DTE Electric Company
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April 5, 2022

Lisa Felice
Executive Secretary
Michigan Public Service Commission
7109 West Saginaw Highway
Lansing, MI 48917

RE: In the matter of the application of **DTE ELECTRIC COMPANY** for authority to increase its rates, amend its rate schedules and rules governing the distribution and supply of electric energy, and for miscellaneous accounting authority
MPSC Case No. U-20836

Dear Ms. Felice:

Attached for electronic filing in the above captioned matter are DTE Electric Company's Revised Exhibit A-23 Schedules M4 – M6. The changes made to each of these schedules are limited to correcting the breakdown between material/labor/other for projects and does not change any of the totals. The original information remains, but is redlined, for ease of comparison between the original and revised. Also, all references to schedules M4, M5, and M6 in testimony and in Part III Attachments should be construed as referencing these revised schedules. All page numbers remain the same. Enclosed is also the Proof of Service.

Please feel free to contact me should you have any questions, comments, or concerns.

Very truly yours,

Lauren D. Donofrio

Digitally signed by Lauren D. Donofrio
Date: 2022.04.05 15:52:05 -04'00'

Lauren D. Donofrio

LDD/cdm
Attachments

cc: Service List

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Resilience & Hardening

Case No.: U-20836
Exhibit: A-23
Schedule: M4 Revised
Witness: S. G. Pfeuffer

(a)	(b)
Category	**Distribution Plant Capital Project Detail - Infrastructure Resilience & Hardening**
	Capital Exhibit:
pages: 2-5 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 2 Mobile Fleet Program
pages: 6-9 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 3 Substation Risk: Drexel
pages: 10-13 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 4 Substation Risk: Chestnut
pages: 14-17 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 5 Substation Risk: Savage
pages: 18-21 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 6 Substation Risk: Apache
pages: 22-25 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 7 Substation Risk: Port Huron
pages: 26-29 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 8 Substation Risk: Belleville Switchgear Decommission
pages: 30-33 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 9 4.8 kV Hardening
pages: 34-37 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 10 Pole and Pole Top Hardware
pages: 38-41 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 11 & 12 Cable Replacement Program
pages: 42-45 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 13 Frequent Outage Program (CEMI) including Circuit Renewal
pages: 46-49 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 14 System Resiliency - Efficient Frontier
pages: 50-53 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 15 Breaker Replacement Program
pages: 54-57 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 16 Pontiac Vaults
pages: 58-61 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 17 & 18 URD Replacement Program
pages: 62-65 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 19 4.8 kV Relay Improvements (Delta Ground Detection Program)
pages: 62-65 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 20 40 kV: Automatic Pole Top Switch
pages: 66-69 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 21 Disconnect and Switcher Replacement
pages: 70-73 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 22 SCADA Pole Top Device Replacement
pages: 74-77 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 23 Substation Regulator Replacement
pages: 78-81 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 24 Steel Pole Highway Crossings
pages: 86-89 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 25 Station Upgrade: Warren (Relay Replacement)
pages: 90-93 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 26 Station Upgrade: Northeast (Relay Replacement)
pages: 94-97 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 27 Station Upgrade: Lincoln
pages: 98-101 of 101	Exhibit A-12, Schedule B5.4, Page 8 of 12, Line 28 Station Upgrade: Navarre

(a)	(b)
Program:	Mobile Fleet Program (Pg. 1 of 4)
Purpose and Necessity:	Mobile Fleet program (aka portable equipment) provides timely restoration to customers stranded during major outage events. The Mobile Fleet program also enables system shut downs during planned capital and O&M work to minimize customers affected. It will increase existing fleet and would allow for the proper execution of the PM program - including addressing the 46% backlog of single tap substations. This does not include unplanned failures or obsolescence of the existing fleet of portable substations.
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	Mobile Fleet Program (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 2 : 9.6
DGP Section:	9.6
Scope:	Portable equipment/DG • Acquire a portable battery trailer 1MW x 4MWH for use as a non-wire alternative and test validate storage use cases. Purchase (4) additional units to support NWA projects at Malta, Fisher and Omega substations • Commissioning of switchgear trailer Portable Substation: • To purchase enough portable substations to supplement existing fleet and replace some of the existing units to allow for maintenance of DTE single tap substations (per our policy). Currently, there are 118 single tap substations and 46% of them are due or overdue for inspection.

(a)	(b)						
Program:	Mobile Fleet Program (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Mitigate major substation outage risk by reducing customer restoration time during major substation events • Improve system operability under contingency conditions or planned work • Allow for the proper execution of the preventative maintenance program						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:				x	x		

(a)	(b)
Program:	Mobile Fleet Program (Pg. 4 of 4)
Current Projects:	Mobile Fleet Program: Portable Equip / DG Mobile Fleet Program: Portable Substation
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $11.5 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~560~~	~~2,066~~	~~2,626~~
	~~Material~~	~~112~~	~~413~~	~~525~~
	~~Other~~	~~75~~	~~275~~	~~350~~
	~~**Total**~~	~~**747**~~	~~**2,754**~~	~~**3,501**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	124	282	407
	Material	585	2,334	2,919
	Other	37	138	175
	Total	**747**	**2,754**	**3,501**

(a)	(b)
Program:	Substation Risk: Drexel (Pg. 1 of 4)
Purpose and Necessity:	Drexel experienced a failure in position ‘I’ which caused major damage to surrounding positions. As a result, Bus 11 and Bus 12 were decommissioned and load was jumpered to surrounding substations.
Category:	Infrastructure Resilience & Hardening

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Resilience & Hardening

(a)	(b)
Program:	Substation Risk: Drexel (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 3
DGP Section:	9.2
Scope:	• Decommission and remove the damaged switchgear lineup • Install nine position switchgear • Install one 15/20/25 MVA transformer to feed the new switchgear • Install 6900 feet of EPR cable from new switchgear lineup to existing cable poles • Restore circuits to pre-fire configurations

(a)	(b)						
Program:	Substation Risk: Drexel (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce substation outage risk by replacing aging infrastructure and failed equipment						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x			

(a)	(b)
Program:	Substation Risk: Drexel (Pg. 4 of 4)
Current Projects:	Substation Risk: Drexel
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $1.9 M

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~106~~	~~-~~	~~106~~
	~~Material~~	~~21~~	~~-~~	~~21~~
	~~Other~~	~~14~~	~~-~~	~~14~~
	~~**Total**~~	~~**141**~~	~~**-**~~	~~**141**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	113	-	113
	Material	14	-	14
	Other	14	-	14
	Total	**141**	**-**	**141**

(a)	(b)
Program:	Substation Risk: Chestnut (Pg. 1 of 4)
Purpose and Necessity:	Chestnut substation is located in Madison Heights and is at risk for failure. It is a two switchgear lineup that is connected in the same building, creating more of a risk in the event of a major failure. A switchgear failure could result in loss of all switchgear positions and a potential of stranded load of up to 32 MVA.
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	Substation Risk: Chestnut (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 4
DGP Section:	9.2
Scope:	• Replace existing 19-position PDC with (2) 12-position PDCs • Install two capacitor banks • Install 500 feet of 15-5” concrete encased duct bank • Install four new manholes • Install 10,000 feet 1000 AL EPR cable & associated branch and straight joints

(a)	(b)						
Program:	Substation Risk: Chestnut (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce substation outage risk by replacing aging infrastructure and failed equipment • Reduction in O&M cost due to removal of aging infrastructure • Provide sufficient capacity needed to serve fast growing Detroit core downtown areas						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x			

(a)	(b)
Program:	Substation Risk: Chestnut (Pg. 4 of 4)
Current Projects:	Substation Risk: Chestnut
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $4.5 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~63~~	~~1,833~~	~~1,895~~
	~~Material~~	~~13~~	~~367~~	~~379~~
	~~Other~~	~~8~~	~~244~~	~~253~~
	~~**Total**~~	~~**83**~~	~~**2,444**~~	~~**2,527**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	46	1,178	1,224
	Material	29	1,021	1,050
	Other	8	244	253
	Total	**83**	**2,444**	**2,527**

(a)	(b)
Program:	Substation Risk: Savage (Pg. 1 of 4)
Purpose and Necessity:	Savage substation has high substation outage risk. The stranded load is estimated at 30 MVA after possible load transfer and mobile fleet deployments. This project is to address the substation outage risk at Savage substation. In addition, it will establish means for jumper point connections to circuits from neighboring circuits in similar conditions.
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	Substation Risk: Savage (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 5
DGP Section:	9.2
Scope:	Stranded Load Scope • Extend 770 feet of conduit and 3,489 feet of cable to feed seven new primary switch cabinets and overhead connections • Extend overhead 770 feet to establish two portable ready locations • Install two sets of 3-333KVA regulators

(a)	(b)						
Program:	Substation Risk: Savage (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce substation outage risk by replacing aging infrastructure and failed equipment • Enhance safety and operability						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x	x	x	x

(a)	(b)			
Program:	Substation Risk: Savage (Pg. 4 of 4)			
Current Projects:	Substation Risk: Savage Stranded Load			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.2 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	5	-	5
	Material	1	-	1
	Other	1	-	1
	Total	**7**	**-**	**7**

(a)	(b)
Program:	Substation Risk: Apache (Pg. 1 of 4)
Purpose and Necessity:	In 2015, a breaker position failure at Apache Substation caused a significant area-wide outage for the entire substation area. The downtown business district of Troy and the surrounding commercial/residential area were without electrical service for several days. This switchgear was classified as at risk and needs to be replaced to prevent a second switchgear failure. A switchgear failure could result in loss of all switchgear positions and a potential of stranded load of up to 16 MVA.
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	Substation Risk: Apache (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 6
DGP Section:	9.2
Scope:	• Replace existing 19 position switchgear with two 12 position switchgear • Replace three circuit switchers with three new S&C 2020 circuit switchers • Build system cable termination in new switchgear for all 13 distribution circuits • Decommission/remove existing 19 position switchgear once all load is cut over to new switchgear • Install 325 feet of 12-5" conduit on the north side of the substation • Build one two-way manhole • Build two three-way manholes • Remove 9,100 feet of 1000 EPR 1CX3 cable (including straight and branch joints) • Install 9,950 feet of 1000 EPR 1CX3 cable (including straight and branch joints) • Cable testing, manhole cleaning/pumping, and, if necessary, asbestos abatement

(a)	(b)						
Program:	Substation Risk: Apache (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce substation outage risk due to switchgear failure and stranded load upwards to 16.0 MVA by replacing aging infrastructure and failed equipment • Future opportunity to relieve Apache Substation circuits that exceed day to day circuit limits						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x	x	x	

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Resilience & Hardening

Case No.: U-20836
Exhibit: A-23
Schedule: M4 Revised
Witness: S. G. Pfeuffer

(a)	(b)
Program:	Substation Risk: Apache (Pg. 4 of 4)
Current Projects:	Substation Risk: Apache
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $18.10 M

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~1,062~~	~~5,766~~	~~6,828~~
	~~Material~~	~~212~~	~~1,153~~	~~1,366~~
	~~Other~~	~~142~~	~~769~~	~~910~~
	~~**Total**~~	~~**1,416**~~	~~**7,688**~~	~~**9,104**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	807	4,382	5,189
	Material	467	2,537	3,004
	Other	142	769	910
	Total	**1,416**	**7,688**	**9,104**

(a)	(b)
Program:	Substation Risk: Port Huron (Pg. 1 of 4)
Purpose and Necessity:	Port Huron substation has exposed energized equipment causing safety and operating concerns. Work is not possible unless the equipment is deenergized. Jumpering options are very limited, making it difficult to deenergize the equipment and still serve customers. Energized equipment extends beyond the rope barrier. Along with the safety concerns at the substation, the breakers are at risk.
Category:	Infrastructure Resilience & Hardening

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Resilience & Hardening

(a)	(b)
Program:	Substation Risk: Port Huron (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 7
DGP Section:	9.2
Scope:	• Install customized nine position indoor, non-walk in, 15kV metal-clad switchgear line-up on main floor of Port Huron Substation building • Decommission and remove existing breakers, disconnects and bus work • Install distribution primary cable from new switchgear to first manhole • Maintain current distribution circuit configurations

(a)	(b)						
Program:	Substation Risk: Port Huron (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Eliminate safety issues and operating constraints • Reduce substation outage risk by replacing aging infrastructure and failed equipment						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x			x

(a)	(b)			
Program:	Substation Risk: Port Huron (Pg. 4 of 4)			
Current Projects:	Substation Risk: Port Huron			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $2.9 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	1	-	1
	Material	0	-	0
	Other	0	-	0
	Total	**1**	**-**	**1**

(a)	(b)
Program:	Substation Risk: Belleville Switchgear Decommission (Pg. 1 of 4)
Purpose and Necessity:	Belleville Substation 4.8kV switchgear is at end-of-life and there are no replacements for breakers if they were to fail. Belleville is currently without the automatic throw over. The control wiring in every position is falling apart and requires weeks of work to re-wire.
Category:	Infrastructure Resilience & Hardening

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Resilience & Hardening

(a)	(b)
Program:	Substation Risk: Belleville Switchgear Decommission (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 8
DGP Section:	9.2
Scope:	• This work will bypass BELVL's 4.8kV switchgear by installing overhead NOVA Triple-Single reclosers just outside of the substation. The 4.8kV portion of BELVL substation will be converted from a Class 'A' to a Class 'T' operating at 4.8kV. • Reconfigure the 3 load carrying circuits and throw over circuit into 2 load carrying circuits

(a)	(b)						
Program:	Substation Risk: Belleville Switchgear Decommission (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce substation outage risk by eliminating aging infrastructure						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x		

(a)	(b)			
Program:	Substation Risk: Belleville Switchgear Decommission (Pg. 4 of 4)			
Current Projects:	Substation Risk: Belleville Switchgear Decommission			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $1.6 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~142~~	~~-~~	~~142~~
	~~Material~~	~~28~~	~~-~~	~~28~~
	~~Other~~	~~19~~	~~-~~	~~19~~
	~~**Total**~~	~~**189**~~	~~**-**~~	~~**189**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	121	-	121
	Material	49	-	49
	Other	19	-	19
	Total	**189**	**-**	**189**

(a)	(b)
Program:	4.8 kV Hardening (Pg. 1 of 4)
Purpose and Necessity:	The 4.8 kV Hardening Program is a program designed to harden and stabilize the 4.8 kV distribution system to enhance safety, reliability and storm resiliency, and extend the life of the 4.8 kV until DTE Electric completes conversion to 13.2 kV over the next several decades as supported primarily by load growth or cost reductions. Additionally, there has been a lack of proper maintenance within the City of Detroit's alleys, which over time have become overgrown and filled with debris, impeding access and making maintenance activities difficult and costly, which the 4.8 kV Hardening Program will help address.
Category:	Infrastructure Resilience & Hardening

