCS). MDMS and CIS will be replaced with new solutions with offsetting investment categories to capture the new capital and O&M costs. The current MDMS will be replaced with a new MDMS and savings include ongoing software maintenance, servers, and other costs. The current C2 CIS will be replaced with a new CIS system and savings include ongoing costs for mainframe support, servers, and databases. Additionally, the current C2 CIS will eventually be replaced and it is assumed that this replacement would occur in 2033. There is an avoided cost benefit by replacing C2 sooner as part of AMF. Survey meter cellular charges and FCS are benefits that do not have an offsetting investment category. FCS includes all AMR infrastructure to collect, read, store, and process customer usage data for billing and benefits includes billing and IT labor, equipment, and hardware to maintain the system as well as ongoing SaaS fees. Survey meter benefits include savings from cellular charges as the survey meters will be able to communicate in the new telecommunications network.

BENEFIT TIMELINE (\$M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE				Begin Benefit of Avoided MDMS and CIS Ongoing Costs	Begin Benefit of Avoided Survey Meter Cellular Costs and FCS IT, Equipment, and Labor Costs				Begin C2 CIS Replacement and Integration Benefit End Benefit of Avoided C2 CIS Ongoing Costs	Complete C2 CIS Replacement and Integration Benefit Begin Benefit of Avoided Ongoing Costs from New CIS
DEPENDENCY	Begin CIS replacement	Begin MDMS Implementation Complete CIS replacement, being integration	Complete MDMS Implementation Complete CIS integration	Begin AMF Deployment	Complete AMF Deployment	Begin AMF Steady State				

TOTAL BENEFIT (\$M)

MDMS Ongoing	\$5.70M
C2 CIS Ongoing	\$10.17M
CIS Replacement, Integration and Ongoing	\$177.86
Survey	\$0.10M
FCS	\$9.58M
Total	\$203.40

DEPENDENCIES

AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO
Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

3 System Cost Avoidance (MDMS, CIS, Survey Meters & FCS)

20-YEAR NPV (\$M)					
MDMS	C2 CIS ONGOING	CIS REPLACE	SURVEY	FCS	TOTAL
\$2.42	\$6.18	\$81.41	\$0.04	\$3.86	\$93.91

Summary of Findings

DATA INPUTS | CALCULATIONS AND OTHER METHODOLOGY (NOMINAL VALUES)

INPUT NAME	ESTIMATE	SOURCE
MDM		
Annual MDMS Costs	\$219,798	West Monroe - Scaled from MA AMF Study
MDMS Exceptions Labor Costs	\$6,000	Eversource
C2 CIS ONGOING		
Annual C2 CIS Costs	\$1,356,093	West Monroe - Scaled from MA AMF Study
CIS REPLACEMENT		
Total CIS Replacement Cost	\$73,000,000 (2023\$)	See CIS Replacement and Integration Investment
Total CIS Integration Cost	\$10M (2023\$)	
Annual Ongoing Costs	\$2,783,794	
SURVEY METERS		
Survey Meters (#)	654	Eversource
Annual Cellular Charge per Survey Meter	\$6.24	Eversource
FCS		
Annual IT Labor	\$95,000	Eversource
Annual Billing Labor	\$87,446 (inc. loaders)	Eversource
Annual Hardware & Equipment	\$89k - equip. hardware \$9k - break/fix \$13k - replacements \$111,000 - Total	Eversource
Annual SaaS	\$120,000	Eversource

MDMS

$$\text{Annual MDMS Costs (\$)} \times \text{General Inflation (\%)} = \text{Annual Avoided MDMS Cost (\$)}$$

\$219,798 × 3% = \$255k-\$408k

$$\text{MDMS Exceptions Labor Costs (\$)} \times \text{Labor Inflation (\%)} = \text{Annual Avoided Exceptions Cost (\$)}$$

\$6k × 3% = \$7k-\$11k

SURVEY METERS

$$\text{Survey Meters (\#)} \times \text{Annual Cellular Charge (\$)} \times \text{Meters Deployed (\%)} \times \text{Inflation (\%)} = \text{Annual Avoided Survey Meter Cost (\$)}$$

654 × \$6.24 × 0-100% × 3% = \$2k-\$8k

C2 CIS ONGOING

$$\text{Annual CIS/C2 Costs (\$)} \times \text{General Inflation (\%)} = \text{Annual Avoided C2 CIS Ongoing Cost (\$)}$$

\$1.4M × 3% = \$1.8M

CIS REPLACEMENT

$$\text{Total Cost to Replace C2 (\$)} \times \text{General Inflation (\%)} = \text{Total Avoided Cost to Replace C2 (\$)}$$

\$73M × 3% = \$125M

$$\text{New CIS Integration Costs (\$)} \times \text{General Inflation (\%)} = \text{Total Avoided Integration Costs (\$)}$$

\$10M × 3% = \$14.1M

$$\text{New CIS Annual Costs (\$)} \times \text{General Inflation (\%)} = \text{Avoided Annual New CIS Costs (\$)}$$

\$2.8M × 3% = \$3.7

AMR FIELD COLLECTION SYSTEM (FCS)

$$(\text{Annual IT Labor (\$)} + \text{Annual Billing Labor (\$)}) \times \text{Labor Inflation (\%)} + (\text{Annual Hardware \& Equipment (\$)} + \text{Annual SaaS (\$)}) \times \text{General Inflation (\%)} \times \text{Percent of Meters Deployed (\%)} = \text{Annual Avoided FCS Cost (\$)}$$

(\$95k + \$87k) × 3% + (\$111k + \$120k) × 3% × 0-100% = \$243k-\$760k

ASSUMPTIONS

- MDMS replacement completes before meter deployment begins
- A new CIS replacement in the future is avoided by replacing C2 as part of AMF. It is assumed C2 would begin replacement and integration in 2033 and completed by 2035
- C2 CIS Ongoing benefit ends when the new CIS replacement benefit begins in 2033
- The CIS replacement benefit assumes the same costs and 2-year replacement and integration as well as ongoing fees inflated at 3% to the 2033 start year

4

Theft Reduction & Remote Disconnect Energy Savings

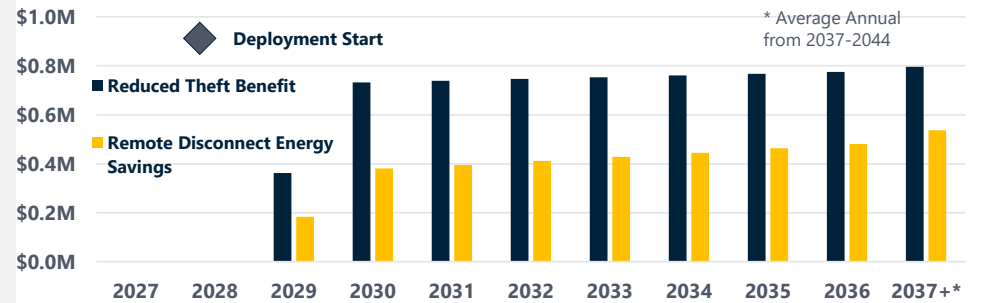
20-YEAR NPV (\$M)		
THEFT	REMOTE DISCONNECT	TOTAL
\$5.02	\$3.11	\$8.13

Summary of Findings

OVERVIEW

Energy theft is difficult to detect, requiring manual review of billing and meter-reading system reports to find discrepancies in energy consumption. AMF data allows detection of abnormal usage and theft faster and more accurately by providing almost immediate notification of meter tampering, leading to an investigation. Additionally, a discrepancy between the sum of individual meter consumption and measured usage on the associated network meter provides real time indication of theft and can be spotted quickly for investigation. Additional theft investigators beyond the current 1 theft investigators are required to realize the theft detection benefit from AMF. For remote disconnect energy savings, AMF will enable remote turn-on and turn-off capability, reducing the amount of non-technical loss, which is energy that is consumed, but not billed. With AMF, when service is cancelled, Eversource will immediately perform a remote shut-off, eliminating non-technical loss.