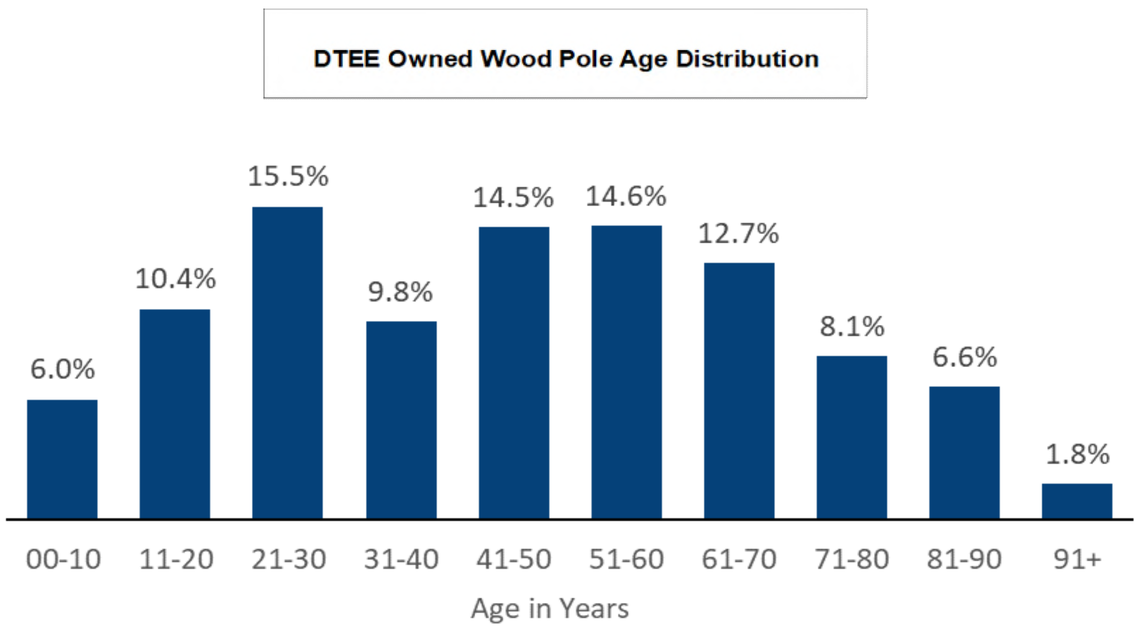
(a)	(b)
Program:	4.8 kV Hardening (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 9
DGP Section:	9.3
Scope:	• Test all utility poles that have Company equipment attached and replace or reinforce those poles as needed • Replace wooden cross arms with fiberglass cross arms • Remove Detroit Public Lighting Department (DPLD) arc wire from Company-owned equipment and ensure the remaining Company wires are left in a safe configuration • Remove DPLD distribution wire from Company-owned equipment when it can be confirmed that the wire is not serving customers • Remove service lines to abandoned properties • Trim trees as required to support construction activities • Perform any additional necessary work as dictated by field conditions • Conduct pilot projects to explore and assess alternatives to existing rear lot overhead configurations. The pilots include converting rear lot overhead construction to underground residential distribution construction; and removing primary overhead construction and adding secondary overhead construction to serve sparsely populated areas. The pilots aim at improving reliability and reducing trouble events in some areas of the City of Detroit where inaccessible overhead construction in rear lots is encroached by fence lines and overgrown trees.

(a)	(b)						
Program:	4.8 kV Hardening (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Avoid 61 M customer minute interruptions annually by 2026 • Avoid $4 M costs annually for both circuit tree related and non-tree related reactive capital by 2026 • Extend the life of the 4.8 kV system, allowing the deferral of more expensive conversions to 13.2 kV						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x		x		x	x	x

(a)	(b)
Program:	4.8 kV Hardening (Pg. 4 of 4)
Current Projects:	4.8 kV Hardening
Budget Basis:	• Ranked 3rd based on the Global Prioritization Model • Spend based on engineering estimates to harden approximately 50% of the circuits in the City of Detroit, within 10 years
Cost:	Estimated project spend in 2021-2023: $298.1 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~14,482~~	~~71,250~~	~~85,732~~
	~~Material~~	~~2,896~~	~~14,250~~	~~17,146~~
	~~Other~~	~~1,931~~	~~9,500~~	~~11,431~~
	~~**Total**~~	~~**19,310**~~	~~**95,000**~~	~~**114,310**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	14,482	71,250	85,732
	Material	3,862	19,000	22,862
	Other	965	4,750	5,715
	Total	**19,310**	**95,000**	**114,310**

<table>
<tr><th>(a)</th><th>(b)</th></tr>
<tr><td>Program:</td><td>Pole and Pole Top Hardware (Pg. 1 of 4)</td></tr>
<tr><td>Purpose and Necessity:</td><td>DTE Electric owns more than 1 millions distribution and subtransmission poles and attaches to nearly 200,000 poles owned by other utilities. The average pole age in the DTEE system is approximately 46 years. The life expectancy of a pole is 40 years for wood pine poles and 50 years for wood cedar poles. The Pole and Pole Top Hardware programs are designed to identify and remediate poles with deteriorating strength and identify and replace defective pole top hardware prior to causing outages.

</td></tr>
<tr><td>Category:</td><td>Infrastructure Resilience & Hardening</td></tr>
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(a)	(b)
Program:	Pole and Pole Top Hardware (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 10
DGP Section:	9.1
Scope:	• Perform foot patrols to visually and physically inspect poles for signs of damage or rot, and to test mechanical strength • Reinforce or replace poles based on testing results • Perform foot patrols to visually inspect pole top hardware for signs of defective or damaged equipment • Replace defective or damaged pole top hardware

(a)	(b)						
Program:	Pole and Pole Top Hardware (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Comply with MPSC recommendation of inspecting poles on a 10-12 year cycle • Enhance safety • Avoid 40 M customer minute interruptions annually by 2026 • Avoid $4.8 M costs annually for both circuit tree related and non-tree related reactive capital by 2026						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x		x		x	x	x

(a)	(b)			
Program:	Pole and Pole Top Hardware (Pg. 4 of 4)			
Current Projects:	Pole and Pole Top Equipment (including Fuse Cutouts)			
Budget Basis:	• Pole Replacement program and Pole Top Hardware program ranked 4th based on the Global Prioritization Model • Adherence to the industry's best practice of 10-12 year inspection cycle			
Cost:	Estimated project spend in 2021-2023: $185.9 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~7,364~~	~~58,438~~	~~65,802~~
	~~Material~~	~~1,473~~	~~11,688~~	~~13,160~~
	~~Other~~	~~982~~	~~7,792~~	~~8,774~~
	~~**Total**~~	~~**9,819**~~	~~**77,917**~~	~~**87,735**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	7,268	57,674	64,942
	Material	1,569	12,451	14,020
	Other	982	7,792	8,774
	Total	**9,819**	**77,917**	**87,735**

(a)	(b)
Program:	Cable Replacement Program (Pg. 1 of 4)
Purpose and Necessity:	DTE Electric distribution and subtransmission systems have around 3,200 miles of underground system cable. System cable is a critical component for both the subtransmission and distribution systems. A failure can interrupt a large number of customers for an extended period of time and remove important operational contingency. Approximately 43% of the system cable is identified as candidate for replacement.
Category:	Infrastructure Resilience & Hardening

Underground System Cable Ages and Life Expectancy

Cable Type	PILC	EPR	VCL	Gas	XLPE Post 1990 (Tree retardant)	XLPE Pre 1990 (Non-tree retardant)	BUYTL
Miles	2,365	570	125	55	35	69	35
% of Total population	72.7%	17.5%	3.8%	1.7%	1.1%	2.1%	1.1%
Average age	50	16	59	54	20	36	52
Life Expectancy	40	35	40	40	40	25	20

(a)	(b)
Program:	Cable Replacement Program (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 11/ Exhibit A-12, Schedule B5.4, Page 8, Line 12
DGP Section:	9.1
Scope:	• Prioritize and replace system cable based on multiple factors including cable type, vintage, previous failure history, impacts to the system, cable loading, and critical infrastructure customers • Remove underground hazards and replace defective conduits if needed

(a)	(b)						
Program:	Cable Replacement Program (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Enhance safety • Reduce major substation outage risk • Avoid 0.6 M customer minute interruptions annually by 2026 • Avoid $1.8 M costs annually for both circuit tree related and non-tree related reactive capital by 2026						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x	x		x

(a)	(b)
Program:	Cable Replacement Program (Pg. 4 of 4)
Current Projects:	Cable Replacement Program Cable Replacement: I-696/Dequindre Overpass Cable Replacement Program: Evergreen VCL TRK 7104 Cable Replacement Cable Replacement: Harsen's Island
Budget Basis:	• Ranked 29th based on the Global Prioritization Model • Avoid further acceleration of system cable failures
Cost:	Estimated project spend in 2021-2023: $92.8 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~4,391~~	~~27,625~~	~~32,016~~
	~~Material~~	~~878~~	~~5,525~~	~~6,403~~
	~~Other~~	~~585~~	~~3,683~~	~~4,269~~
	~~**Total**~~	~~**5,854**~~	~~**36,834**~~	~~**42,688**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	4,157	26,152	30,308
	Material	1,171	7,367	8,538
	Other	527	3,315	3,842
	Total	**5,854**	**36,834**	**42,688**

(a)	(b)
Program:	Frequent Outage Program (CEMI) including Circuit Renewal (Pg. 1 of 4)
Purpose and Necessity:	The Frequent Outage program, also known as the CEMI (Customers Experiencing Multiple Interruptions) program, includes improvements to either circuit sections (customer pockets) or entire circuits. The number of customers experiencing either sustained or momentary outages, historical reliability performance, power quality complaints, and MPSC complaints are considered in determining inclusion in the Frequent Outage program.
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	Frequent Outage Program (CEMI) including Circuit Renewal (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 13
DGP Section:	9.4
Scope:	Work scope may include: • Rebuild / reconductor / relocate overhead lines • Replace condemned poles and other pole top hardware • Install sectionalizing and switching devices • Add or strengthen circuit ties • Underground portion of the circuits

(a)	(b)						
Program:	Frequent Outage Program (CEMI) including Circuit Renewal (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Enhance safety • Avoid 75 M customer minute interruptions annually by 2026 • Avoid $0.2 M costs annually for both circuit tree related and non-tree related reactive capital by 2026						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:			x		x	x	x

(a)	(b)
Program:	Frequent Outage Program (CEMI) including Circuit Renewal (Pg. 4 of 4)
Current Projects:	Frequent Outage Program: Plymouth 4.8 kV CC: Globe 8034 Power Quality Frequent Outage Program: Customer Excellence Frequent Outage Program: CEMI Overloaded Transformers Pilot 2020 LOCDL Delphi Reliability Frequent Outage Program: Lark - Spruce 2024
Budget Basis:	• Target number of circuits and engineering estimates of cost per circuit
Cost:	Estimated project spend in 2021-2023: $98.2 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~5,755~~	~~13,796~~	~~19,551~~
	~~Material~~	~~1,151~~	~~2,759~~	~~3,910~~
	~~Other~~	~~767~~	~~1,840~~	~~2,607~~
	~~**Total**~~	~~**7,673**~~	~~**18,395**~~	~~**26,068**~~

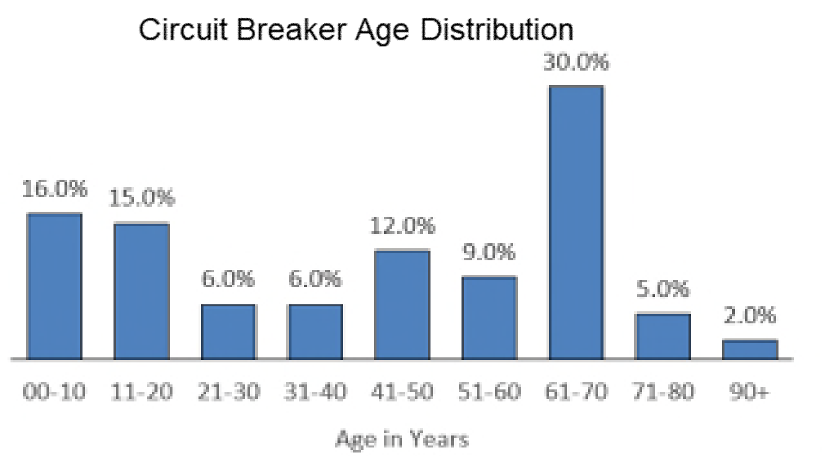
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	6,139	14,716	20,855
	Material	998	2,391	3,389
	Other	537	1,288	1,825
	Total	**7,673**	**18,395**	**26,068**

(a)	(b)
Program:	System Resiliency - Efficient Frontier (Pg. 1 of 4)
Purpose and Necessity:	Circuits selected for the System Resiliency Program are circuits with low penetration of switching and sectionalizing devices and little opportunity to localize outage events to perform Restore Before Repair (RBR). The target of the system resiliency program is to reduce long-outage durations for circuits with few sectionalizing points.
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	System Resiliency - Efficient Frontier (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 14
DGP Section:	9.4
Scope:	• Install sectionalizing and switching devices to localize outage events and enable restore before repair

(a)	(b)						
Program:	System Resiliency - Efficient Frontier (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Improved customer reliability • Remediate long-outage durations for circuits with few sectionalizing points						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:					x		

(a)	(b)			
Program:	System Resiliency - Efficient Frontier (Pg. 4 of 4)			
Current Projects:	System Resiliency - Efficient Frontier			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.0 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

(a)	(b)
Program:	Breaker Replacement Program (Pg. 1 of 4)
Purpose and Necessity:	DTE Electric has approximately 6,000 circuit breakers. Out of the total population, 58% are candidates for replacement due to factors such as equipment condition, age, lack of available parts (no support from vendors), and environmental concerns (oil spills). A failure of a circuit breaker can cause outages on multiple circuits and could reduce system redundancy for an extended period of time during repairs. Approximately 60% of DTE Electric's circuit breakers are beyond industry life expectancy and should also be replaced over time. DTE works to extend asset life as much as possible through its preventative maintenance programs and uses equipment condition, not just age, to determine which breakers to replace and when. The industry life expectancy of a circuit breaker is approximately 40 years for early to mid-20th century equipment and 30 years for modern equipment. Graph below illustrates Circuit Breaker Age Distribution. 
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	Breaker Replacement Program (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 15
DGP Section:	9.1
Scope:	• Remove and replace at-risk breakers including • H breakers - 30 • Subtransmission breakers - 97 • Substation reclosers - 24 • Distribution breakers - 116

(a)	(b)						
Program:	Breaker Replacement Program (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Enhance safety • Reduce major substation outage risk • Improve customer reliability • Avoid 2.9 M customer minute interruptions annually by 2026 • Avoid $2.8 M costs annually for both circuit tree related and non-tree related reactive capital by 2026 • Avoid further acceleration of breaker failures • Address most at risk breakers through aggressive prioritization						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x	x	x	x

(a)	(b)
Program:	Breaker Replacement Program (Pg. 4 of 4)
Current Projects:	Essex 24kV H-Breaker Decom & Bus Consolidation Breaker Replacement Program
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $45.1 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~1,930~~	~~11,250~~	~~13,180~~
	~~Material~~	~~386~~	~~2,250~~	~~2,636~~
	~~Other~~	~~257~~	~~1,500~~	~~1,757~~
	~~**Total**~~	~~**2,573**~~	~~**15,000**~~	~~**17,573**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	1,930	11,250	13,180
	Material	437	2,550	2,987
	Other	206	1,200	1,406
	Total	**2,573**	**15,000**	**17,573**

(a)	(b)
Program:	Pontiac Vaults (Pg. 1 of 4)
Purpose and Necessity:	DTE Electric acquired from CMS Energy the 8.3KV Distribution System serving the City of Pontiac (late 1970's). The underground system contained fifteen system switching vaults. These (confined space) vaults, containing obsolete overhead equipment, are typically located beneath city sidewalks with surface mounted grates. Shock hazard to personnel entering the vaults and inadequate arc flash distance make it difficult or impossible to operate within the vaults. Restoration time to an outage event was considerably extended due to system complexity and hazardous work environment conditions. DTE Electric eliminated three vaults and upgraded ten vaults by 2020. The remaining two vaults will be completed by March 2021. The project objective is complete redesign of system configuration, vault equipment replacement and structural reconditioning, and replacement of prevalent undersized, end of life cables.
Category:	Infrastructure Resilience & Hardening

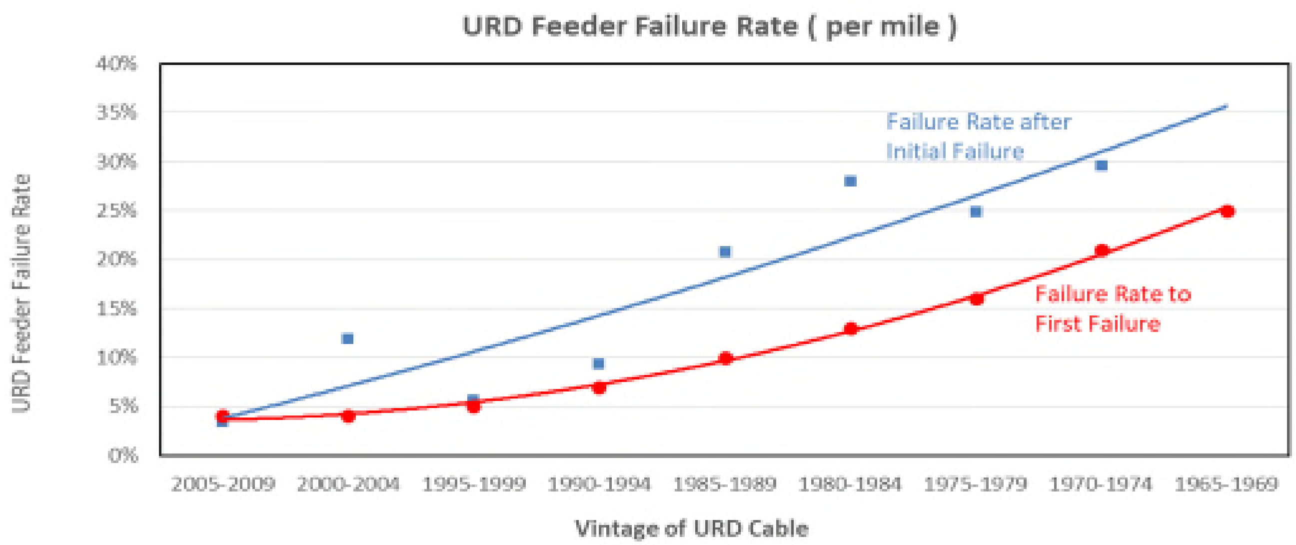
(a)	(b)
Program:	Pontiac Vaults (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 16
DGP Section:	11.5
Scope:	• Redesign underground system configuration • Remove live front overhead equipment from the below grade vaults and replace with dead front (arc flash contained) submersible equipment • Upgrade / repair structural condition of these vaults • Replace 39,167 feet of paper and lead cable with 500 EPR cable • Install SCADA communication / monitoring equipment

(a)	(b)						
Program:	Pontiac Vaults (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Enhance safety • Improve operability • Replace aging infrastructure and improve reliability • Reduce reactive cost by replacing obsolete, special order equipment						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x	x	x

(a)	(b)
Program:	Pontiac Vaults (Pg. 4 of 4)
Current Projects:	Pontiac Vaults
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $4.3 M

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~77~~	~~-~~	~~77~~
	~~Material~~	~~15~~	~~-~~	~~15~~
	~~Other~~	~~10~~	~~-~~	~~10~~
	~~**Total**~~	~~**103**~~	~~**-**~~	~~**103**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	62	-	62
	Material	31	-	31
	Other	10	-	10
	Total	**103**	**-**	**103**

(a)	(b)
Program:	URD Replacement Program (Pg. 1 of 4)
Purpose and Necessity:	DTE Electric has approximately 11,000 miles of underground residential distribution (URD) cable, of which approximately 41% (4,500 miles) is cross-linked polyethylene (XLPE) cable installed prior to 1985. This cable is prone to high failure rates due to a manufacturing flaw known as "water treeing"; which is a breakdown of the insulation that allows water to enter the cable and causes faults. All cable insulation will breakdown eventually as URD cable is typically direct buried and more susceptible to environmental interference. As URD cable ages, the number of failures goes up as shown in the graph below. In addition, after the URD loop has experienced one failure, the risk for a second failure also goes up. The average age of DTE Electric's URD cable is 28 years. 
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	URD Replacement Program (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 17/ Exhibit A-12, Schedule B5.4, Page 8, Line 18
DGP Section:	9.1
Scope:	• Prioritize and replace pre-1985 non-tree retardant URD cable based on multiple factors including previous failure history, impacts to the system and customers, loading, and partial discharge testing results • Replace live front transformers with dead front (arc flash contained)

(a)	(b)						
Program:	URD Replacement Program (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Enhance safety by replacing live front transformers with dead front transformers • Avoid 5 M customer minute interruptions annually by 2026 • Avoid $4.4 M costs annually for both circuit tree related and non-tree related reactive capital by 2026						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x	x	x

(a)	(b)
Program:	URD Replacement Program (Pg. 4 of 4)
Current Projects:	URD Replacement Program URD Replacement Program: PLY 86 URD Replacement Program: Outer Drive 1299 URD Replacement Program: Detroit URD 1-1
Budget Basis:	• Ranked 41st based on the Global Prioritization Model • Manage URD cable failures and avoid an acceleration of asset failures
Cost:	Estimated project spend in 2021-2023: $21.2 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~754~~	~~6,250~~	~~7,004~~
	~~Material~~	~~151~~	~~1,250~~	~~1,401~~
	~~Other~~	~~100~~	~~833~~	~~934~~
	~~**Total**~~	~~**1,005**~~	~~**8,333**~~	~~**9,338**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	703	5,833	6,537
	Material	231	1,917	2,148
	Other	70	583	654
	Total	**1,005**	**8,333**	**9,338**

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Resilience & Hardening

(a)	(b)
Program:	4.8 kV Relay Improvements (Delta Ground Detection Program) (Pg. 1 of 4)
Purpose and Necessity:	Reconfigure alarm panel to allow System Operations Center (SOC) to automatically detect and receive alerts of wire down events. This will allow quick response to these events.
Category:	Infrastructure Resilience & Hardening

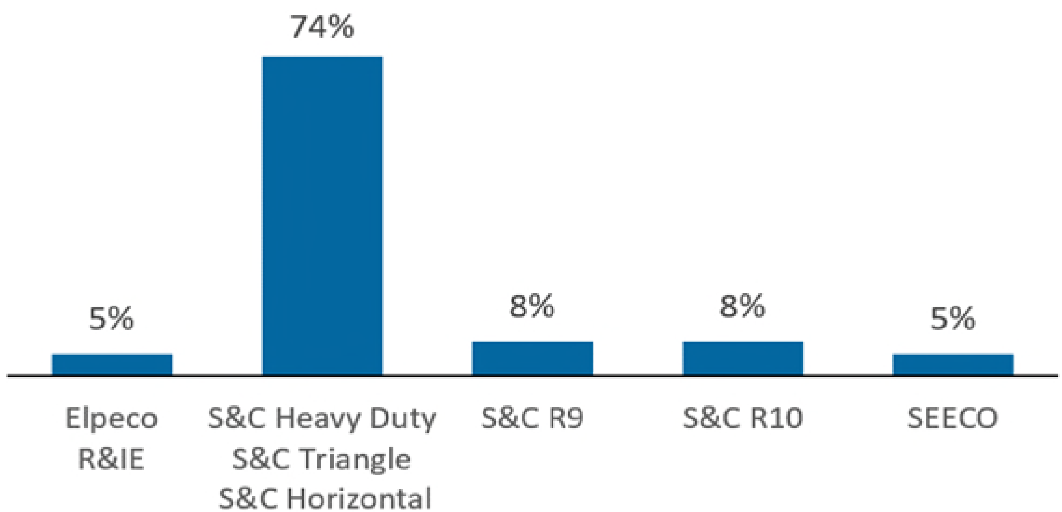
(a)	(b)
Program:	4.8 kV Relay Improvements (Delta Ground Detection Program) (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 19
DGP Section:	9.5
Scope:	• Install and/or upgrade telecommunication and Remote Terminal Unit (RTU) for substation remote monitoring • Reconfigure alarm panels at 4.8 kV substations • Connect system to FCN network to provide data to the Systems Operation Center • Upgrade cable trays as needed

(a)	(b)						
Program:	4.8 kV Relay Improvements (Delta Ground Detection Program) (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Enhance safety • Allow SOC to automatically detect and receive alerts of wire down events and isolate the ground alarms from other station alarms						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x						

(a)	(b)
Program:	4.8 kV Relay Improvements (Delta Ground Detection Program) (Pg. 4 of 4)
Current Projects:	4.8 kV Relay Improvements (Delta Ground Detection Program)
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $14.3 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~384~~	~~5,313~~	~~5,697~~
	~~Material~~	~~77~~	~~1,063~~	~~1,139~~
	~~Other~~	~~51~~	~~708~~	~~760~~
	~~**Total**~~	~~**513**~~	~~**7,083**~~	~~**7,596**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	323	4,463	4,786
	Material	154	2,125	2,278
	Other	36	496	532
	Total	**513**	**7,083**	**7,596**

(a)	(b)
Program:	40 kV: Automatic Pole Top Switch (Pg. 1 of 4)
Purpose and Necessity:	DTE Electric has approximately 144 automatic pole top switches (APTS) with control boxes on the 40 kV subtransmission system. In recent years, the failure rate of these switches has been increasing, ranging from 15 percent to 20 percent annually. A failure of one of these switches has the potential to interrupt thousands of customers or result in significant operational constraints. The entire 40 kV APTS population is considered for replacement to address high failure rates and unavailable spare parts for early vintages. The following graph shows the vintages of the APTS in the Company's system. 40 kV Automatic Pole Top Switches by Vintage 
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	40 kV: Automatic Pole Top Switch (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 20
DGP Section:	9.1
Scope:	• Replace the entire population of the obsolete 40 kV APTSs with modern SCADA controlled equipment

(a)	(b)						
Program:	40 kV: Automatic Pole Top Switch (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Improve reliability by effectively sectionalizing subtransmission lines and localizing faults • Provide SCADA capability • Improve system shutdown capability and allow for safe operation and maintenance • Avoid 20 M customer minute interruptions annually by 2026 • Avoid $1 M costs annually for both circuit tree related and non-tree related reactive capital by 2026						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:					x		x

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Resilience & Hardening

(a)	(b)
Program:	40 kV: Automatic Pole Top Switch (Pg. 4 of 4)
Current Projects:	40 kV: Automatic Pole Top Switch Sub transmission OH Bypass for PTS Maintenance
Budget Basis:	• Engineering estimate
Cost:	Estimated project spend in 2021-2023: $13.1 M This project is expected to continue beyond 2023

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~663~~	~~3,938~~	~~4,600~~
	~~Material~~	~~133~~	~~788~~	~~920~~
	~~Other~~	~~88~~	~~525~~	~~613~~
	~~Total~~	**~~883~~**	**~~5,250~~**	**~~6,133~~**

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	645	3,833	4,477
	Material	177	1,050	1,227
	Other	62	368	429
	Total	**883**	**5,250**	**6,133**

(a)	(b)
Program:	Disconnect and Switcher Replacement (Pg. 1 of 4)
Purpose and Necessity:	Disconnects: Subtransmission disconnect switches are used to sectionalize and provide isolation points on the electrical system for operational reasons or for service / maintenance. Failures of disconnect switches during operation, when operators attempt to open or close a disconnect manually, can lead to safety concerns, reduce system operability, and force additional equipment to be taken out of service to allow critical work to continue. DTE Electric is replacing at risk subtransmission disconnect switches. Switchers: Series 2000 circuit switchers are installed for primary side transformer protection on 120kV systems. Failures of circuit switchers to trip when necessary can lead to system outages and damage to other critical equipment such as transformers. DTE has a strategy to replace certain at risk circuit switchers. Also, 35 installations have been identified where fault currents at the station now exceed the interrupting rating of the circuit switcher. The circuit switchers need to be replaced with ones with a higher interrupting rating in order to operate as designed to provide protection to the transformer.
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	Disconnect and Switcher Replacement (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 21
DGP Section:	9.1
Scope:	• Replace at risk Cap & Pin and PM-40 disconnects • Replace at risk and undersized Circuit Switchers

(a)	(b)						
Program:	Disconnect and Switcher Replacement (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Enhance safety • Improving system operability • Improve system reliability						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x	x	x

(a)	(b)
Program:	Disconnect and Switcher Replacement (Pg. 4 of 4)
Current Projects:	Disconnect and Switcher: Disconnect Disconnect and Switcher: Switcher
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $10.4 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~441~~	~~2,219~~	~~2,660~~
	~~Material~~	~~88~~	~~444~~	~~532~~
	~~Other~~	~~59~~	~~296~~	~~355~~
	~~**Total**~~	~~**588**~~	~~**2,959**~~	~~**3,547**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	488	2,456	2,944
	Material	59	296	355
	Other	41	207	248
	Total	**588**	**2,959**	**3,547**

(a)	(b)
Program:	SCADA Pole Top Device Replacement (Pg. 1 of 4)
Purpose and Necessity:	Through Asset Health Assessments, DTE has identified two types of SCADA pole-top equipment that have experienced high rates of failure - the Form 3 reclosers and the Bridges pole top switches.
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	SCADA Pole Top Device Replacement (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 22
DGP Section:	9.1
Scope:	• Replace end-of-life VWE Form 3 Reclosers with Form 6 Triple Single reclosers • Replace end-of-life PTSs with Second Generation S&C PTS

(a)	(b)						
Program:	SCADA Pole Top Device Replacement (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Eliminate aging infrastructure/equipment						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:					x	x	x

(a)	(b)
Program:	SCADA Pole Top Device Replacement (Pg. 4 of 4)
Current Projects:	SCADA Pole Top Device Replacement
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $4.2 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~178~~	~~1,188~~	~~1,366~~
	~~Material~~	~~36~~	~~238~~	~~273~~
	~~Other~~	~~24~~	~~158~~	~~182~~
	~~**Total**~~	~~**238**~~	~~**1,583**~~	~~**1,821**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	150	998	1,147
	Material	71	475	546
	Other	17	111	127
	Total	**238**	**1,583**	**1,821**

(a)	(b)
Program:	Substation Regulator Replacement (Pg. 1 of 4)
Purpose and Necessity:	Through Asset Health Assessments, DTE has identified induction, tri-delta and tri-wye type regulators as being obsolete with technology that is no longer manufactured or supported. An increasing number of issues are occurring with these types of units with repair time continuing to increase due to a need to dry out the insulation in the units and repair or replace voltage controls.
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	Substation Regulator Replacement (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 23
DGP Section:	9.1
Scope:	• Replace 5 obsolete three-phase substation regulators per year for several years (tri-delta, tri-wye, or induction) with new three-phase step regulators.