BENEFIT TIMELINE (\$M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE				1 incremental theft investigators (2 total)	Begin Theft and Remote Disconnect Benefit 2 incremental theft investigators (3 total)	4 incremental theft investigators (5 total)	Maintain 3 incremental theft investigators (4 total)	Maintain 3 incremental theft investigators (4 total)	Maintain 3 incremental theft investigators (4 total)	Maintain 3 incremental theft investigators (4 total)
DEPENDENCY			<ul style="list-style-type: none"> Begin relevant Analytics use cases Start OMS Integration 	<ul style="list-style-type: none"> Begin Deploy AMF Complete relevant Analytics use cases Complete OMS Integration 	Complete AMF Deployment	Begin Steady State AMF				

TOTAL BENEFIT (\$M)

Theft Reduction	\$12.13
Remote Disconnect Energy Savings	\$7.81
Total	\$19.95

DEPENDENCIES

AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

4

Theft Reduction & Remote Disconnect Energy Savings

20-YEAR NPV (\$M)		
THEFT	REMOTE DISCONNECT	TOTAL
\$5.02	\$3.11	\$8.13

Summary of Findings

DATA INPUTS CALCULATIONS AND OTHER METHODOLOGY

INPUT NAME	ESTIMATE	SOURCE
Theft Reduction		
Annual Revenue	1,474,800,000	ES 2023 Financial Report
Estimate of Theft	0.4%	MA AMF Study
Percent of Theft Revenue Recovered Through AMF (%)	50%	MA AMF Study
Theft Recovered per Investigator	\$1M	MA AMF Study
Meter Density	22%	West Monroe (see calc below)
Steady State Investigators	4	Eversource
Remote Disconnect Energy Savings		
Annual Average Non-Technical Loss (kWh)	2,482,144	Eversource
Retail Rate (\$/kWh)	\$0.11725	Eversource
Reduction of Non-Technical Loss	100%	Eversource

THEFT REDUCTION

$$\begin{array}{ccccccccc}
 \text{Annual Revenue (\$)} & \times & \text{Estimate of Theft (\%)} & \times & \text{Identifiable Theft Recovered (\%)} & \times & \text{Annual Meter Growth (\%)} & \times & \text{General Inflation (\%)} & = & \text{Annual Theft Reduction Potential (\$)} \\
 \$1.47B & & 0.4\% & & 50\% & & 0.85\% & & 3\% & & \$1.7M-\$3.8M
 \end{array}$$

The annual theft benefit can be up to \$3.8M, given the MA assumption that 1 theft investigator can recover \$1M annually in theft and Eversource will have 4 steady state theft investigators. However, given Eversource's rural service area, we assume that 1 theft investigator can only recover 22% of that, so \$220k annually, and \$0.9M across all 4 steady state investigators. If Eversource expands the number of theft investigators, it may get a larger share of the \$3.8M potential theft reduction

$$\begin{array}{ccccccc}
 \text{MA Theft Recovered per Investigator (\$)} & \times & \text{NH:MA Meter Density (\%)} & = & \text{NH Theft Recovered per Investigator (\$)} & \times & \text{Total Steady State Theft Investigators} & = & \text{Annual Recoverable Theft Reduction (\$)} \\
 \$1M & & 22\% & & \$220k & & 4 & & \$0.9M
 \end{array}$$

REMOTE DISCONNECT ENERGY SAVINGS

$$\begin{array}{ccccccccc}
 \text{Annual Average Non-Technical Loss (kWh)} & \times & \text{Retail Rate (\$/kWh)} & \times & \text{Reduction of Non-Technical Losses (\%)} & \times & \text{Percent of Meters Deployed (\%)} & \times & \text{Annual Meter Growth (\%)} & \times & \text{General Inflation (\%)} & = & \text{Annual Remote Disconnect Energy Savings (\$)} \\
 2,482,144 & & 0.11725 & & 100\% & & 0-100\% & & 0.85\% & & 3\% & & \$183-\$662k
 \end{array}$$

New Hampshire:
 - 587,322 meters across 5,628 square miles
 - 587,322/5,628 = 104 meters/square mile
Massachusetts:
 - 1,488,315 meters across 3,192 square miles of electric service area
 - 1,488,315/3,192 = 466 meters/square mile
NH meter density / MA meter density = 104 / 466 = 22%

ASSUMPTIONS

- Theft reduction follows same methodology as Eversource MA AMF business case, except given NH's rural service area compared to MA, meter density proportion was added
- Theft/Fraud detection use case as part of the Advanced Analytics investment, links metering anomalies and theft instances to a customer leading to better leads/investigation success rate and more identified theft beyond the \$30k that is currently recovered on average by the 1 investigator
- Total theft investigation resources increase to 5 shortly after deployment (4 incremental) then reduces to 4 steady state (3 incremental)
- Remote disconnect energy savings is related to consumption on inactive meters prior to soft close orders
- Average annual non-technical loss is an average from 2019 to 2022 for total billed and unidentified kWh
- 100% reduction of non-technical loss leverages same percent improvement in the meter alive remote shut off efficiency improvement and is same assumption as Eversource Massachusetts AMF feasibility study

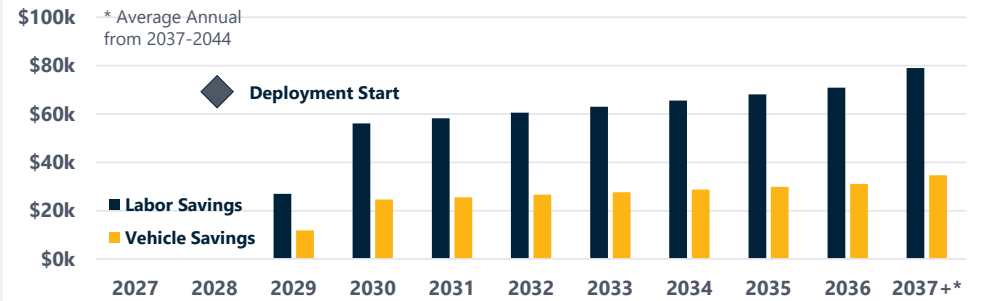
5 No Trouble Found (NTF) Reduction

20-YEAR NPV (\$M)		
LABOR	VEHICLE	TOTAL
\$0.46	\$0.20	\$0.66

Summary of Findings

OVERVIEW BENEFIT TIMELINE (\$M)

Eversource depends on customer calls to predict the location of damage on the system and initiate the restoration process. Based on these calls, a crew needs to be dispatched to investigate claims of an outage or power quality concern, as there is no ability to remotely determine service level. Most of these on-site investigations are ultimately resolved as “no trouble found” (NTF), meaning the issue was on the customer-side of the meter rather than an outage. With an AMF system, operators can conduct remote diagnostics to confirm a reported outage or service issue. By confirming an outage remotely, AMF prevents unnecessary labor and truck rolls to address NTF calls, a benefit calculated through the number of NTF calls received per year and the average cost of those calls. In the event of a NTF call from a customer, the operator has ready access to historical event flags, hourly usage data, and other metrics that provide actionable insights into what caused a confirmed outage and can pass this info along to the customer, enhancing satisfaction.



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE					Begin Realizing NTF Reduction Benefit					
DEPENDENCY			<ul style="list-style-type: none"> Begin relevant Analytics use cases Start OMS Integration 	<ul style="list-style-type: none"> Begin Deploy AMF Complete relevant Analytics use cases Complete OMS Integration 	Complete AMF Deployment	Begin Steady State AMF				

TOTAL BENEFIT (\$M) DEPENDENCIES

Labor Savings	\$1.15M	AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Vehicle Savings	\$0.50M	Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Total	\$1.65M	Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
		Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
		Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
		Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

5 No Trouble Found (NTF) Reduction

Summary of Findings

20-YEAR NPV (\$M)		
LABOR	VEHICLE	TOTAL
\$0.46	\$0.20	\$0.66

DATA INPUTS CALCULATIONS AND OTHER METHODOLOGY

INPUT NAME	ESTIMATE	SOURCE
Annual Number of NTF (5-year ave.)	746	Eversource
Labor Savings		
Troubleshooter Labor Rate (loaded) (\$/hr)	\$54	Eversource
Vehicle Savings		
Miles Driven per NTF Event	25	Eversource
Cost per Mile Driven (\$/mile)	\$1.12	Eversource
Reduction in NTF	90%	Eversource

LABOR SAVINGS

$$\begin{array}{c}
 \text{Annual Number of NTF (\#)} \\
 746
 \end{array}
 \times
 \begin{array}{c}
 \text{Troubleshooter Labor Rate (Unloaded) (\$/hr)} \\
 \$54
 \end{array}
 \times
 \begin{array}{c}
 \text{Labor Inflation (\%)} \\
 3\%
 \end{array}
 \times
 \begin{array}{c}
 \text{Reduction in NTF (\%)} \\
 90\%
 \end{array}
 \times
 \begin{array}{c}
 \text{Meters Deployed (\%)} \\
 0-100\%
 \end{array}
 \times
 \begin{array}{c}
 \text{Meter Growth} \\
 0.85\%
 \end{array}
 =
 \begin{array}{c}
 \text{Annual Labor Savings (\$)} \\
 \$27k-\$97k
 \end{array}$$