(a)	(b)						
Program:	Substation Regulator Replacement (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Allow for proper voltage regulation at those substations and avoid out-of-range voltage that could damage customer equipment or cause reliability problems. • Eliminate aging infrastructure						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:					x	x	x

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Resilience & Hardening

Case No.: U-20836
Exhibit: A-23
Schedule: M4 Revised
Witness: S. G. Pfeuffer

(a)	(b)			
Program:	Substation Regulator Replacement (Pg. 4 of 4)			
Current Projects:	Substation Regulator Replacement			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.9 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~53~~	~~266~~	~~319~~
	~~Material~~	~~11~~	~~53~~	~~64~~
	~~Other~~	~~7~~	~~35~~	~~43~~
	~~**Total**~~	~~**71**~~	~~**354**~~	~~**425**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	51	255	306
	Material	14	71	85
	Other	6	28	34
	Total	**71**	**354**	**425**

(a)	(b)
Program:	Steel Pole Highway Crossings (Pg. 1 of 4)
Purpose and Necessity:	DTE has been subject to a few incidents that have resulted in collapse of freeway/highway crossings this year. As a result all wood poles at freeway and highway crossings should be replaced with steel poles as a multi-year phased program as opposed to a project. 5-7 locations will be targeted in 2022.
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	Steel Pole Highway Crossings (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 24
DGP Section:	Not Available
Scope:	For the future installations of steel poles at Freeway/Highway crossings, the following work will be needed. • 2-4 poles to be replaced with new steel poles at each crossing. • Approximately 400-600 feet of OH Conductor to be replaced at each crossing • 636 AL or 945 ACSR Conductor will be used for Subtransmission lines • Distribution lines and Communication lines will be replaced, as necessary

(a)	(b)						
Program:	Steel Pole Highway Crossings (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Switching from Wood to Steel Poles increases reliability of the structure. • Design stress limited to 75% for increased strength at crossings • Damage limiter structures at or near the crossings will be required to prevent cascading failures • Re-Designing the crossings will allow us the ability to ensure the crossings have adequate strengths due to the addition of joint use post initial design • Future rebuilds of adjacent circuits that the crossings are associated with will go smoother as the crossing will be brought up to current standards and DDOs • Pending: Installation of an overhead conduit to receive a future DTE communication fiber						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x	x		

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Resilience & Hardening

(a)	(b)
Program:	Steel Pole Highway Crossings (Pg. 4 of 4)
Current Projects:	Steel Pole Highway Crossings
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $11.1 M This project is expected to continue beyond 2023
~~**Test Year ($000's):**~~	

	~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
~~Total Labor (DTE Electric & Contractors)~~	~~375~~	~~5,000~~	~~5,375~~
~~Material~~	~~75~~	~~1,000~~	~~1,075~~
~~Other~~	~~50~~	~~667~~	~~717~~
~~**Total**~~	~~**500**~~	~~**6,667**~~	~~**7,167**~~

Test Year ($000's):

	2 mos. 11/01/22 12/31/22	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
Total Labor (DTE Electric &	260	3,067	3,327
Material	120	2,667	2,787
Other	120	933	1,053
Total	**500**	**6,667**	**7,167**

(a)	(b)
Program:	Station Upgrade: Warren (Relay Replacement) (Pg. 1 of 4)
Purpose and Necessity:	Existing 24kV relay panels are marble and cannot be maintained or modified when relay upgrades are needed. There is not enough space to install new panels and new configuration is needed to create space. Existing relays are nearly 60 years old and obsolete. There are at risk breakers, disconnects, and other equipment. Replacements of the breakers and disconnects are challenging due to space constraints. A comprehensive station upgrade is needed to address these issues. In addition, ITC is upgrading their 120 kV bus relaying and removing high speed protection for the transformers. DTE needs to add that functionality by installing new relay panels.
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	Station Upgrade: Warren (Relay Replacement) (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 25
DGP Section:	9.2
Scope:	• Replace (21) 24 kV oil circuit breakers with gas circuit breakers • Replace existing relay panels with 43 new microprocessor based relay panels • New relay panels include three bus panels and one under frequency panel

(a)	(b)						
Program:	Station Upgrade: Warren (Relay Replacement) (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Remove at risk relays • Improve grid-wide situational awareness • Enable SCADA, fault detection, and metering capabilities in substations • Enable remote modification on relay settings can be applied remotely, resulting in fewer field visits • Reduce reactive costs during non-storm and storm events						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:				x	x	x	x

(a)	(b)
Program:	Station Upgrade: Warren (Relay Replacement) (Pg. 4 of 4)
Current Projects:	Station Upgrade: Warren (Relay Replacement)
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $1.0 M

Test Year ($000's):

	2 mos. 11/01/22 12/31/22	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
Total Labor (DTE Electric & Contractors)	-	-	-
Material	-	-	-
Other	-	-	-
Total	**-**	**-**	**-**

(a)	(b)
Program:	Station Upgrade: Northeast (Relay Replacement) (Pg. 1 of 4)
Purpose and Necessity:	Existing 24kV relay panels are marble and cannot be maintained or modified when relay upgrades are needed. There is not enough space to install new panels and new configuration is needed to create space. Existing relays are nearly 60 years old and obsolete. There are at risk breakers, disconnects, and other equipment. Replacements of the breakers and disconnects are challenging due to space constraints. A comprehensive station upgrade is needed to address these issues. In addition, ITC is upgrading their 120 kV bus relaying and removing high speed protection for the transformers. DTE needs to add that functionality by installing new relay panels.
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	Station Upgrade: Northeast (Relay Replacement) (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 26
DGP Section:	9.2
Scope:	• Replace (21) 24 kV oil circuit breakers with gas circuit breakers • Replace existing relay panels with 37 new microprocessor based relay panels • New relay panels include three bus panels and one under frequency panel

(a)	(b)						
Program:	Station Upgrade: Northeast (Relay Replacement) (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Remove at risk relays • Improve grid-wide situational awareness • Enable SCADA, fault detection, and metering capabilities in subtransmission stations • Enable remote modification on relay settings can be applied remotely, resulting in fewer field visits • Reduce reactive costs during trouble						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:				x	x	x	x

(a)	(b)
Program:	Station Upgrade: Northeast (Relay Replacement) (Pg. 4 of 4)
Current Projects:	Station Upgrade: Northeast (Relay Replacement)
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $10.5 M

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~1,029~~	~~-~~	~~1,029~~
	~~Material~~	~~206~~	~~-~~	~~206~~
	~~Other~~	~~137~~	~~-~~	~~137~~
	~~**Total**~~	~~**1,372**~~	~~**-**~~	~~**1,372**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	823	-	823
	Material	398	-	398
	Other	151	-	151
	Total	**1,372**	**-**	**1,372**

(a)	(b)
Program:	Station Upgrade: Lincoln (Pg. 1 of 4)
Purpose and Necessity:	Existing 24kV relay panels are marble and cannot be maintained or modified when relay upgrades are needed. There is not enough space to install new panels and new configuration is needed to create space. Existing relays are nearly 60 years old and obsolete. There are at risk breakers, disconnects, and other equipment. Replacements of the breakers and disconnects are challenging due to space constraints. A comprehensive station upgrade is needed to address these issues.
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	Station Upgrade: Lincoln (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 27
DGP Section:	9.2
Scope:	• Replace (14) 24 kV oil circuit breakers with gas circuit breakers • Replace existing relay panels with 20 new microprocessor based relay panels • New relay panels include three bus panels and one under frequency panels

(a)	(b)						
Program:	Station Upgrade: Lincoln (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Remove at risk relays • Improve grid-wide situational awareness • Enable SCADA, fault detection, and metering capabilities in substations • Enable remote modification on relay settings can be applied remotely, resulting in fewer field visits • Reduce reactive costs during non-storm and storm events						
Impact Dimension: Targeted:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
				x	x	x	x

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Resilience & Hardening

(a)	(b)			
Program:	Station Upgrade: Lincoln (Pg. 4 of 4)			
Current Projects:	Station Upgrade: Lincoln			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $5.6 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~41~~	~~3,313~~	~~3,354~~
	~~Material~~	~~8~~	~~663~~	~~671~~
	~~Other~~	~~6~~	~~442~~	~~447~~
	~~**Total**~~	~~**55**~~	~~**4,417**~~	~~**4,472**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	51	2,650	2,701
	Material	-	1,281	1,281
	Other	4	486	490
	Total	**55**	**4,417**	**4,472**

(a)	(b)
Program:	Station Upgrade: Navarre (Pg. 1 of 4)
Purpose and Necessity:	Existing 24kV relay panels are marble and cannot be maintained or modified when relay upgrades are needed. There is not enough space to install new panels and new configuration is needed to create space. Existing relays are nearly 60 years old and obsolete. There are at risk breakers, disconnects, and other equipment. Replacements of the breakers and disconnects are challenging due to space constraints. A comprehensive station upgrade is needed to address these issues.
Category:	Infrastructure Resilience & Hardening

(a)	(b)
Program:	Station Upgrade: Navarre (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 8, Line 28
DGP Section:	9.2
Scope:	• Replace (20) 24 kV oil circuit breakers with gas circuit breakers • Replace existing relay panels with 35 new microprocessor based relay panels. New relay panels include three bus panels and one under frequency panel

(a)	(b)						
Program:	Station Upgrade: Navarre (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Remove at risk relays • Improve grid-wide situational awareness • Enable SCADA, fault detection, and metering capabilities in substations • Enable remote modification on relay settings can be applied remotely, resulting in fewer field visits • Reduce reactive costs during non-storm and storm events						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:				x	x	x	x

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Resilience & Hardening

Case No.: U-20836
Exhibit: A-23
Schedule: M4 Revised
Witness: S. G. Pfeuffer

(a)	(b)
Program:	Station Upgrade: Navarre (Pg. 4 of 4)
Current Projects:	Station Upgrade: Navarre
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $0.3 M This project is expected to continue beyond 2023

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~206~~	~~206~~
	~~Material~~	~~-~~	~~41~~	~~41~~
	~~Other~~	~~-~~	~~28~~	~~28~~
	~~**Total**~~	~~**-**~~	~~**275**~~	~~**275**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	-	253	253
	Material	-	-	-
	Other	-	22	22
	Total	**-**	**275**	**275**

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

Case No.: U-20836
Exhibit: A-23
Schedule: M5 Revised
Witness: S. G. Pfeuffer

(a)	(b)
Category	**Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization**
	Capital Exhibit:
pages: 4-7 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 2 Ann Arbor System Improvements: State Substation
pages: 8-11 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 3 Ann Arbor System Improvements: Apex (Blue) Substation
pages: 12-15 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 4 Ann Arbor System Improvements: Argo 40kV Reconfiguration
pages: 16-19 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 5 Transformer High Side Protection Program
pages: 20-23 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 6 PQ Meter Fault Locating
pages: 24-27 of 355	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 7 Subtransmission Redesign & Rebuild: Prior Year's
pages: 28-31 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 8 Subtransmission Redesign & Rebuild: Tie 4104
pages: 32-35 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 9 Subtransmission Redesign & Rebuild: Tie 3416
pages: 36-39 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 10 Subtransmission Redesign & Rebuild: Maxwell Amherst
pages: 40-43 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 11 Subtransmission Redesign & Rebuild: Tie 810
pages: 44-47 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 12 Subtransmission Redesign & Rebuild: Trunk 7106
pages: 48-51 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 13 Subtransmission Redesign & Rebuild: Trunk 2255
pages: 52-55 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 14 Subtransmission Redesign & Rebuild: Trunk 2237-ST
pages: 56-59 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 15 Subtransmission Redesign & Rebuild: Trunk 7333
pages: 60-63 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 16 Subtransmission Redesign & Rebuild: Sandusky Transformer 101 Breaker
pages: 64-67 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 17 Subtransmission Redesign & Rebuild: Sandusky Transformer 102 Addition
pages: 68-71 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 18 Subtransmission Redesign & Rebuild: Boyne
pages: 72-75 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 19 Subtransmission Redesign & Rebuild: Tie 6907
pages: 76-79 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 20 Subtransmission Redesign & Rebuild: Tie 7504
pages: 80-83 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 21 Subtransmission Redesign & Rebuild: Tie 4105
pages: 84-87 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 22 Subtransmission Redesign & Rebuild: Trunk 2308
pages: 88-91 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 23 Subtransmission Redesign & Rebuild: Tie 1568
pages: 92-95 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 24 Subtransmission Redesign & Rebuild: Trunk 4217
pages: 96-99 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 25 Subtransmission Redesign & Rebuild: Trunk 3509
pages: 100-103 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 26 Subtransmission Redesign & Rebuild: Trunk 4266
pages: 104-107 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 27 Subtransmission Redesign & Rebuild: Badax Transformer 102 Addition
pages: 108-111 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 28 Subtransmission Redesign & Rebuild: Trunk 4245
pages: 112-115 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 29 Subtransmission Redesign & Rebuild: Tie 6602
pages: 116-119 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 30 Subtransmission Redesign & Rebuild: Trunk 4911
pages: 120-123 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 31 Subtransmission Redesign & Rebuild: Custer Republic

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign

Case No.: U-20836
Exhibit: A-23
Schedule: M5 Revised
Witness: S. G. Pfeuffer

(a)	(b)
Category	**Distribution Plant Capital Project Detail - Infrastructure Redesign**
	Capital Exhibit:
pages: 124-127 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 32 Subtransmission Redesign & Rebuild: Pigeon Area Improvement
pages: 128-131 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 33 Subtransmission Redesign & Rebuild: Trunk 2443
pages: 132-135 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 34 Subtransmission Redesign & Rebuild: Trunk 5838
pages: 136-139 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 35 Subtransmission Redesign & Rebuild: Trunk 2419
pages: 140-143 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 36 Subtransmission Redesign & Rebuild : Small Projects & Reserve
pages: 144-147 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 37 Subtransmission Breaker Short Circuit Violations
pages: 148-151 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 38 Subtransmission Redesign & Rebuild: Slocum
pages: 152-155 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 39 Station Upgrade: Cortland Station Expansion
pages: 156-159 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 40 Subtransmission Redesign & Rebuild: 40kV Capacitor Banks at Armada and Adair
pages: 160-163 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 41 CODI: Charlotte Network Upgrade
pages: 164-167 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 42 CODI: Targeted Network Secondary Cable Replacement
pages: 168-171 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 43 CODI: Corktown Substation
pages: 172-175 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 44 CODI: Islandview Substation
pages: 176-179 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 45 CODI: CATO Substation Expansion
pages: 180-183 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 46 CODI: Howard Conversion
pages: 184-187 of 347	Exhibit A-12, Schedule B5.4, Page 9 of 12, Line 47 CODI: Midtown Substation Expansion
pages: 188-191 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 48 CODI: Alfred Substation Expansion
pages: 192-195 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 49 CODI: Garfield Network Upgrade
pages: 196-199 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 50 CODI: Kent/Gibson Conversion
pages: 200-203 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 51 4.8 kV CC: Hilton Substation and Circuit Conversion
pages: 204-207 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 52 4.8 kV CC: Zenon Substation and Circuit Conversion
pages: 208-211 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 53 4.8 kV CC: Cortland / Oakman / Linwood Consolidation
pages: 212-215 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 54 4.8 kV CC: Ariel Substation and Circuit Conversion
pages: 216-219 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 55 4.8 kV CC: I-94 Substation and Circuit Conversion
pages: 220-223 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 56 4.8 kV CC: Almont Relief and Circuit Conversion (Midas)
pages: 224-227 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 57 4.8 kV CC: Buckler Circuit Conversion
pages: 228-231 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 58 4.8 kV CC: Calla Circuit Conversion
pages: 232-235 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 59 4.8 kV CC: Northville Decommissioning and Circuit Conversion
pages: 236-239 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 60 4.8 kV CC: Lapeer - Elba Expansion and Circuit Conversion (Apollo)
pages: 240-243 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 61 4.8 kV CC: McKinstry Sub Decommission
pages: 244-247 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 62 4.8 kV CC: White Lake Decommissioning and Circuit Conversion

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign

Case No.: U-20836
Exhibit: A-23
Schedule: M5
Witness: S. G. Pfeuffer

(a)	(b)
Category	**Distribution Plant Capital Project Detail - Infrastructure Redesign**
	Capital Exhibit:
pages: 248-251 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 63 4.8 kV CC: Quincy Conversion
pages: 252-255 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 64 & 65 4.8 kV CC: Pinegrove Substation Relocation and Conversion
pages: 256-259 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 66 4.8 kV CC: Promenade Site Prep and Below Grade
pages: 260-263 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 67 4.8 kV CC: Hawthorne Relief and Circuit Conversion
pages: 264-267 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 68 4.8 kV CC: Birmingham Decommissioning and Circuit Conversion
pages: 268-271 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 69 4.8kV CC: ISO Camden
pages: 272-275 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 70 4.8kV CC: ISO Gilbert
pages: 276-279 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 71 8.3 kV CC: Pontiac Overhead Conversion
pages: 280-283 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 72 8.3 kV CC: Pontiac Underground Conversion
pages: 284-287 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 73 System Loading: Prior Year
pages: 288-291 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 74 System Loading: Brest Substation
pages: 292-295 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 75 System Loading: Carleton
pages: 296-299 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 76 System Loading: Grayling
pages: 300-303 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 77 System Loading: Prospect
pages: 304-307 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 78 System Loading: Mandy 307 Load Transfer
pages: 308-311 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 79 System Loading: Brown City
pages: 312-315 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 80 System Loading: Mack Transformer 102
pages: 316-319 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 81 System Loading: Port Sanilac
pages: 320-323 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 82 System Loading: Richmond/Armada
pages: 324-327 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 83 System Loading: Cody
pages: 328-331 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 84 System Loading: Otsego/Capac/Shaw
pages: 332-335 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 85 System Loading: Macomb/Golf
pages: 336-339 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 86 System Loading: Grenada
pages: 340-343 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 87 Pilot: Strategic and Service Undergrounding
pages: 344-347 of 347	Exhibit A-12, Schedule B5.4, Page 10 of 12, Line 88 Pilot: Primary Deconductoring

(a)	(b)
Program:	Ann Arbor System Improvements: State Substation (Pg. 1 of 4)
Purpose and Necessity:	The existing system in the Greater Ann Arbor area experiences frequent reliability and power quality issues and is not adequately sized to accommodate existing load and accelerated load growth in the area. Voltage sags and outages are frequent in the area, negatively affecting customers. The overloaded system is an impediment to economic growth. There is currently limited ability to jumper/transfer load to adjacent substations during emergency situations or for routine maintenance. This project, coupled with the other Ann Arbor System Improvements Projects Apex, Argo, and Buckler Circuit Conversions, will address these issues.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Ann Arbor System Improvements: State Substation (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 2
DGP Section:	11.2
Scope:	• Construct a new 120/40 kV class 'D' station (including two 45/60/75 MVA, 120-40 kV transformers and seven Subtransmission breakers) • Establish four Subtransmission circuits out of State Station. Load from three existing stations will be transferred to State. Substations impacted include: Burton, Hoover, University, Ingalls, and Academy. • Construct a new 120/13.2 kV class 'A' substation (including two 24/32/40 MVA, 120-13.8 kV transformers and ten circuit breakers) • Decommission existing State substation and cutover eight distribution circuits from existing substation to the new substation.

(a)	(b)						
Program:	Ann Arbor System Improvements: State Substation (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide sufficient capacity to serve existing and new customer load. • Reduce equipment risk by providing load relief to the Subtransmission system in the Greater Ann Arbor area to be compliant with the Subtransmission Planning Criteria and Distribution Design Orders. • Improve system shutdown capability and operability. • Improve customer reliability and power quality.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x		

(a)	(b)
Program:	Ann Arbor System Improvements: State Substation (Pg. 4 of 4)
Current Projects:	Ann Arbor System Improvements: State Substation
Budget Basis:	• MEP Estimate
Cost:	Estimated project spend in 2021-2023: $18.1 M

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~1,683~~	~~-~~	~~1,683~~
	~~Material~~	~~337~~	~~-~~	~~337~~
	~~Other~~	~~224~~	~~-~~	~~224~~
	~~**Total**~~	~~**2,244**~~	~~**-**~~	~~**2,244**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	1,459	-	1,459
	Material	561	-	561
	Other	224	-	224
	Total	**2,244**	**-**	**2,244**

(a)	(b)
Program:	Ann Arbor System Improvements: Apex (Blue) Substation (Pg. 1 of 4)
Purpose and Necessity:	The existing system in the Greater Ann Arbor area experiences frequent reliability and power quality issues and is not adequately sized to accommodate existing load and accelerated load growth in the area. Voltage sags and outages are frequent in the area, negatively affecting customers. The overloaded system is an impediment to economic growth. There is currently limited ability to jumper/transfer load to adjacent substations during emergency situations or for routine maintenance. This project, coupled with the other Ann Arbor System Improvements Projects State, Argo, and Buckler Circuit Conversions, will address these issues.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Ann Arbor System Improvements: Apex (Blue) Substation (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 3
DGP Section:	11.2
Scope:	• ITC to design and construct five miles of 120 kV line to Apex Station. • Construct a new 120/40 kV class 'D' station (including two 60/80/100 MVA, 120-40kV transformers and 11 Subtransmission breakers). • Reconfigure the existing 40 kV system in the area. Establish eight Subtransmission circuits out of Apex station. Load from three existing stations will be transferred to Apex Station. Substations impacted include: University, Ingalls, Academy, Campus, Leland, and Bates.

(a)	(b)						
Program:	Ann Arbor System Improvements: Apex (Blue) Substation (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide sufficient capacity to serve existing and new customer load. • Reduce equipment risk by providing load relief to Subtransmission system in the Greater Ann Arbor area to be compliant with the Distribution Design Orders. • Improve system shutdown capability and operability. • Improve customer reliability and power quality.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x		

(a)	(b)			
Program:	Ann Arbor System Improvements: Apex (Blue) Substation (Pg. 4 of 4)			
Current Projects:	Ann Arbor System Improvements: Apex (Blue) Substation			
Budget Basis:	• MEP Estimate			
Cost:	Estimated project spend in 2021-2023: $6.6 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~506~~	~~-~~	~~506~~
	~~Material~~	~~101~~	~~-~~	~~101~~
	~~Other~~	~~68~~	~~-~~	~~68~~
	~~**Total**~~	~~**675**~~	~~**-**~~	~~**675**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	439	-	439
	Material	169	-	169
	Other	68	-	68
	Total	**675**	**-**	**675**

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	Ann Arbor System Improvements: Argo 40kV Reconfiguration (Pg. 1 of 4)
Purpose and Necessity:	Due to high growth in Ann Arbor, ARGO does not have capacity to serve downtown Ann Arbor. This is part of the ARGO decommissioning project. Both Power Delivery Planning and South West Central Distribution Engineering will work together to decommission and remove Argo from service (see related project Buckler Circuit Conversions). This project also avoids $5M of work that would be required at the ARGO yard should the reconfiguration not take place.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Ann Arbor System Improvements: Argo 40kV Reconfiguration (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 4
DGP Section:	11.2
Scope:	• Decommission and remove all 40kV busses at Argo: Bus 1, Bus 2, and Bus 3. • Decommission all 40kV Breakers and Disconnects at Argo Station. • Decommission TIE 4501 Argo source, re-tag circuit as TRK 4567 out of Lark Station and TRK 5595 out of Phoenix Station. • Decommission TIE 5517 Argo source, and Re-tag circuit as TRK 5595A-B from Phoenix Station. • Reconfigure TIE 5513, remove Argo source. • Reconfigure TIE 1540, remove Argo source and redesignate as TRK 1572 out of Superior. • Reconfigure TIE 1531, remove Argo source and redesignate as TRK 1510 out of Superior. • Decommission TRK 3150 and TRK 3160A-3161A.

(a)	(b)						
Program:	Ann Arbor System Improvements: Argo 40kV Reconfiguration (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide sufficient capacity to serve existing and new customer load • Reduce equipment risk by providing load relief to subtransmission system in the Greater Ann Arbor area to be compliant with DTE Electric's Distribution Design Standards • Improve system shutdown capability and operability • Improve customer reliability and power quality						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x		

(a)	(b)
Program:	Ann Arbor System Improvements: Argo 40kV Reconfiguration (Pg. 4 of 4)
Current Projects:	Ann Arbor System Improvements: Argo 40kV Reconfiguration
Budget Basis:	• MEP Estimate
Cost:	Estimated project spend in 2021-2023: $23.3 M

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~831~~	~~10,423~~	~~11,254~~
	~~Material~~	~~166~~	~~2,085~~	~~2,251~~
	~~Other~~	~~111~~	~~1,390~~	~~1,501~~
	~~**Total**~~	~~**1,108**~~	~~**13,897**~~	~~**15,006**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	720	9,035	9,755
	Material	277	3,474	3,751
	Other	111	1,388	1,499
	Total	**1,108**	**13,897**	**15,006**

(a)	(b)
Program:	Transformer High Side Protection Program (Pg. 1 of 4)
Purpose and Necessity:	Several subtransmission and distribution transformers require the installation of high side protection, either a circuit switcher or breaker, to mitigate observed NERC reportable system issues during simulated contingency conditions that may result in the loss of service to 100+ MVA of customer load. These issues were discovered during annual studies performed by ITC and are required to be mitigated by NERC TPL-001-4 standards.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Transformer High Side Protection Program (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 5
DGP Section:	11.2
Scope:	• Install high side switching devices, circuit switchers or breakers, on 22 subtransmission and distribution transformers located at 16 different stations • 10 of these transformers will also require relocation and/or replacement due to space constraints at their current sites with the possibility of additional relaying and monitoring equipment for operation of the high side switching devices

(a)	(b)						
Program:	Transformer High Side Protection Program (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• DTE Transformers will be in compliance with NERC TPL-001-4 criteria • Mitigate the impact of potential DTE equipment failures impacting the ITC Bulk Electric System • Improve Bulk Electric System reliability and resiliency to widespread system outage of 100+ MVA of customer load • Increase DTE operational flexibility by allowing remote operation of protective devices at the transformers						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:			x	x	x		

(a)	(b)
Program:	Transformer High Side Protection Program (Pg. 4 of 4)
Current Projects:	Transformer High Side Protection Program
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $7.9 M This project is expected to continue beyond 2023

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~375~~	~~1,875~~	~~2,250~~
	~~Material~~	~~75~~	~~375~~	~~450~~
	~~Other~~	~~50~~	~~250~~	~~300~~
	~~**Total**~~	~~**500**~~	~~**2,500**~~	~~**3,000**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	229	1,145	1,374
	Material	261	1,305	1,566
	Other	10	50	60
	Total	**500**	**2,500**	**3,000**

(a)	(b)
Program:	PQ Meter Fault Locating (Pg. 1 of 4)
Purpose and Necessity:	PQ Meters provide power quality (voltage, current, fault current, fault location, and duration of event) information for the subtransmission system in order to improve the analysis of system performance. This information will help provide a more accurate record of what circuits on the system are impacted by events/outages and further target specific locations on those circuits where the events originate. This detail will help with scoping of the redesign of the circuit or with short-term mitigation plans to address reoccurring issues. Furthermore, the System Operations Center will be able to fault locate using PQ meters to optimize patrol efforts and improve operational efficiency.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	PQ Meter Fault Locating (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 6
DGP Section:	11.2
Scope:	A total of 177 meters will be installed throughout the system: • 82 station transformer positions • 95 24 kV/ 40 kV tie lines

(a)	(b)						
Program:	PQ Meter Fault Locating (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Obtain accurate power quality data to diagnose issues on the subtransmission system • Improve capability to address trouble root causes and customer complaints.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:					x	x	

(a)	(b)			
Program:	PQ Meter Fault Locating (Pg. 4 of 4)			
Current Projects:	PQ Meter Fault Locating			
Budget Basis:	• Consultant estimate			
Cost:	Estimated project spend in 2021-2023: $1.8 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~6~~	~~1,087~~	~~1,093~~
	~~Material~~	~~1~~	~~217~~	~~219~~
	~~Other~~	~~1~~	~~145~~	~~146~~
	~~**Total**~~	~~**8**~~	~~**1,449**~~	~~**1,457**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	5	870	875
	Material	2	435	438
	Other	1	144	144
	Total	**8**	**1,449**	**1,457**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Prior Year's (Pg. 1 of 4)
Purpose and Necessity:	DTE Electric's subtransmission system is experiencing increasing failures due to corrosion of steel cores in the conductors, arc strike (lightning) damage, and other storm and trouble events that cause multiple splices along sections of the trunk and tie lines. Additionally, multiple trunk and tie lines on the subtransmission system are over their emergency ratings during contingency events. Any trunk or tie line failure could impact multiple substations and a significant number of customers. The program was established to address both reliability and loading issues associated with subtransmission tie lines and trunk lines.
Category:	Infrastructure Redesign & Modernization

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Prior Year's (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 7
DGP Section:	Not Available
Scope:	• RP Defective Transformers (HV): Replace defective OH distribution transformers that caused voltage in excess of 110% of nominal voltage • TIE 4512 / 120-40 kV station in Lima Twp. (Chelsea): Build a 120-40 kV station and split TIE 4512 into two 40 kV lines

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Prior Year's (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce equipment risk by providing load relief to substations and circuits • Provide capacity to serve existing and new customer load • Improve system shutdown capability and operability • Address voltage and power quality issues • Reduce major substation outage risk by reducing stranded load • Improve reliability by adding contingencies to the system						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x			x		

(a)	(b)			
Program:	Subtransmission Redesign & Rebuild: Prior Year's (Pg. 4 of 4)			
Current Projects:	RP Defective Transformers (HV) Tie 4512/120-40kV Station Lima Twp. (Chelsea)			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $0.0 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 4104 (Pg. 1 of 4)
Purpose and Necessity:	The north end of TIE 4104 has experienced four sustained outages impacting customer service due to wire down events during the first quarter of 2019. Testing of the wire confirmed lightning arc strike damage, corrosion on the steel core, and cracked zinc coating (galvanization) on the conductor. Distribution Design Order-0070-008 states that the Standard conductor size for subtransmission system shall be 636 AL SW-ACSR. There are 17.8 miles of 3/0 ACSR SW-AL wire that need to be replaced.
Category:	Infrastructure Redesign & Modernization