VEHICLE SAVINGS

$$\begin{array}{c}
 \text{Annual Number of NTF (\#)} \\
 746
 \end{array}
 \times
 \begin{array}{c}
 \text{Miles Driven per NTF Event (\#)} \\
 25
 \end{array}
 \times
 \begin{array}{c}
 \text{Cost per Mile (\$/mi)} \\
 \$1.12
 \end{array}
 \times
 \begin{array}{c}
 \text{General Inflation (\%)} \\
 3\%
 \end{array}
 \times
 \begin{array}{c}
 \text{Reduction in NTF (\%)} \\
 90\%
 \end{array}
 \times
 \begin{array}{c}
 \text{Meters Deployed (\%)} \\
 0-100\%
 \end{array}
 \times
 \begin{array}{c}
 \text{Meter Growth} \\
 0.85\%
 \end{array}
 =
 \begin{array}{c}
 \text{Annual Vehicle Savings (\$)} \\
 \$12k-\$43k
 \end{array}$$

ASSUMPTIONS

- Labor savings calculated based on reduction of NTF
- Vehicle savings from reduced truck rolls for responses
- 90% reduction due to meter status awareness
- Estimated 25 miles driven per event
- 746 NTF events occur on average over the past 5 years from 2018-2022
- Benefit realization based on completion of OMS integrations
- Benefit increases over time as number of meters increases; therefore, increasing number of NTF

6 Meter Reading and Field Operations Benefit

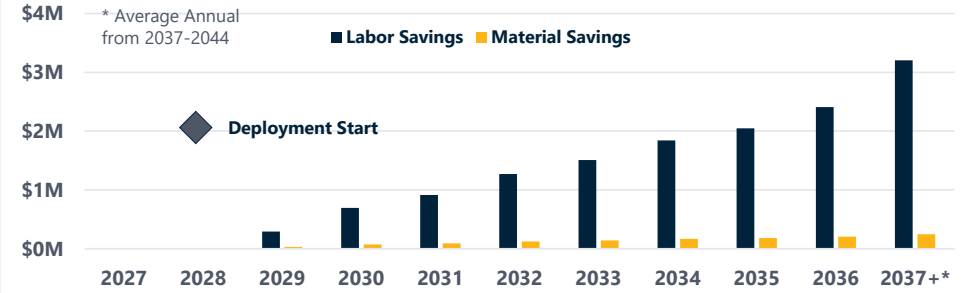
20-YEAR NPV (\$M)		
LABOR	MATERIAL	TOTAL
\$14.89	\$1.22	\$16.11

Summary of Findings

OVERVIEW

Meter reading is currently performed by drive-by AMR technology with several meter readers supporting the data collection. AMF technology uses wireless telecommunications for the collection of meter data. Meter data can be collected as needed to support billing and a number of other customer and operational programs and benefits. The majority of meter reading will be performed remotely at steady state, yet a planned percent of AMF opt-out informed the requirements for a contingent of manual meter reading activities will remain. All excess meter readers are repurposed for door knocking while they remain on staff, but in the steady state they attrit away and are either backfilled by doorknockers or left unreplaced. Both an incremental increase in disconnects and allowance for labor attrition is possible due to the disconnect efficiencies enabled by AMF. Avoided activities include elimination of reconnects, could-not-get-ins, and a reduction of non-credit orders such as soft closes.

BENEFIT TIMELINE (\$M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE					Begin Realizing Meter Reading and Field Ops Benefit					
DEPENDENCY				Begin AMF Deployment	<ul style="list-style-type: none"> Complete AMF Deployment Begin attrition 	Begin Steady State AMF				

TOTAL BENEFIT (\$M)

Labor	\$41.63
Material	\$3.30
Total	\$44.93

DEPENDENCIES

AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

6 Meter Reading and Field Operations Benefit

20-YEAR NPV (\$M)		
LABOR	MATERIAL	TOTAL
\$14.89	\$1.04	\$15.93

Summary of Findings

CALCULATIONS AND OTHER METHODOLOGY

ANNUAL LABOR SAVINGS

	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
MA Budget Savings from Natural Attrition (MA AMF Feasibility Study)	\$0.1	\$0.6	\$1.3	\$1.6	\$2.2	\$2.5	\$3.0	\$3.2	\$3.7	\$4.0	\$4.5	\$4.6	\$4.9	\$5.3	\$5.6	\$5.8	\$5.8
*Adjusted MA Budget Savings from Natural Attrition (MA AMF Feasibility Study)	\$0.1	\$0.6	\$1.3	\$1.7	\$2.3	\$2.7	\$3.2	\$3.4	\$3.9	\$4.3	\$4.7	\$4.9	\$5.2	\$5.6	\$5.9	\$6.2	\$6.2
NH Budget Savings from Natural Attrition (43% Proportion from MA No. of Meters)	\$0.0	\$0.2	\$0.6	\$0.7	\$1.0	\$1.1	\$1.3	\$1.4	\$1.6	\$1.8	\$2.0	\$2.0	\$2.2	\$2.3	\$2.5	\$2.6	\$2.6
NH Budget Savings from Natural Attrition (with 3% annual inflation)		\$0.3	\$0.7	\$0.9	\$1.3	\$1.5	\$1.8	\$2.0	\$2.4	\$2.7	\$3.1	\$3.3	\$3.6	\$4.0	\$4.4	\$4.7	\$4.8

*Adjustment based on Year 1 model differences between MA (2023) and NH (2025)

ANNUAL MATERIAL SAVINGS



ASSUMPTIONS

- Annual Labor Savings modeled from MA AMF Feasibility Study data and adjusted to NH based on Year 1 differences between MA and NH, meter proportion (43%), and added a 3% annual inflation
- Annual Materials Savings modeled following assumptions from the 2013 PSNH AMR Business Case and inflated to 2023
- Number of FTEs for AMR and AMF were escalated to 2023 based on meter growth between 2013-2023, and then assumed current AMR staff was 33% less
- Cost per vehicle and clothing cost were escalated to 2023 based on inflation in the 2013-2023 timeframe (30% overall inflation based on CPI)
- Workforce attrition occurs over 16 years, following MA AMF Business Case assumption
- AMF enables the majority of meter reading and soft close activities remotely
- Number of fewer vehicles is less than fewer staff because not all staff has dedicated vehicle
- Certain staff positions maintained at steady state for remaining manual activities
- Efficiencies per disconnect were estimated on the same assumptions as the MA AMF Business Case which is based on Eversource experience leveraging AMR to AMF bridge meters for remote disconnects and other services avoided enabled more time per field service rep to be dedicated to disconnects.
- Analysis comparing meter reading / field collections door knock attrition to the backfilling of labor attrition showed that attrition yielded higher overall value while no door knock requirement enabled the greatest value
- With door knock requirement, credit disconnects are made more efficient and could-not-get-in (CGIs) are avoided, which also improves safety and avoid unknown hazards at the premise

6
 NO AMR

No AMR Deployed Scenario: Meter Reading and Field Operations Benefit

20-YEAR NPV (\$M)

LABOR	MATERIAL	TOTAL
\$40.61	\$6.42	\$47.03

Summary of Findings

DATA INPUTS

INPUT NAME	ESTIMATE			Source
	2023 Cost	Manual Reading	AMF	
Resource	2023 Cost	Manual Reading	AMF	Source
Manager	\$133,320	1	1	2013 PSNH AMR Business Case
Supervisors	\$116,120	3	2	
Working Foreman	\$81,888	16	2	
Meter Reader Specialists	\$75,476	12	0	
Meter Readers	\$72,951	82	0	
Field Service Reps	\$72,951	0	17	
AMR Drivers	\$72,951	0	0	
Clerks	\$68,804	0	2	
System Support	\$81,888	0	2	

Additional Inputs

Cost Per Vehicle (\$/year)	\$13,543*	2013 PSNH AMR Business Case
Number of Fewer Vehicles Needed for AMF (#)	33*	
Clothing Allowance (\$/year/FTE)	\$1,138*	WM Benchmark
Manual Meter Reading Injury Cost (\$/meter/year)	\$0.508	

TOTAL BENEFIT (\$M)

Labor	\$111.25
Material	\$17.39
Total	\$128.64

- The 2013 PSNH AMR Business Case has 94 FTEs, but that number is assumed to increase to 113 FTEs due to meter growth from 2013 to 2023
- Workforce attrition occurs over 16 years, following MA AMF Business Case assumption
- Cost per vehicle and clothing cost were escalated to 2023 based on inflation in the 2013-2023 timeframe (30% overall inflation based on CPI)
- Please see #6 Meter Reading and Field Operations Benefit for additional relevant assumptions

CALCULATIONS AND OTHER METHODOLOGY

ANNUAL LABOR SAVINGS

$$\left[\begin{array}{l} \text{Salary (\$)} \\ \$68k- \\ \$133k \end{array} \right] \times \left[\begin{array}{l} \text{Manual Reading Staff (\#)} \\ 113 \\ - \\ \text{AMF Staff (\#)} \\ 26 \end{array} \right] \times \begin{array}{l} \text{Meters Deployed (\%)} \\ 0-100\% \end{array} \times \begin{array}{l} \text{Meter Growth} \\ 0.85\% \end{array} = \begin{array}{l} \text{Annual Labor Savings (\$)} \\ \$0.9M- \\ \$11.7M \end{array}$$

$$\left[\begin{array}{l} \text{Injury Cost (\$/meter)} \\ \$0.508 \end{array} \right] \times \begin{array}{l} \text{Number of Meters (\#)} \\ 600k \end{array} \times \begin{array}{l} \text{Meters Deployed (\%)} \\ 0-100\% \end{array} \times \begin{array}{l} \text{Meter Growth} \\ 0.85\% \end{array} = \begin{array}{l} \text{Annual Avoided Injuries} \\ \$30k- \$320k \end{array}$$