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 4104 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 8
DGP Section:	11.2
Scope:	• Rebuild Delaware tap - remove 3.1 miles of 3/0 ACSR 40 KV and install 3.1 Miles of 636 AL -SW-AL, replace all poles with steel poles, replace Automatic Pole Top Switch 1694 with new SEECO 600 AMPS Automatic Pole Top Switch, rebuild underbuilt 3.1 miles of TLBOT 8051 3-phase 13.2KV and replaced distribution circuit equipment as needed. • Rebuild Talbot tap - remove 0.2 miles of 3/0 ACSR and install 636 ALL SW-AL. Substation work - Install 636 AL trainer to the TLBOT Transformer 1. Portable will be needed for shutdown or generation. Reconductor 0.2 miles of underbuilt TLBOT 8051 3-phase 13.2KV. • Rebuild 3.6 Miles of 40 KV with 636 AL SW-AL from Automatic Pole Top Switch 1681 to Ruth Rd and under build 1.8 Miles DC TLBOT 8051. Install 13 miles of new 40 KV using 636 AL-SW going North on Ruth RD and East on Section RD. Rebuild 0.4 Miles of 40 KV LW Shock RD and Underbuild NEFF 0314 4.8 KV 3 phase. Decommission & Remove 17.8 miles of 40kV 3/0 ACSR, which 5.5 miles has distribution under build.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Tie 4104 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce safety risk, to customers and crews, of wire down events with new conductor • Improve customer reliability and power quality with less outage events and better voltage support with new conductor • Reduce reactive trouble cost by approximately 20% for TIE 4104 and associated underbuilt distribution circuits						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x	x	x	x

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 4104 (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Tie 4104
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $5.6 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~38~~	~~3,329~~	~~3,367~~
	~~Material~~	~~8~~	~~666~~	~~673~~
	~~Other~~	~~5~~	~~444~~	~~449~~
	~~**Total**~~	~~**50**~~	~~**4,439**~~	~~**4,489**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	43	3,551	3,594
	Material	3	444	446
	Other	5	444	449
	Total	**50**	**4,439**	**4,489**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 3416 (Pg. 1 of 4)
Purpose and Necessity:	TIE 3416 Breaker Replacement and Reconductoring Distribution Design Order-0090-013 (Subtransmission Loading Criteria): Allowable Summer Normal configuration (day to day) loading on subtransmission equipment is 100% and Summer Emergency loading on subtransmission equipment is 90%. • TIE 3416 I-K section is at 100.24% of the Summer Normal rating (0.1 MVA over the allowable loading). Limiting elements are CTs with a Summer Normal rating of 23.8 MVA currently loaded at 100.24 %, and a trainer/conductor 1/0 AWG with a Summer Normal rating of 25.2 MVA currently loaded at 95% • TIE 3416 I-K section is loaded at 109% of the Summer Emergency rating (2.6 MVA over the allowable load) upon the contingency event of a breaker operation on the Randolph end and Automatic Pole Top Switch 1781. Three other contingencies result in lower overload. The limiting element is CTs with a Summer Emergency rating of 28.9 MVA, currently loaded at 109%. Current potential load shed, to protect from overloading equipment and causing damage, for a single contingency event is 5.5 MVA TIE 3416 Reconductoring - Pigeon Distribution Design Order-0070-008 Subtransmission Voltage Criteria : Under emergency conditions, for single contingency events (N-1), Subtransmission voltage limits are 92%-105% of the nominal voltage • SULVN, SILO, STPS29, STPS4, STPS10, STPS15, ELKTN2, ELKTN1 (all substations fed by TIE 3416) the voltage is at 83% of nominal for a single contingency event of a breaker operation on the Bad Axe end and APTS 1662. Six more single contingency events on the system cause low voltages for every substation on TIE 3416 in the range of 86-91% of nominal. Current potential load shed, to protect customer equipment from damage caused by low voltage, for a single contingency event is 9.5 MVA. TIE 3416 Reconductoring - Pigeon DDO-0070-008 Subtransmission Voltage Criteria : Under emergency conditions, for single contingency events (N-1), Subtransmission voltage limits are 92%-105% of the nominal voltage • SULVN, SILO, STPS29, STPS4, STPS10, STPS15, ELKTN2, ELKTN1 (all substations fed by TIE 3416) voltage is at 83% for single contingency loss of TIE 3416 Bad Axe POS RH and APTS 1662. Six more single contingencies on the system causes low voltages for every substation on TIE 3416 in the range of 86-91%. Load shed for single contingency is 9.5 MVA.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 3416 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 9
DGP Section:	11.2
Scope:	TIE 3416 Breaker Replacement and Reconductoring • Bad Axe Substation: Replace oil breaker 0221 and CTs; replace trainers: 250KCM, 1/0 AWG; replace disconnects; replace relay panel at position RH BADAX. Overhead Line: replace 1.57 miles of 3/0 ACSR with 636 AL SW-ACSR (enhanced 40 KV, armless, steel pole construction) and replace underbuilt distribution voltage lines from Bad Axe substation to Van Dyke and Pigeon. Replace distribution equipment as needed. TIE 3416 Reconductoring - Pigeon • Substation: replace 3/0 trainers coming to substation for Transformer 1 and Transformer 2 Elkton. Overhead Line: replace 6.33 Miles of 3/0 ACSR with 636 AL SW-ACSR (enhanced 40 KV, armless, steel pole construction) from Pigeon substation to the buck pole at the Subtransmission Power Service (STPS)s tap including tap to STPSs, Elkton Transformer 1 and Elkton Transformer 2 taps and replace underbuilt distribution voltage lines. Replace distribution equipment as needed. Replace Pole Top Switch 314, Pole Top Switch 85 & Pole Top Switch 206.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Tie 3416 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	TIE 3416 Breaker Replacement and Reconductoring: • Alleviate thermal loading violations, and the possibility of shedding customer load during a single contingency event on TIE 3416 I-K section. New equipment ratings lower the percent of capacity utilized by the current system loading from the Summer Emergency rating of 109% to 84% and the Summer Normal rating of 100.2 % to 81%. Replace 3/0 ACSR wire, that is prone to failures that result in wire down events, with standard 636AL. The new conductor creates 26.5 MVA of additional capacity on TIE 3416 I-K section for the customers in the area. TIE 3416 Reconductoring - Pigeon : • Alleviate voltage violations, and the possibility of shedding customer load during a single contingency event on TIE 3416 from 83% to 94% of nominal voltage. 40 KV wire up to latest standard 636 AL per Distribution Design Order-0070-008, which will also improve the reliability of service to the customers for those sections.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)			
Program:	Subtransmission Redesign & Rebuild: Tie 3416 (Pg. 4 of 4)			
Current Projects:	Tie 3416 Breaker Replacement and Reconductoring Tie 3416 Reconductoring - Pigeon			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $0.0 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Maxwell Amherst (Pg. 1 of 4)
Purpose and Necessity:	Maxwell is a switching station which includes buses and circuit switchers. Amherst is an industrial substation dedicated to serving a specific customer. There are two transformers serving this customer and one of them failed. The customer requires both transformers to be in service due to the necessary current inrush of the motor startups and redundancy. To get this customer back up and running, the easiest place to install a transformer was the Maxwell switching station on trouble. Now, transformer two at Amherst must be moved to Maxwell and follow up work must be completed to sustain the customer being served from Maxwell substation. Moving the transformers to this location and installing a similar sister unit ensures the correct impedance for the customer.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Maxwell Amherst (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 10
DGP Section:	11.2
Scope:	Work at Amherst: • Decommission and remove Amherst Transformer 2 • Decommission and remove capacitor 11A and 11B • Decommission and remove 120 kV cable between Maxwell - Amherst • Decommission old audio-tone transfer trip scheme between DTEE and the customer sites Work at Maxwell: • Install 120-13.8 kV, 24/32/40 MVA Transformer 2 at Maxwell position HR • Decommission and remove Maxwell position HP circuit switcher • Install/Replace three circuit switchers at Maxwell position HQ, HR, and HD • Install 2,000 feet 13.2 kV 1500 CU EPR 1C X 3 from Transformer 2 secondary to customer's manhole and splice with customer's cable • Install ION 7650 SCADA/PQ meter with ethernet connection at Maxwell • Install new transfer trip scheme between the customer and Maxwell using radio communication and SEL 2506/751A relays

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Maxwell Amherst (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Correct impedance and improved equipment serviceability for the customer due to both transformers being the same type and distance from the customer, as well as located at the same site • Reduce equipment risk of failure by replacing Transformer 2 serving the customer						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x			

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Maxwell Amherst (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Maxwell Amherst
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $0.3 M
Test Year ($000's):	

	2 mos. 11/01/22 12/31/22	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
Total Labor (DTE Electric & Contractors)	-	-	-
Material	-	-	-
Other	-	-	-
Total	**-**	**-**	**-**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 810 (Pg. 1 of 4)
Purpose and Necessity:	Distribution Design Order-0090-013 (Subtransmission Loading Criteria): Allowable emergency loading on subtransmission equipment is 90%. • 21 separate violations have been identified. 6 greater than 100% of the Summer Emergency rating. Distribution Design Order-0090-013 (Subtransmission Loading Criteria): A single contingency event should not result in load loss. • 31.4MVA of potential load loss through different single contingency events. Distribution Design Order-0070-008 Subtransmission Voltage Criteria: Under emergency conditions, for single contingency events (N-1), Subtransmission voltage limits are 92%-105% of the nominal voltage. • 30 single contingency events (N-1) result in voltage violations of the above criteria.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 810 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 11
DGP Section:	11.2
Scope:	• Build a new subtransmission voltage station (Gramer Station) • Reconfigure TIE 810 into 3 separate circuits: TIE 9505, TIE 9514, and TRK 4938 • Complete the following work for TIE 9505, TIE 9514 and TRK 4938: • Install 11 miles of new overhead conductor with 636 AL SW-ACSR (enhanced 40 KV, armless, steel pole construction) • Rebuild 16 miles of overhead lines with 636 AL SW-ACSR (enhanced 40 KV, armless, steel pole construction) and replace underbuilt distribution voltage lines and equipment • Decommission and remove 5 miles of overhead lines

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Tie 810 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide additional capacity to serve existing and new customer load • Reduce risk of thermal overload to equipment and the potential to shed customer load • Improve system shutdown capability and operability to perform regular maintenance work • Improve customer reliability with new overhead lines built along the road and improve power quality with voltage changes remaining within the Distribution Design Order limits						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x			x	x	x

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 810 (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Tie 810
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $35.8 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~2,271~~	~~10,111~~	~~12,382~~
	~~Material~~	~~454~~	~~2,022~~	~~2,476~~
	~~Other~~	~~303~~	~~1,348~~	~~1,651~~
	~~**Total**~~	~~**3,028**~~	~~**13,481**~~	~~**16,509**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	1,968	8,763	10,731
	Material	757	3,370	4,127
	Other	303	1,348	1,651
	Total	**3,028**	**13,481**	**16,509**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 7106 (Pg. 1 of 4)
Purpose and Necessity:	Southfield 40kV TRK 7106T is 134% of the Summer Normal rating (N-0), 126% of the Summer Emergency rating (N-1) upon a contingency event loss of TRK 2237-ST, and 112% of the Summer Emergency rating (N-1) upon contingency outage event of TRK 7151A. The limiting element is the underground cable of TRK 7106. Distribution Design Order Violations: Distribution Design Order-0040-003: Automatic throwover Blocking schemes are not acceptable • Blocking schemes are in place to prevent substation automatic throwovers, due to overloads on the 40 kV feeds to FRMTN & INDIN substations. FRMTN substation automatic throwover has been placed on manual blocking to prevent equipment failure on TRK 7106 due to overloads. 12.7 MVA of customer load at FRMTN substation will be dropped in the event of an outage of TRK 7151 for momentary or sustained outage events. Distribution Design Order-0090-013 (Subtransmission Loading Criteria): Allowable day to day (summer Normal) loading on subtransmission equipment is 100%. • TRK 7106 is at 134% (6.6 MVA over the allowable load) of the Summer Normal rating. Distribution Design Order-0090-013 (Subtransmission Loading Criteria): Allowable emergency loading on subtransmission equipment is 90%. • TRK 7106 is 126% of its Summer Emergency rating. The current potential load shed, to protect from overloading equipment and causing damage, for a single contingency event is 10.3 MVA. Distribution Design Order-0090-013 (Subtransmission Loading Criteria): Single contingency events on the Subtransmission System should not result in load loss.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 7106 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 12
DGP Section:	11.2
Scope:	Reconfigure 40kV TRK 7106 into two circuits TRK 7106 and TRK 7187: • TRK 7106 will serve Farmington substation Transformer 4 utilizing the existing cable Create new TRK 7187 at Southfield station position RC that will serve Subtransmission Distribution Facility 38, West Service Center Transformer 1 and Indian Transformer 2: • Install 40kV breaker and two 40kV disconnects at Southfield station position RC • Install 2.3 miles of 40kV 650-1Cx3 EPR cable for TRK 7187 from Southfield station position RC to the overhead cable pole • Install a manual Pole Top Switch on TRK 7187

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Trunk 7106 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviate thermal loading violations, and the possibility of shedding customer load during a single contingency event • Eliminate automatic throwover blocking schemes that can result in customer outages during a single contingency event, improve operability and enable load transfers during planned and trouble events						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x	x	x

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 7106 (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Trunk 7106
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $3.2 M

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~1~~	~~-~~	~~1~~
	~~Material~~	~~0~~	~~-~~	~~0~~
	~~Other~~	~~0~~	~~-~~	~~0~~
	~~**Total**~~	~~**2**~~	~~-~~	~~**2**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	2	-	2
	Material	0	-	0
	Other	0	-	0
	Total	**2**	**-**	**2**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 2255 (Pg. 1 of 4)
Purpose and Necessity:	TRK 2255 ST section B-C is 98% of the Summer Normal ratings (N-0) and 110% of the Summer Emergency rating (N-1) upon a contingency event outage of TRK 2276. The limiting element is the C cable of TRK 2255-ST. Distribution Design Order Violations: Distribution Design Order-0040-003 (Automatic throwover Blocking schemes are not acceptable). • Blocking schemes are in place to prevent overloads on the 40 kV feeds to Glendale substation & Villa substation. Distribution Design Order-0090-013 Violations (Subtransmission Loading Criteria): Allowable Summer Normal on subtransmission equipment is 100%. • TRK 2255 is 98% of its Summer Normal rating. Distribution Design Order-0090-013 Violations (Subtransmission Loading Criteria): Allowable Summer Emergency loading on subtransmission equipment is 90%. • TRK 2255 is at 110% of its Summer Emergency rating (~2.2 MVA over the allowable loading). Distribution Design Order-0090-013 Violations (Subtransmission Loading Criteria): Single contingency events on the Subtransmission System should not result in load loss: • Approximately 11 MVA of customer load at Villa substation would be shed with the current automatic throwover blocking scheme in place, and the contingency event of an outage on TRK 2276.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 2255 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 13
DGP Section:	11.2
Scope:	A new underground cable will be installed to split the load of the "C" cable & replace the "E" Cable of TRK 2255-ST: • Break down branch joint “C”, “D” & “E” cable in manhole 15434 and install one straight joint “C” to “D” cable • Remove 4,765 feet of 350 CU PLSJ 40kV cable on TRK 2255 from manhole 15434 to Villa Transformer 2 • Install 40kV cable pole and 350 EPR termination • Install 15 feet of 1x2 5" conduit for cable pole sweep • Install 6,687 feet of 40kV 350 -1Cx3- EPR cable from cable pole to Villa Transformer 2 utilizing the existing conduit

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Trunk 2255 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviate the Sumer Normal and Summer Emergency overloads • Remove the automatic throwover blocking schemes and the potential for 11 MVA of customer load shed during a contingency outage event on TRK 2276 • Improve operability and enable load transfers during planned work and trouble events • Replace aging cable with new cable reducing the risk of outages						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x			x

(a)	(b)			
Program:	Subtransmission Redesign & Rebuild: Trunk 2255 (Pg. 4 of 4)			
Current Projects:	Subtransmission Redesign & Rebuild: Trunk 2255			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $4.3 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~494~~	~~22~~	~~516~~
	~~Material~~	~~99~~	~~4~~	~~103~~
	~~Other~~	~~66~~	~~3~~	~~69~~
	~~**Total**~~	~~**659**~~	~~**29**~~	~~**689**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	450	23	473
	Material	144	3	147
	Other	66	3	69
	Total	**659**	**29**	**689**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 2237-ST (Pg. 1 of 4)
Purpose and Necessity:	Evergreen station 40kV TRK 2237-ST is at 100% of its Summer Normal rating (N-0) and 110% of its Summer Emergency rating (N-1) upon the contingency event of an outage on TRK 2250. It is also at 96% of its Summer Emergency rating (N-1) upon the contingency event of an outage on TRK 7106T. Distribution Design Order Violations: Distribution Design Order-0040-003 (Automatic throwover Blocking schemes are not acceptable): • A Blocking scheme is in place to prevent overloads on the 40 kV feed to SIXMI substation. Distribution Design Order-0090-013 (Subtransmission Loading Criteria): Allowable Summer Normal loading on subtransmission equipment is 100% • TRK 2237-ST is at 100% of its Summer Normal rating. Distribution Design Order-0090-013 (Subtransmission Loading Criteria): Allowable Summer Emergency loading on subtransmission equipment is 90%. • TRK 2237-ST is at 110% of its Summer Emergency rating (5.7 MVA over the allowable loading). Distribution Design Order-0090-013 (Subtransmission Loading Criteria): Single contingency events on the Subtransmission System should not result in load loss. • Approximately 10.3 MVA of customer load would be shed at SIXMI substation for the contingency event outage of TRK 2250AC-BC.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 2237-ST (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 14
DGP Section:	11.2
Scope:	• Install 4,400 feet 350-1Cx3 EPR cable to parallel overloaded TRK 2237-ST "E" cable in the vicinity of Redford substation • Install a new cable pole • Remove branch joint and install (2) straight joints in manhole 7157 • Install 15 feet of 1x2 5" conduit sweep to the new cable pole

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Trunk 2237-ST (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviate the Summer Normal and Summer Emergency overloads • Remove the Automatic throwover blocking schemes and the potential for 10.3 MVA of customer load shed during a contingency outage event on TRK 2250AC-BC • Improve operability and enable load transfers during planned work and trouble events						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x	x	x

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 2237-ST (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Trunk 2237-ST
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $2.4 M

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~280~~	~~-~~	~~280~~
	~~Material~~	~~56~~	~~-~~	~~56~~
	~~Other~~	~~37~~	~~-~~	~~37~~
	~~**Total**~~	~~**373**~~	~~**-**~~	~~**373**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	242	-	242
	Material	93	-	93
	Other	37	-	37
	Total	**373**	**-**	**373**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 7333 (Pg. 1 of 4)
Purpose and Necessity:	TRK 7333T A-B section is at 129% of the Summer Normal rating (N-0) and is at 126% Summer Emergency rating (N-1) upon the contingency event of an outage on TRK 7315 (limited by cable). Distribution Design Order Violations: Distribution Design Order -0040-003 (Automatic throwover Blocking schemes are not acceptable): • A Blocking scheme is in place to prevent overloads on the 40 kV feeds to Brazil & Kenney substations. Distribution Design Order -0090-013 (Subtransmission Loading Criteria): Allowable Summer Normal loading on subtransmission equipment is 100% • TRK 7333 is at 129% of its Summer Normal rating (6.5 MVA over the allowable loading). Distribution Design Order -0090-013 (Subtransmission Loading Criteria): Allowable Summer Emergency loading on subtransmission equipment is 90%. • TRK 7333 is at 126% of its Summer Emergency rating (12 MVA over the allowable loading). Distribution Design Order -0090-013 (Subtransmission Loading Criteria): Single contingency events on the Subtransmission System should not result in load loss • Approximately 12 MVA of customer load would be shed at Brazil substation for a contingency outage event of TRK 7315
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 7333 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 15
DGP Section:	11.2
Scope:	• Reconfigure TRK 7333T into two separate trunk lines - TRK 7333 and TRK 7370 • Rebuild TRK 7333 underground cable joint with a straight joint in manhole 17429 • For TRK 7370, install 16,391 feet of 650 -1C x 3- EPR 40 kV cable from Chestnut station position SB to manhole 17429 via existing conduit • Install a 40 kV breaker and two 40 kV disconnects (2000 Amp) at position SB in Chestnut station

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Trunk 7333 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviate Summer Normal and Summer Emergency overloads • Remove the Automatic throwover blocking schemes and the potential for 12 MVA of customer load shed during a contingency outage event on TRK 7315 • Improve operability and enable load transfers during planned work and trouble events						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x	x	x

(a)	(b)			
Program:	Subtransmission Redesign & Rebuild: Trunk 7333 (Pg. 4 of 4)			
Current Projects:	Subtransmission Redesign & Rebuild: Trunk 7333			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $3.1 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	2	-	2
	Material	0	-	0
	Other	0	-	0
	Total	**3**	**-**	**3**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Sandusky Transformer 101 Breaker (Pg. 1 of 4)
Purpose and Necessity:	The station equipment for Sandusky Transformer 101 exceeds its thermal rating by 126% under normal system conditions. This thermal overload is a violation of the Subtransmission Planning Criteria and the Distribution Design Order-0090-013: Day to day loading (normal, N-0) on the Subtransmission system shall not exceed 100% of the day to day rating of equipment). In the event an equipment failure occurs at Sandusky Transformer 101 due to overload, customers would experience low voltage and be at risk of load shed for an extended period until permanent repairs are made. Wind park generation in the area would also be restricted or taken offline. The existing station configuration at Sandusky does not include a section breaker between the two 40kV buses. Without a section breaker in place, bus shutdowns needed for maintenance or reactive work require the entire station to be outaged.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Sandusky Transformer 101 Breaker (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 16
DGP Section:	11.2
Scope:	• Replace Sandusky Transformer 101 secondary disconnect switch. • Replace Sandusky Transformer 101 secondary breaker and associated control cables and current transformers. • Replace trainers at Sandusky Transformer 101 and Sandusky Bus 4 with 750 CU MCM trainers. • Install new relay panel for Sandusky Transformer 101. • Install a new section breaker between Sandusky Bus 2 and Bus 4.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Sandusky Transformer 101 Breaker (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Eliminate thermal loading violation of the Subtransmission Planning Criteria and Distribution Design Order-0090-013. • Prevent equipment failure at Sandusky Transformer 101 due to thermal overload which could result in customer low voltage events, curtailed wind park generation, and extensive contingency plans and portable generation to restore customers. • Improved operability to maintain equipment at Sandusky station by the installation of a section breaker.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x	x	

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Sandusky Transformer 101 Breaker (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Sandusky Transformer 101 Breaker
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $1.6 M

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~188~~	~~-~~	~~188~~
	~~Material~~	~~38~~	~~-~~	~~38~~
	~~Other~~	~~25~~	~~-~~	~~25~~
	~~**Total**~~	~~**250**~~	~~**-**~~	~~**250**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	163	-	163
	Material	63	-	63
	Other	25	-	25
	Total	**250**	**-**	**250**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Sandusky Transformer 102 Addition (Pg. 1 of 4)
Purpose and Necessity:	For the single contingency event where Sandusky Transformer 101 is taken out of service, several substations result in customer low voltage events. This contingency of Sandusky Transformer 101 violates the Subtransmission Planning Criteria as well as Distribution Design Order-0070-008: Under emergency conditions, for single contingency events (N-1), Subtransmission voltage limits are 92%-105% of the nominal voltage. Customers would experience low voltage and be at risk of load shed. Approximately 8.2 MVA of load would be shed to operate within required voltage limits. Wind park generation in the area would also be restricted or taken offline.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Sandusky Transformer 102 Addition (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 17
DGP Section:	11.2
Scope:	• Install one 120-40kV 45/60/75 MVA TRANSFORMER 102 from a new 120kV source to a new 40kV position on Sandusky 40kV Bus 2. • Install one 120kV S&C 2020 circuit switcher, one 40kV 2000A breaker, two 40kV 1200A disconnects, and a new relay panel.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Sandusky Transformer 102 Addition (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Elimination the violation of the Subtransmission Planning Criteria & Distribution Design Order-0070-008. • Prevent customer low voltage events that occur when Sandusky Transformer 101 is taken out of service. • Prevent load shed, curtailed wind park generation, and extensive contingency plans and portable generation to restore customers for the single contingency event when Sandusky Transformer 101 is taken out of service. • Improved operability to maintain equipment at Sandusky station by the installation of a 2nd 120kV source for the area.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x		

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Sandusky Transformer 102 Addition (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Sandusky Transformer 102 Addition
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $0.1 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~73~~	~~73~~
	~~Material~~	~~-~~	~~15~~	~~15~~
	~~Other~~	~~-~~	~~10~~	~~10~~
	~~**Total**~~	~~**-**~~	~~**97**~~	~~**97**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	-	87	87
	Material	-	-	-
	Other	-	10	10
	Total	**-**	**97**	**97**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Boyne (Pg. 1 of 4)
Purpose and Necessity:	Boyne Station is a single transformer station. Boyne Transformer 101 has system load limitations for shutdowns to do maintenance/equipment upgrades. In the event Boyne Transformer 101 breaker opens due to a fault, up to 24.6 MVA of load will be shed for this single contingency. This violates the Subtransmission Planning Criteria and Distribution Design Order-0090-013, stating the forced outage of any single element should not result in load loss. There have been several requests to serve new load in the Harrison Township area currently served by TRK 7909 (out of Boyne Station) and TRK 6759 (out of Medina Station). These two trunk lines have no remaining capacity. TRK 7909 is loaded at 120% of its summer emergency thermal rating when TRK 6759 is taken out of service (N-1). TRK 6759 is loaded at 107% of its summer emergency thermal rating when TRK 7909 is taken out of service (N-1). This violates the Subtransmission Planning Criteria and Distribution Design Order-0090-013: Emergency loading on the Subtransmission system (resulting from the forced outage of any single element, N-1) shall not exceed 90% of the emergency rating of equipment. When these outage events occur (scheduled shutdown or breaker operation due to fault), customer load shed as high as 13.5 MVA will occur to prevent permanent damage to the Subtransmission equipment.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Boyne (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 18
DGP Section:	11.2
Scope:	• Install new 40kV Bus 2 at Boyne Station. • Install new 120-40 kV Transformer 102, disconnect on the low side of Transformer 102, circuit switcher on the high side of Transformer 102, and install 40kV section breaker. • Install new 18 Megavar Capacitor on new Boyne Bus 2 for voltage support. • Install one 40 kV line breaker, install disconnects and breaker for the new position (new 40kV trunk line, TRK 7921) on Bus 2, install relay panel for new TRK 7921 position • Install 1.5 miles of new underground conduit 3x5 5" ducts • Reconductor 2.2 miles of TRK 7909. Remove 2.2 miles of 3/0 ACSR conductor and install 2.2 miles of 636 ACSR conductor with 1/0 ACSR shield wire lightning protection. • Replace approximately 0.2 miles of 750 Copper EPR cable with 0.2 miles of parallel 650 Copper EPR cable on TRK 6759 and reconductor approximately 0.03 miles of 3/0 ACSR conductor with 636 ACSR conductor with shield wire lightning protection. • Establish new TRK 7921 out of Boyne Station to serve the load of Selfridge Transformers 2 and 3, Omega Transformer 1, and Beach Transformer 3. Install 1.5 miles of 40kV 650 Copper EPR cable. Install 2.5 miles of new 40kV overhead conductor 636 ACSR with 1/0 ACSR shield wire lightning protection.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Boyne (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Eliminate equipment thermal overloads for TRK 7909, TRK 6759, and Boyne Transformer 101. Eliminate violations of the Subtransmission Planning Criteria and Distribution Design Order-0090-013. • Eliminate load shed for a single contingency outage or shutdown events. • Provide capacity for future load growth.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x	x	

(a)	(b)			
Program:	Subtransmission Redesign & Rebuild: Boyne (Pg. 4 of 4)			
Current Projects:	Subtransmission Redesign & Rebuild: Boyne			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $25.7 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~2,255~~	~~1,816~~	~~4,072~~
	~~Material~~	~~451~~	~~363~~	~~814~~
	~~Other~~	~~301~~	~~242~~	~~543~~
	~~**Total**~~	~~**3,007**~~	~~**2,421**~~	~~**5,429**~~
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	1,783	1,436	3,219
	Material	923	743	1,667
	Other	301	242	543
	Total	**3,007**	**2,421**	**5,429**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 6907 (Pg. 1 of 4)
Purpose and Necessity:	TIE 6907 is loaded at 110% of its summer emergency thermal rating. Approximately 5.8 MVA of load to be shed to operate within thermal loading limits upon the contingency event of the TIE 6907 breaker at Adams Station opening (N-1). This violates the Subtransmission Planning Criteria as well as Distribution Design Order-0090-013: Emergency loading on the Subtransmission system (resulting from the forced outage of any single element, N-1) shall not exceed 90% of the emergency rating of equipment. This contingency event (TIE 6907 breaker operation at Adams Station) also causes low voltage for customers served out of Washington Substation (91% of nominal voltage) and Disco Substation (89% of nominal voltage). This violates the Subtransmission Planning Criteria as well as Distribution Design Order-0070-008: Under emergency conditions, for single contingency events (N-1), Subtransmission voltage limits are 92%-105% of the nominal voltage. Buildings have been constructed over top of the cable section tagged as Bridge Main 05 on TIE 6907 and the cable section tagged as Bridge Main 014 on TRK 6941. In the event a cable failure occurs on either of these cables, an extended outage would occur, and customers would be at risk for load shed.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 6907 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 19
DGP Section:	11.2
Scope:	• Reconfigure TIE 6907 and TRK 6941 Spokane ends to eliminate the thermal overload on TIE 6907 and abandon cable & conduit of Bridge Main 005 & Bridge Main 014. • Install 1,700 feet of overhead 636 ACSR conductor with 1/0 ACSR lightning protection for the line extension to Parkdale substation. • Re-tag TIE 6907 cables and Spokane positions. • Replace existing breaker at Spokane position RP with 2000A gas breaker.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Tie 6907 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Eliminate equipment thermal overloads for TIE 6907. • Eliminate customer low voltage events. • Prevent extended outage/load shed in the event of a cable failure on TRK 6941 or TIE 6907.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x			