ANNUAL MATERIAL SAVINGS

$$\left[\begin{array}{l} \text{Cost Per Vehicle (\$)} \\ \$13.5k \end{array} \right] \times \begin{array}{l} \text{Number of Fewer Vehicles (\#)} \\ 91 \end{array} + \begin{array}{l} \text{Clothing Allowance (\$/FTE)} \\ \$1k \end{array} \times \begin{array}{l} \text{Fewer Staff (\#)} \\ 87 \end{array} \times \begin{array}{l} \text{Meters Deployed (\%)} \\ 0-100\% \end{array} \times \begin{array}{l} \text{Meter Growth} \\ 0.85\% \end{array} = \begin{array}{l} \text{Annual Savings (\$)} \\ \$0.1M- \\ \$1.4M \end{array}$$

7 Outage Restoration

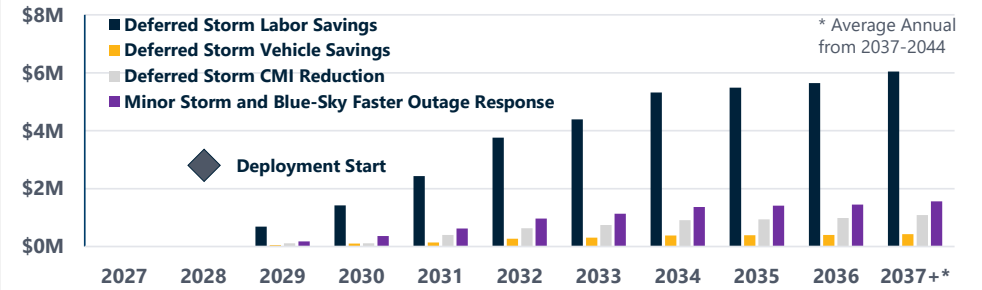
20-YEAR NPV (\$M)				
D.S. LABOR	D.S. VEHICLE	D.S. CMI	M.S. FASTER	TOTAL
\$30.73	\$2.16	\$5.33	\$7.91	\$46.12

Summary of Findings

OVERVIEW

Interruptions in electric power service pose significant inconvenience for residential, small commercial and industrial (C&I), and large C&I customers. AMF is expected to reduce the duration of major outage events by supporting earlier identification of nested outages at the tail end of the restoration. Currently, the OMS uses algorithms to predict total number of customers out of power and the number of damage locations. With AMF, real-time data is provided throughout storm events, which makes restoration of power more efficient and targeted to highly impacted areas. Reduced outage tails will enable crews to be sent home faster yielding reduced costs. While not yielding an operational benefit, outage response during minor storm and non-storm days (blue sky) will benefit through increased awareness of an outage. Instead of waiting for customers to call, field crews can be dispatched right when an outage occurs in more circumstances than possible today. Customers for whom power is restored more quickly than it would have been without AMF will place a value on that benefit, which was calculated using the Lawrence Berkley National Lab Interruption Cost Estimate ("ICE") calculator.

BENEFIT TIMELINE (\$ M)



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE					Begin partial Outage Restoration Benefit Realization (15%)					Begin full Outage Restoration Benefit (100%) in 2034
DEPENDENCY			Begin relevant Analytics use cases	<ul style="list-style-type: none"> Begin Deploy AMF Complete relevant Analytics use cases Start Asset Mgmt Integration 	<ul style="list-style-type: none"> Complete AMF Deployment Complete Asset Mgmt Integration 	Begin Steady State AMF				

TOTAL BENEFIT (\$ M)

Deferred Storm Labor Savings	\$80.89
Deferred Storm Vehicle and Other Expenses Savings	\$5.71
Deferred Storm CMI Reduction	\$1.26
Minor Storm and Blue-Sky Faster Outage Response	\$20.82
Total	\$121.68

DEPENDENCIES

AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

7 Outage Restoration

20-YEAR NPV (\$M)

D.S. LABOR	D.S. VEHICLE	D.S. CMI	M.S. FASTER	TOTAL
\$30.73	\$2.16	\$5.33	\$7.91	\$46.12

Summary of Findings

DATA INPUTS

INPUT NAME	ESTIMATE	SOURCE
Annual Deferred Storm Frequency (#)	4	Eversource
Deferred Storm Expense Reduction through AMF (%)	12.46%	Eversource
Weighted Ave. Cost per Storm & Non-Storm Outage Minute (\$/min.)	\$1.459	ICE Calculator
Deferred Storm Labor Savings		
Labor Expenses per Deferred Storm	7,717,299	Eversource
Deferred Storm Vehicle Savings		
Vehicle & Other Expenses per Deferred Storm	548,066	Eversource
Deferred Storm CMI Reduction		
Non-Storm Average Annual Number of Customer Interrupted (#)	277,003	Eversource
Deferred Storm Average Duration (min)	1,440 mins or 24 hours	Eversource
Deferred Storm Percent of Customers on Outage Tail (%)	1%	Eversource
Minor Storm and Blue-Sky Faster Outage Response		
Minor Storm & Blue-Sky 2-min. Faster Outage Response	678,387	Calculated by West Monroe; Data provided by Eversource

CALCULATIONS AND OTHER METHODOLOGY

DEFERRED STORM LABOR SAVINGS

$$\begin{array}{l}
 \text{Labor Expenses per Deferred Storm (\$)} \times \text{Deferred Storm Frequency (\#)} \times \text{Deferred Storm Expense Reduction through AMF (\%)} \times \text{Labor Inflation (\%)} \times \text{Benefit Realization (\%)} = \text{Annual Labor Savings (\$)} \\
 \mathbf{\$7.7M} \quad \mathbf{4} \quad \mathbf{12.46\%} \quad \mathbf{3\%} \quad \mathbf{15-100\%} \quad \mathbf{\$0.7M-\$7.2M}
 \end{array}$$

DEFERRED STORM VEHICLE & OTHER EXPENSES SAVINGS

$$\begin{array}{l}
 \text{Vehicle \& Other Expenses per Deferred Storm (\$)} \times \text{Deferred Storm Frequency (\#)} \times \text{Deferred Storm Expense Reduction through AMF (\%)} \times \text{General Inflation (\%)} \times \text{Benefit Realization (\%)} = \text{Annual Vehicle \& Other Savings (\$)} \\
 \mathbf{\$548k} \quad \mathbf{4} \quad \mathbf{12.46\%} \quad \mathbf{3\%} \quad \mathbf{15-100\%} \quad \mathbf{\$49k-\$500k}
 \end{array}$$

DEFERRED STORM CMI REDUCTION

$$\begin{array}{l}
 \text{Deferred Storm Average Annual Customers Interrupted (\#)} \times \text{Deferred Storm Duration (min)} \times \text{Deferred Storm Percent of Customers on Outage Tail (\%)} \times \text{Deferred Storm Expense Reduction through AMF (\%)} \times \text{Weighted Ave. Cost per Storm \& Non-Storm Outage Minute (\$/min.)} \times \text{Meter Growth (\%)} \times \text{General Inflation (\%)} \times \text{Benefit Realization (\%)} = \text{Annual CMI Reduction Benefit (\$)} \\
 \mathbf{277,003} \quad \mathbf{1,440} \quad \mathbf{1\%} \quad \mathbf{12.46\%} \quad \mathbf{\$1.459} \quad \mathbf{0.85\%} \quad \mathbf{3\%} \quad \mathbf{15-100\%} \quad \mathbf{\$0.1M-\$1.4M}
 \end{array}$$

MINOR STORM AND BLUE-SKY FASTER OUTAGE RESPONSE

$$\begin{array}{l}
 \text{Minor Storm \& Blue-Sky 2-min. Faster Outage Response (min)} \times \text{Weighted Ave. Cost per Storm \& Non-Storm Outage Minute (\$/min.)} \times \text{General Inflation (\%)} \times \text{Benefit Realization (\%)} = \text{Annual Faster Response Benefit (\$)} \\
 \mathbf{678,387} \quad \mathbf{\$1.459} \quad \mathbf{3\%} \quad \mathbf{15-100\%} \quad \mathbf{\$0.2M-\$1.8M}
 \end{array}$$

ASSUMPTIONS

- Instead of waiting for customers to call, field crews can be dispatched right when an outage occurs in more circumstances than possible today. An estimate for this delta was observed in data where sensors are leveraged and identified through SCADA
- Customers for whom power is restored more quickly than it would have been without AMF will place a value on that benefit, and an estimate of that benefit was found using the Lawrence Berkley National Lab Interruption Cost Estimate ("ICE") calculator
- Deferred Storm Labor and Vehicle Savings: Type restoration curve difference between actual results and predicted lower limit as target benefit through AMF is 12.5% reduction in expenses across direct labor, contractors, overheads, vehicles, and other expenses
- Deferred Storm CMI Reduction: 1% customers on outage tail receiving the benefit to overall Major/Deferred Storm CMI (ICE Cost of Interruption Methodology)
- Minor Storm and Blue-Sky Faster Outage Response: Through AMF, crews will be dispatched 2 minutes faster, reducing customer outages by 2 minutes. Calculation performed by West Monroe using same methodology as the Eversource MA AMF business case
- Benefit realization occurs progressively over 6 years starting from Year 2 of AMF deployment in 2029

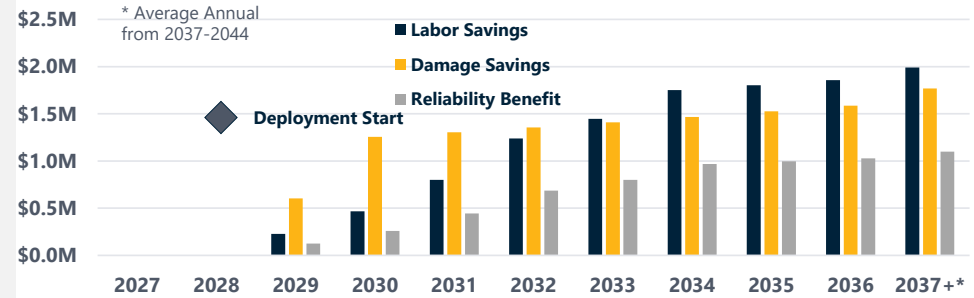
8 Asset Analytics

20-YEAR NPV (\$M)			
LABOR	RELIABILITY	DAMAGE	TOTAL
\$10.11	\$5.59	\$10.25	\$25.94

Summary of Findings

OVERVIEW BENEFIT TIMELINE (\$M)

AMF enables asset analytics, benefiting both Eversource operations and customers with use cases including blown fuses, transformer overloads, secondary failures, and open neutrals. Voltage data from AMF in addition to usage is a critical piece of information. For example, with transformer load management (TLM), an algorithm is used to predict transformers at risk for overload. With the growing penetration of behind-the-meter solar generation, among other factors, the historical TLM algorithm may not be indicative of future load patterns. Additional data enabled by AMF would serve to inform updated algorithms and more granular and area-specific analysis. By providing interval data at the customer premise level, AMF will provide more accurate information about the timing and magnitude of individual customer peak loads than is otherwise available as well as enabling voltage readings to be associated with pertinent assets on the feeder. The AMF data will enable Eversource to plan and design the system in response to increased EV adoption, including customer charging patterns, and assessing grid impacts of different chargers. Incorporating the information enabled by AMF into the asset management methodology will enable engineers to identify failures, providing a financial benefit from reducing resources required to address overloads and failures, while enhancing customer reliability, safety, and overall satisfaction.



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE					Begin partial Asset Analytics Benefit Realization (15%)					Begin full Asset Analytics Benefit (100%) in 2034
DEPENDENCY			Begin relevant Analytics use cases	<ul style="list-style-type: none"> Begin Deploy AMF Comp. Analytics use cases Start Asset Mgmt Integration 	<ul style="list-style-type: none"> Complete AMF Deployment Complete Asset Mgmt Integration 	Begin Steady State AMF				

TOTAL BENEFIT (\$M)		DEPENDENCIES			
Labor Savings	\$26.61	AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Reliability Benefit	\$14.72	Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Damage Savings	\$25.75	Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
Total	\$67.07	Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
		Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
		Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

8 Asset Analytics

20-YEAR NPV (\$M)			
LABOR	RELIABILITY	DAMAGE	TOTAL
\$10.11	\$5.59	\$10.25	\$25.94

Summary of Findings

DATA INPUTS CALCULATIONS AND OTHER METHODOLOGY

INPUT NAME	ESTIMATE	SOURCE
AMF Enhanced Voltage Monitoring and Asset Mgmt (%)	70%	Eversource
Process Efficiency between Planned and Unplanned (%)	67%	Eversource
Labor Savings		
Number of Events (#)	Varies based on asset	Eversource
CAIDI	Varies based on asset	Eversource
Crew Labor Rate (\$/hr)	\$267	Eversource
Event Reliability Savings		
Weighted Ave. Cost per Storm & Non-Storm Outage Minute (\$/min.)	\$1.459	Eversource
CMI	Varies based on asset	Eversource
AMF Enhanced Blue Sky Outage Awareness Benefit (%)	5%	Eversource
Transformer Damages Savings		
Failures / overloads yield damages (#)	274	Eversource
Cost of damaged transformer (\$)	\$5,000	WM benchmark

ASSUMPTIONS

- 70% mitigation of blue-sky transformer overloads, secondary failures, blown fuses, and open neutral events through voltage monitoring & controls, analytics, and planned maintenance/upgrades
- 67% efficiency in planned vs. unplanned asset management with crew over recorded occurrence event durations
- Yields blue sky reliability benefit for duration of events mitigated
- Cost of transformer failure damages only use case currently quantified in terms of damage costs
- Eversource MA uses 3-person crews at \$400 per hour, while Eversource NH uses 2-person crew; therefore, assume \$267 per hour for a 2-person crew
- Benefit realization occurs progressively over 6 years starting from Year 2 of AMF deployment in 2029

LABOR SAVINGS								
	Events (#)	CAIDI (min. converted to hr.)	AMF Enhanced Voltage Monitoring and Asset Mgmt (%)	Process Efficiency between Planned and Unplanned (%)	Crew Labor Rate (\$/hr)	Labor Inflation (%)	Benefit Realization (%)	Annual Labor Savings (\$)
Blown Fuses	4,151	122	70%	67%	\$267	3%	15-100%	\$188k-\$2.0M
Transformer Overloads	141	147	70%	67%	\$267	3%	15-100%	\$8k-\$80k
Secondary Failures	465	171	70%	67%	\$267	3%	15-100%	\$30k-\$307k
Open Neutrals	23	109	70%	67%	\$267	3%	15-100%	\$1k-\$10k

EVENT RELIABILITY SAVINGS								
	Weighted Ave. Cost per Storm & Non-Storm Outage Minute (\$/min.)	CMI (min.)	AMF Enhanced Blue Sky Outage Awareness Benefit (%)	AMF Enhanced Voltage Monitoring and Asset Mgmt (%)	Process Efficiency between Planned and Unplanned (%)	General Inflation (%)	Benefit Realization (%)	Annual Reliability Savings (\$)
Blown Fuses	\$1.459	19.3M	5%	70%	67%	3%	15-100%	\$117k-\$1.2M
Transformer Overloads	\$1.459	161k	5%	70%	67%	3%	15-100%	\$1k-\$10k
Secondary Failures	\$1.459	1.1M	5%	70%	67%	3%	15-100%	\$6k-\$67k
Open Neutrals	\$1.459	41k	5%	70%	67%	3%	15-100%	\$1k-\$3k

TRANSFORMER DAMAGES SAVINGS								
	Failures / overloads yield damages (#)	Cost of damage transformer (\$)	AMF Enhanced Voltage Monitoring and Asset Mgmt (%)	Meters Deployed (%)	Meter Growth (%)	General Inflation (%)	Benefit Realization (%)	Annual Transformer Savings (\$)
	274	\$5k	70%	0-100%	0.85%	3%		\$600k-\$2.2M

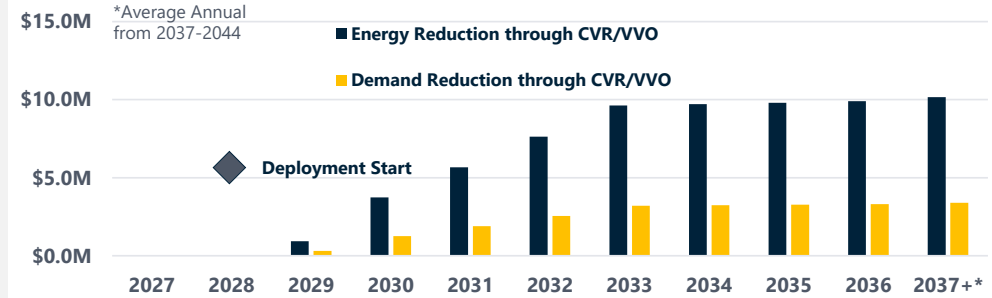
9 CVR/VVO Benefit

20-YEAR NPV (\$M)		
ENERGY	DEMAND	TOTAL
\$54.86	\$18.31	\$73.17

Summary of Findings

OVERVIEW BENEFIT TIMELINE (\$M)

AMF data and associated analytics can help achieve energy reduction by providing insights for advanced voltage control and management through CVR/VVO techniques to adjust service voltage to customers and thus reducing line losses and energy consumption. With real-time sensing, communication and control of line regulators and capacitors, higher levels of savings can be realized while ensuring reliable, high-quality service to customers. Integration of AMF to a CVR/VVO system boosts the visibility and savings that the CVR/VVO system can achieve. The CVR/VVO benefits from AMF are twofold. There are both energy and demand reduction calculated using values from the 2022 AESC study for energy and demand savings. Qualitatively, insight into system voltage will enable Eversource to be prepared for changes in load driven by EVs and other distributed resources. Right now, Eversource does not have CVR/VVO capabilities in New Hampshire with the associated infrastructure, capabilities, analytics, and integrations expected to begin in 2029 and complete by 2033. A partial benefit associated with energy reduction from CVR/VVO begins in 2029 with full benefit by 2033 when installation is complete.



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE					Begin CVR/VVO Benefit (20%)	40 % CVR/VVO Benefit	60% CVR/VVO Benefit	80% CVR/VVO Benefit	Begin full CVR/VVO Benefit	
DEPENDENCY				Begin AMF Deployment	<ul style="list-style-type: none"> Complete AMF Deployment Begin VVO Analytics Begin VVO int. Begin VVO install 	<ul style="list-style-type: none"> Begin Steady State AMF Complete VVO Analytics & Integrat. 			Complete VVO install	

TOTAL BENEFIT (\$M)		DEPENDENCIES			
Energy Reduction through CVR/VVO	\$139.97	AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Demand Reduction through CVR/VVO	\$46.72	Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Total	\$186.70	Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
		Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
		Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
		Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

9 CVR/VVO Benefit

20-YEAR NPV (\$M)		
ENERGY	DEMAND	TOTAL
\$54.86	\$18.31	\$73.17

Summary of Findings

DATA INPUTS			CALCULATIONS AND OTHER METHODOLOGY							
INPUT NAME	ESTIMATE	SOURCE	ENERGY SAVINGS							
Percent of Feeders with VVO (%)	65%	Eversource	Total System Electric Sales Volume (MWh) 7,764,000	× AESC Energy Rate (\$/MWh) \$48.4	× Feeders with VVO (%) 65%	× Energy Reduction through CVR/VVO (%) 3.6%	× Benefit Realization Over 5 Year CVR/VVO Installation (%) 20-100%	× Meter Growth (%) 0.85%	= Annual Energy Savings (\$) \$0.9M-\$10.8M	
Total Number of Feeders (#)	815	Eversource								
Number of Qualified Feeders (#)	529	Eversource								
Energy Savings			DEMAND SAVINGS							
Total System Electric Sales Volume (MWh)	7,764,000	2022 ES Annual Report	AESC Capacity Cost (\$/MW) 30,074	+ AESC T&D Capacity Cost (\$/MW) 45,130	× System Peak Load (MW) 1,668	× Feeders with VVO (%) 65%	× Demand Reduction through CVR/VVO (%) 3.6%	× Benefit Realization Over 5 Year CVR/VVO Installation (%) 20-100%	× Meter Growth (%) 0.85%	= Annual Demand Savings (\$) \$0.3M-\$3.6M
AESC Energy Rate (\$/MWh)	48.4	2022 AESC Report								
Demand Savings										
AESC Capacity Cost (\$/MW)	30,074	2022 AESC Report								
AESC T&D Capacity Cost (\$/MW)	45,130	2022 AESC Report								
System Peak Load (MW)	1,668	Eversource								
Energy Reduction through CVR/VVO (%)	3.6%	Eversource								

ASSUMPTIONS

- CVR/VVO equipment implementation starts in year 2 of AMF deployment with capacitor and regulator installs as well as substation upgrades occurring over 5 years. Benefit realization occurs progressively over the 5-year installation period starting at 20% and increasing 20% each year until completed until 2033 and then 100% steady state. CVR/VVO analytics use case and integrations will complete by 2030
- All CVR/VVO implementation, integration to AMF, and analytics use cases are detailed in a separate investment category within this feasibility study.
- Because New Hampshire does not currently have CVR/VVO equipment and capabilities and they will be installed because of this AMF program, AMF will receive the full 3.6% energy reduction and demand benefit. In the MA AMF business case, AMF was allocated less of the energy and demand reduction percentage at 2.1%
- Express, network, underground feeders removed from analysis since they are unlikely to have VVO. Of the 815 feeders in New Hampshire, 529 feeders (65%) meet this criteria
- Utility benchmarks establish that system benefit with AMF is greater than CVR/VVO designs without AMF insights. Several utilities were leveraged to estimate the benefit while the average benefit in the model is effectively lower than the incremental target, in line with ACEEE

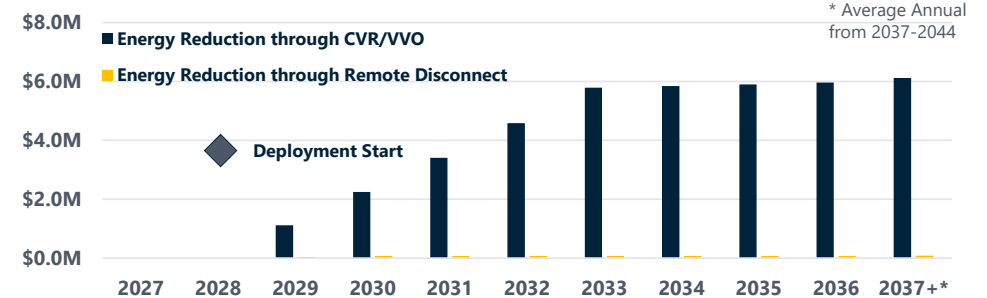
10 Carbon Emissions Reduction

20-YEAR NPV (\$M)		
CVR/VVO	REMOTE DISCONNECT	TOTAL
\$33.40	\$0.53	\$33.92

Summary of Findings

OVERVIEW BENEFIT TIMELINE (\$M)

Carbon dioxide (CO2) reduction is the principal environmental benefit tied to the deployment of AMF as AMF reduces the amount of CO2 that is emitted through generation due to the reduction in energy use through the CVR/VVO and remote disconnect non-technical loss energy reduction. For every kWh reduced, there is a societal benefit for the associated carbon that is avoided which can be quantified. Enhanced CVR/VVO is expected to lower overall energy consumption within the service territory, and non-technical loss related energy is avoided through the remote disconnect process. The benefit was calculated leveraging the 2022 AESC Non-Embedded GHG Cost factor. Right now, Eversource does not have CVR/VVO capabilities in New Hampshire with the associated infrastructure, capabilities, analytics, and integrations expected to begin in 2029 and complete by 2033. A partial benefit associated with energy reduction from CVR/VVO begins in 2029 with full benefit by 2033 when installation is complete. Additional non-quantified benefits are reduced emissions from truck rolls for AMR meter reading and no trouble found responses.



KEY MILESTONES

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2044
MILESTONE					Begin Energy Reduction Benefit from CVR/VVO (20%) and begin (50%) Remote Disconnect Benefit	40% Energy Reduction Benefit from CVR/VVO and begin 100% Remote Disconnect Benefit	60% Energy Reduction Benefit from CVR/VVO	80% Energy Reduction Benefit from CVR/VVO	Begin full Energy Reduction Benefit from CVR/VVO (100%)	
DEPENDENCY				Begin AMF Deployment	Complete AMF Deployment Begin VVO Analytics Begin VVO integration Begin VVO implement	Begin Steady State AMF Complete VVO Analytics Complete VVO integrat.			Complete VVO Implement	

TOTAL BENEFIT (\$M)		DEPENDENCIES			
Energy Reduction through CVR/VVO	\$84.81	AMF Meters	Comm. Network	Headend & MDMS	CIS Replacement
Energy Reduction through Remote Disconnect	\$1.27	Digital CX	Advanced Analytics	Op. System Integrations	Cybersecurity
Total	\$86.08	Customer Engagement	Contact Center & Theft	Project and Change Mgmt	VVO Implementation
		Time-Varying Rates	AMR Meter Avoidance	System Costs Avoidance	Bad Debt Reduction
		Theft & Remote Disconnect	NTF Reduction	Meter Reading and Field Ops	Outage Restoration
		Asset Analytics	CVR/VVO Benefit	Carbon Reduction	

10 Carbon Emissions Reduction

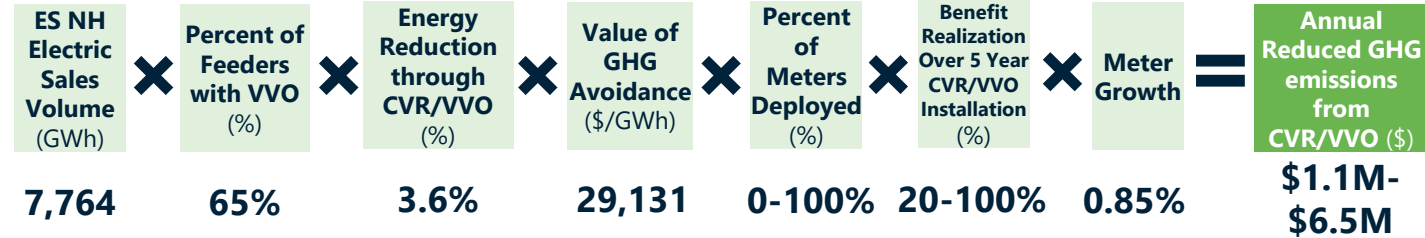
Summary of Findings

20-YEAR NPV (\$M)		
CVR/VVO	REMOTE DISCONNECT	TOTAL
\$33.40	\$0.53	\$33.92

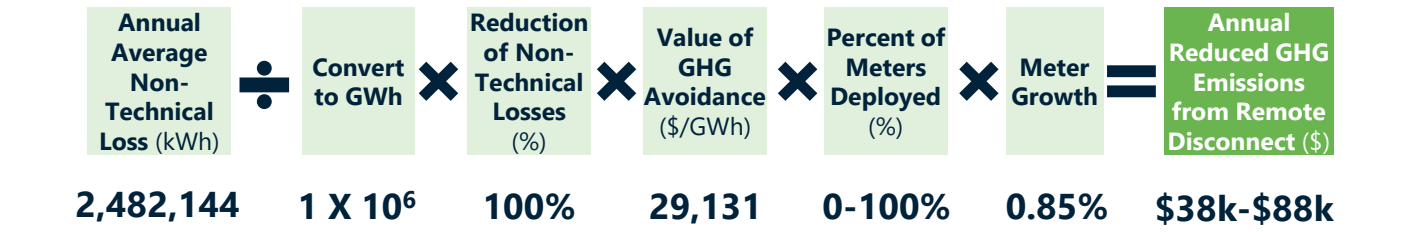
DATA INPUTS CALCULATIONS AND OTHER METHODOLOGY

INPUT NAME	ESTIMATE	SOURCE
Value of GHG Avoidance (\$/GWh)	29,131	2022 AESC Report
Energy Reduction Through CVR/VVO		
Total System Electric Sales Volume (GWh)	7,764	2022 ES Annual Report
Percent of Feeders with VVO (%)	65%	Eversource
Energy Reduction through CVR/VVO (%)	3.6%	Eversource
Energy Reduction Through Remote Disconnect		
Annual Non-Technical Loss (kWh)	2,482,144	Eversource
Reduction of Non-Technical Losses (%)	100%	Eversource

ENERGY REDUCTION THROUGH CVR/VVO



ENERGY REDUCTION THROUGH REMOTE DISCONNECT



ASSUMPTIONS

- Full 3.6% energy reduction attributed to AMF through CVR/VVO
- Environmental benefits include the value of avoided CO₂ emissions, but not avoided emissions of NO_x or SO_x
- CVR/VVO implementation starts in year 2 of AMF deployment in 2029 with capacitor and regulator installing occurring over 5 years through 2033. Benefit realization occurs progressively over the 5-year installation period starting at 20% in 2029 adding 20% until completed and then 100% steady state
- Reduced vehicle emissions from avoided truck rolls are not evaluated

Appendix

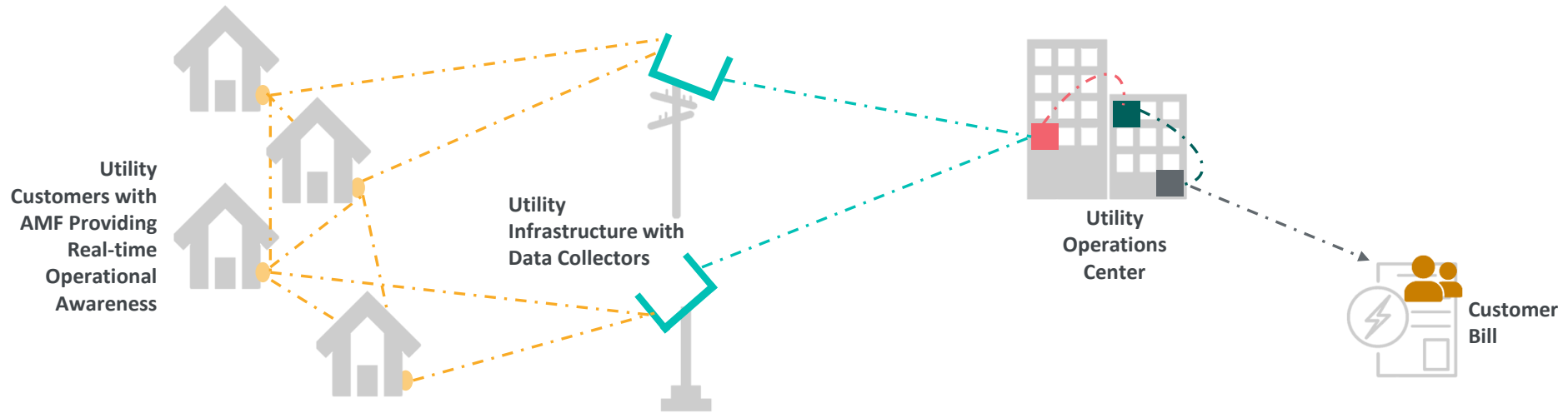
Base Scenario Investment and Benefit Details

AMF Overview



AMF OVERVIEW

An AMF deployment consists of meters, telecommunications devices and infrastructure, and new IT systems - all of which need to work seamlessly with each other and legacy systems and equipment

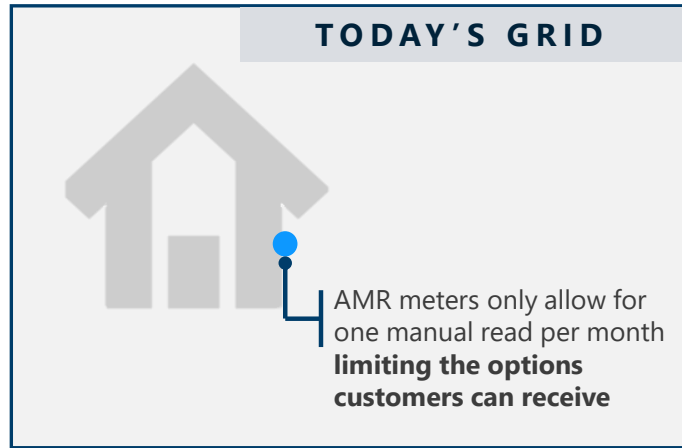


- **Meter Interface Unit (MIU):** A device wired to each customer’s meter that communicates usage data and relevant alarms via Field Area Network to a Data Collector.
- - - - **Field Area Network (FAN):** Transmits data from MIUs to data collectors
- ┌ **Data Collector:** A series of devices that aggregate usage/event data transmitted by MIUs and relays the data to the utility
- . - . - **Backhaul Network:** Transmits data from data collectors to the head-end

- **AMF Headend:** Decrypts the data and makes it ready to be processed by the utility
- **Meter Data Management System (MDMS):** Validates, edits and estimates (VEE) missing reads and performs basic analytics
- **Customer Information System (CIS):** Generates customer bill based on real-time usage data

AMF OVERVIEW

AMF coupled with other investments has the potential to transform how Eversource's customers participate on the grid



TOMORROW'S GRID

AMF enables a simplified net-metering and billing flexibility allows for **customer installed renewables to flourish**

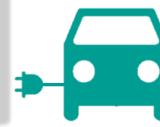


Intelligent grid devices improve reliability by enabling automated operations and dynamic outage response over a secure network. **Ensuring grid reliability and security is critical as more intermittent generation comes online**

AMF meters enable granular view of electric usage through portals and apps including proactive usage alerts. **Customers are increasingly looking for more information about how to manage their energy use and expect easy accessibility and clear analysis**



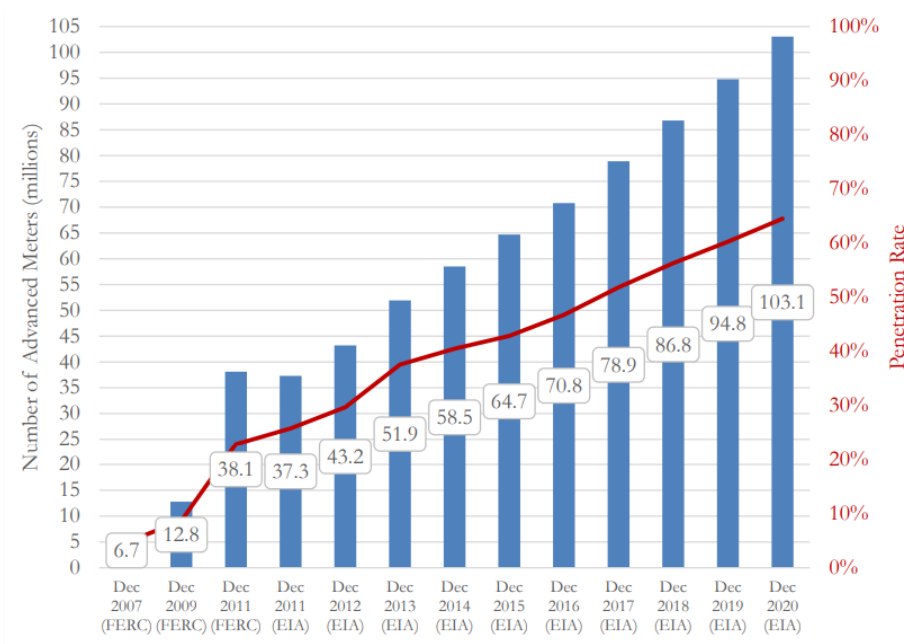
AMF meters allow interval reading through which customers can participate in advanced rate options, proactive outage and restoration alerts, and transactive energy markets. **Customers are transitioning to "prosumers" with higher levels of engagement and participation with their utility**



AMF enables the ability to provide EV rate options to customers. **NH is forecasted to have 57,000 EVs on the road by 2030***

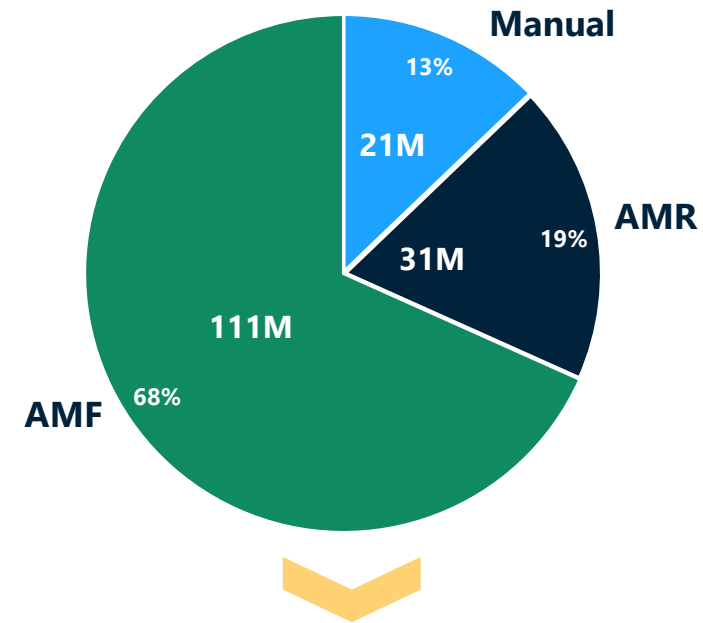
AMF OVERVIEW

Deployment of AMF has continued to grow at a rapid pace since 2009 and by 2021 reached a 68% penetration and over 110 million meters



Since 2013, AMF has grown to over 68% of all meters, while AMR has declined from 34% to 19% and legacy/manual metering declined from 27% to 13% of all meters

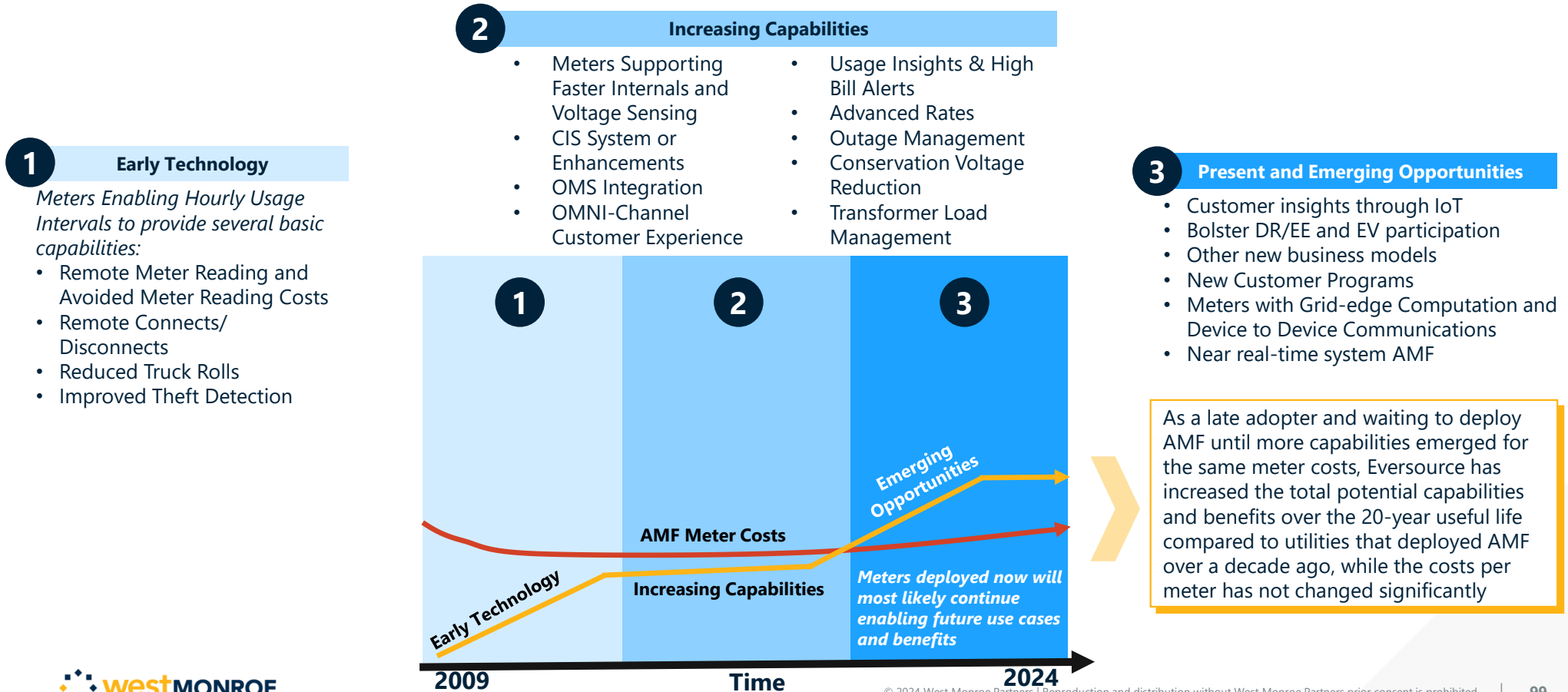
2021 US ELECTRIC METER DISTRIBUTION



AMF technology is firmly the current industry standard for electrical metering technology

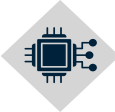
AMF OVERVIEW


As new technology and capabilities for AMF have emerged, the technology has reached a level of maturity that is no longer a risky investment for utilities





AMF OVERVIEW


Additionally, advancements across the AMF value chain will enable new use cases and value streams, increasing the benefit of AMF beyond those documented in this study

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HIGH RESOLUTION & ADVANCED SENSING
 Sub-second sensing capability that previously existed only in high-cost power quality meters is now available on residential metering platforms enabling more grid-edge use cases and near-real time system
- 













PEER-TO-PEER COMMUNICATIONS
 Edge devices can communicate with each other to identify grid anomalies, perform analysis, execute local control, and communicate locally aggregated data (e.g., transformer usage) to utility systems.
- 

ENHANCED COMPUTE & PROCESSING PLATFORM
 Some new electric smart meters include on-board Linux computers enabling local, real-time decision making, analysis, and advanced applications.
- 

NEW APPLICATIONS
 Using an AppStore model, meters can run apps to address different use cases and apps can be developed by the AMF vendor, the utility, and 3rd party providers. These applications, leveraging advanced grid-edge intelligence, will be critical to utilities' enablement of DER and EV management, improved grid management, and enhanced customer experiences.
- 

COMPLIMENTARY DATA ANALYTICS PLATFORM
 A single repository for all grid edge data coupled with rich artificial intelligence, machine learning, and analytics toolsets enables the utility to continuously monitor, learn, and optimize grid operations over-time as more DERs are deployed.

EMERGING USE CASES

 Real Time Load Disaggregation	 Customer Safety	 Equipment Failure
 Home Energy Management	 Smart Inverter Support	 Managed EV Charging
 Feeder Phase Balancing	 Smart Parking	 Waveform Analytics
 Fault Pin Pointing / FLISR	 Critical Load Management	 Transformer Load Management

EVERSOURCE

Advanced Metering Functionality Feasibility Study for New Hampshire

Final Report

May 2024

 **westMONROE**