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 6907 (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Tie 6907
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $0.1 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~44~~	~~44~~
	~~Material~~	~~-~~	~~9~~	~~9~~
	~~Other~~	~~-~~	~~6~~	~~6~~
	~~**Total**~~	~~**-**~~	~~**59**~~	~~**59**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	-	53	53
	Material	-	-	-
	Other	-	6	6
	Total	**-**	**59**	**59**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 7504 (Pg. 1 of 4)
Purpose and Necessity:	Customers served from Cass City Substation and Proctor Substation have low voltage upon the contingency event of the TIE 7504 breaker operation at Arrowhead Station (Cass City will be at 86% of nominal voltage and Proctor will be at 91% of nominal voltage). This violates the Subtransmission Planning Criteria and Distribution Design Order-0070-008: Under emergency conditions, for single contingency events (N-1), Subtransmission voltage limits are 92%-105% of the nominal voltage. Currently up to 7 MVA of load is shed to prevent this low voltage and keep the remaining customers served from this Tie line within the voltage criteria. Recent new load requests have been denied due to existing voltage violations on this Tie line. Customer complaints have also been received due to frequent outages on TIE 7504 in areas where circuit is in deep right-of-way and has had repeated outages due to tree interference and failure of 3/0 ACSR conductor. For the contingency event when Arrowhead Transformer 102 is taken out of service, customers in the area will experience low voltage. Arrowhead Transformer 102 has system load restrictions for maintenance/equipment upgrades due to these low voltage violations. This violates the Subtransmission Planning Criteria and Distribution Design Order-0070-008: Under emergency conditions, for single contingency events (N-1), Subtransmission voltage limits are 92%-105% of the nominal voltage.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 7504 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 20
DGP Section:	11.2
Scope:	• Reconductor 16 miles of overhead conductor on TIE 7504. Remove 3/0 ACSR conductor and install 636 ACSR conductor with 1/0 ACSR lightning protection. Where TIE 7504 is built in deep right-of-way, relocate the Tie line to be truck accessible for improved reliability and maintenance. • ITC to tap the 120 kV line Tuscola-Klam and extend the 120 kV line 12 miles to Wilmot Station. • Expand Wilmot station by installing a 120-40 kV transformer, circuit switcher, and two 40 KV breakers, upgrading relays, and reconfiguring busses.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Tie 7504 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Eliminate customer low voltage events. • Prevent customer load shed for a single contingency event. • Improve system shutdown capability and operability. • Improve customer reliability and power quality. • Provide capacity for new load growth.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x	x	x	x		

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 7504 (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Tie 7504
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $1.1 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~671~~	~~671~~
	~~Material~~	~~-~~	~~134~~	~~134~~
	~~Other~~	~~-~~	~~90~~	~~90~~
	~~**Total**~~	~~-~~	~~**895**~~	~~**895**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	-	806	806
	Material	-	-	-
	Other	-	90	90
	Total	**-**	**895**	**895**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 4105 (Pg. 1 of 4)
Purpose and Necessity:	TIE 4105 is a 61-mile Tie line between Lee and Sandusky stations that has received escalated customer complaints due to repeat power outages. Frequent lightning strikes have been correlated with breaker operations on TIE 4105 to demonstrate that the lack of lightning protection is causing lightning to strike the phase conductors resulting in phase to phase faults on the Subtransmission conductor. Review of the TIE 4105 pole inspection data has shown that a high number of wood poles are deteriorated and require replacement. Review of the sustained and momentary outages in recent years has identified this circuit as a poor performer, and this data was used to identify which segments of TIE 4105 have experienced the most outages. Sections of the 3/0 ACSR conductor have been taken from this Tie line for evaluation of remaining tensile strength in the conductor. It has been determined that the steel core is deteriorated, and the remaining tensile strength greatly reduced. This conductor was determined to be at the end of its life based on this evaluation. The existing TIE 4105 is built in deep Right-of-way, which contribute to frequent outages from tree interference as well as outage duration due to the line being not truck accessible. There are 3,543 customers directly impacted by the reliability of TIE 4105.
Category:	Infrastructure Redesign & Modernization

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 4105 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 21
DGP Section:	11.2
Scope:	• Reconductor 37.6 miles of 3/0 ACSR conductor on TIE 4105 with 636 Al conductor with 1/0 ACSR lightning protection. Relocate the circuit from deep right-of-way to become truck accessible to allow for improved reliability and maintenance. • Rebuild approximately 18.6 miles of distribution under build on the new poles for TIE 4105.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Tie 4105 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce wire down events. • Reduce total outage events and durations. • Improve customer reliability and power quality • Provide additional capacity for customer load growth						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x	x	x	x

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 4105 (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Tie 4105
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $35.7 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~1,250~~	~~12,468~~	~~13,718~~
	~~Material~~	~~250~~	~~2,494~~	~~2,744~~
	~~Other~~	~~167~~	~~1,662~~	~~1,829~~
	~~**Total**~~	~~**1,667**~~	~~**16,624**~~	~~**18,290**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	1,067	10,639	11,706
	Material	433	4,322	4,755
	Other	167	1,662	1,829
	Total	**1,667**	**16,624**	**18,290**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 2308 (Pg. 1 of 4)
Purpose and Necessity:	TRK2308 A-B section is at 99% (5.8 MVA over the allowable load) of the Summer Emergency rating upon the contingency event of breaker operation on the Macomb-Stephens 120kV transmission line. RK 2308 C-D section is at 97% (2.2 MVA over the allowable load) of its Summer Emergency rating upon the contingency event of breaker operation on the Macomb-Stephens 120kV transmission line. There is an Emergency Load Control scheme at BENSN substation that will automatically shed load (5.4 MVA) to protect from overloading equipment and causing damage for a single contingency event. Distribution Design Order-0090-013 (Subtransmission Loading Criteria Violations): Allowable summer normal configuration (day to day) loading on subtransmission equipment is 100% and summer emergency loading on subtransmission equipment is 90%. Distribution Design Order-0040-003 (Substation automatic throwover Blocking): Substation Load blocking schemes are not acceptable
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 2308 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 22
DGP Section:	11.2
Scope:	• Reconductor 1.8 miles of 350AL overhead lines with 636AL SW-ST (enhanced 40kV standard, armless, steel pole construction) and 1.8 miles of distribution under build. • Reconductor 0.6 miles of 0CU overhead lines with 636AL SW-ST (enhanced 40kV standard, armless, steel pole construction) and 0.6 miles of distribution under build. • Reconductor 0.5 miles of 3/0ACSR overhead lines with 636AL SW-ST (enhanced 40kV standard, armless, steel pole construction) and 0.5 miles of distribution under build.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Trunk 2308 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviate thermal loading violations, and the possibility of shedding customer load during a single contingency event. • New equipment ratings lower the percent of capacity utilized by the current system loading. • Replace 3/0 ACSR wire that is prone to failures that result in wire down events. • Improve system shutdown capability and operability						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x		

(a)	(b)			
Program:	Subtransmission Redesign & Rebuild: Trunk 2308 (Pg. 4 of 4)			
Current Projects:	Subtransmission Redesign & Rebuild: Trunk 2308			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $1.9 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~1,186~~	~~1,186~~
	~~Material~~	~~-~~	~~237~~	~~237~~
	~~Other~~	~~-~~	~~158~~	~~158~~
	~~**Total**~~	~~**-**~~	~~**1,582**~~	~~**1,582**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	-	1,028	1,028
	Material	-	395	395
	Other	-	158	158
	Total	**-**	**1,582**	**1,582**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 1568 (Pg. 1 of 4)
Purpose and Necessity:	TIE 1568 B-C section is at 99% (8.7 MVA over the allowable load) of the Summer Emergency rating upon the contingency event of breaker operation on the Noble-Superior 120kV transmission line. There is an Emergency Load Control scheme at CROWN substation that will automatically shed load (10.1 MVA) to protect from overloading equipment and causing damage for a single contingency event. Distribution Design Order-0090-013 (Subtransmission Loading Criteria Violations): Allowable summer normal configuration (day to day) loading on subtransmission equipment is 100% and summer emergency loading on subtransmission equipment is 90%. Distribution Design Order-0040-003 (Substation Blocking): Substation Load blocking schemes are not acceptable
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 1568 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 23
DGP Section:	11.2
Scope:	• Install 0.2 miles of 650EPR cable on CROWN tap. • Remove 0.2 miles of existing TIE 1568 500CU cable. • Replace existing Cable Pole 1 with steel pole.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Tie 1568 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviate thermal loading violations, and the possibility of shedding customer load during a single contingency event. • New equipment ratings lower the percent of capacity utilized by the current system loading. • Improve system shutdown capability and operability.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x		

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 1568 (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Tie 1568
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $0.9 M

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~6~~	~~539~~	~~545~~
	~~Material~~	~~1~~	~~108~~	~~109~~
	~~Other~~	~~1~~	~~72~~	~~73~~
	~~**Total**~~	~~**8**~~	~~**718**~~	~~**726**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	7	488	495
	Material	-	158	158
	Other	1	72	73
	Total	**8**	**718**	**726**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 4217 (Pg. 1 of 4)
Purpose and Necessity:	TRK 4217 is at 123% (4.3 MVA over the allowable load) of the Summer Normal rating. TRK 4217 is at 116% (3.5 MVA over the allowable load) of the Summer Emergency rating upon the contingency event of breaker operation on TRK 4210. TRK 4217 is at 103% (2.3 MVA over the allowable load) of the Summer Emergency rating upon the contingency event of breaker operation on TRK 4218. TRK 4217 is at 100% (2.3 MVA over the allowable load) of the Summer Emergency rating upon the contingency event of breaker operation on TRK 1633. There is an Emergency Load Control scheme at GRPTE and VERNR substations that will automatically shed load (3.5 MVA) to protect from overloading equipment and causing damage for a single contingency event. Distribution Design Order-0090-013 (Subtransmission Loading Criteria Violations): Allowable summer normal configuration (day to day) loading on subtransmission equipment is 100% and summer emergency loading on subtransmission equipment is 90%. Distribution Design Order-0040-003 (Substation Blocking): Substation Load blocking schemes are not acceptable
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 4217 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 24
DGP Section:	11.2
Scope:	• At ERIN station install a new 40kV, 2000A breaker and two 40kV, 1200A disconnects for new station position. • Install 2.1 miles of 650EPR cable from new station position to manhole 14768. • Remove 2.1 miles of existing TRK4217 500CU cable. • Replace VERNR transformer 3 secondary breaker and cable terminations.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Trunk 4217 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviate thermal loading violations, and the possibility of shedding customer load during a single contingency event. • New equipment ratings lower the percent of capacity utilized by the current system loading. • Improve system shutdown capability and operability. • Reduced substation outage risk by replacing aging infrastructure.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x	x	x

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 4217 (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Trunk 4217
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $5.3 M

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~7~~	~~3,125~~	~~3,132~~
	~~Material~~	~~1~~	~~625~~	~~626~~
	~~Other~~	~~1~~	~~417~~	~~418~~
	~~**Total**~~	~~**9**~~	~~**4,167**~~	~~**4,176**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	6	2,917	2,923
	Material	2	833	835
	Other	1	417	418
	Total	**9**	**4,167**	**4,176**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 3509 (Pg. 1 of 4)
Purpose and Necessity:	TRK 3509 is at 100% (0 MVA over the allowable load) of the Summer Normal rating. TRK 3509 is at 109% (6.2 MVA over the allowable load) of the Summer Emergency rating upon the contingency event of breaker operation on TRK 3536. There is an Emergency Load Control scheme at PATON substation that will automatically shed load (4.1 MVA) to protect from overloading equipment and causing damage for a single contingency event. Distribution Design Order-0090-013 (Subtransmission Loading Criteria Violations): Allowable summer normal configuration (day to day) loading on subtransmission equipment is 100% and summer emergency loading on subtransmission equipment is 90%. Distribution Design Order-0040-003 (Substation Blocking): Substation Load blocking schemes are not acceptable
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 3509 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 25
DGP Section:	11.2
Scope:	• At TROY station install a new 40kV, 2000A breaker and two 40kV, 1200A disconnects for new station position. • Install 0.1 miles of 5-inch conduit. • Install 1.1 miles of 650 EPR from new station position to manhole 16357. • Install 0.1 miles of 650 EPR from manhole 16357 to cable pole 5. • Install 0.1 miles of 650 EPR from manhole 16357 to manhole 16358. • Remove 1.3 miles of existing TRK3509 750CU cable.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Trunk 3509 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviate thermal loading violations, and the possibility of shedding customer load during a single contingency event. • New equipment ratings lower the percent of capacity utilized by the current system loading. • Improve system shutdown capability and operability. • Improved reliability by reducing total circuit length.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x			

(a)	(b)			
Program:	Subtransmission Redesign & Rebuild: Trunk 3509 (Pg. 4 of 4)			
Current Projects:	Subtransmission Redesign & Rebuild: Trunk 3509			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $1.6 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~8~~	~~940~~	~~947~~
	~~Material~~	~~2~~	~~188~~	~~189~~
	~~Other~~	~~1~~	~~125~~	~~126~~
	~~**Total**~~	~~**10**~~	~~**1,253**~~	~~**1,263**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	6	767	773
	Material	3	361	364
	Other	1	125	126
	Total	**10**	**1,253**	**1,263**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 4266 (Pg. 1 of 4)
Purpose and Necessity:	TRK 4266 is at 102% (4 MVA over the allowable load) of the Summer Normal rating. TRK 4266 is at 112% (5.8 MVA over the allowable load) of the Summer Emergency rating upon the contingency event of breaker operation on TRK 4227. There is an Emergency Load Control scheme at SAVOY substation that will automatically shed load (6.2 MVA) to protect from overloading equipment and causing damage for a single contingency event. Distribution Design Order-0090-013 (Subtransmission Loading Criteria Violations): Allowable summer normal configuration (day to day) loading on subtransmission equipment is 100% and summer emergency loading on subtransmission equipment is 90%. Distribution Design Order-0040-003 (Substation Blocking): Substation Load blocking schemes are not acceptable
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 4266 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 26
DGP Section:	11.2
Scope:	• Install 2.5 miles of 650 EPR cable to replace TRK4227 “A” cable, Bridge Main 066, SAVOY transformer 1 tap, and BAKER transformer 1 tap. • Remove1.3 miles of 500 CU cable. • Remove 1.2 miles of 750 CU cable.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Trunk 4266 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviate thermal loading violations, and the possibility of shedding customer load during a single contingency event. • New equipment ratings lower the percent of capacity utilized by the current system loading. • Improve system shutdown capability and operability.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x			

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 4266 (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Trunk 4266
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $3.8 M

~~**Test Year ($000's):**~~

	~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
~~Total Labor (DTE Electric & Contractors)~~	~~38~~	~~2,218~~	~~2,255~~
~~Material~~	~~8~~	~~444~~	~~451~~
~~Other~~	~~5~~	~~296~~	~~301~~
~~**Total**~~	~~**50**~~	~~**2,957**~~	~~**3,007**~~

Test Year ($000's):

	2 mos. 11/01/22 12/31/22	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
Total Labor (DTE Electric &	40	1,892	1,932
Material	5	769	774
Other	5	296	301
Total	**50**	**2,957**	**3,007**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Badax Transformer 102 Addition (Pg. 1 of 4)
Purpose and Necessity:	BADAX station serves approximately 16,700 customers and four tie lines. Upon the contingency event of breaker operation on BADAX Transformer 101, 60 voltage violations and three thermal violations. The system is at risk for these violations when total system load exceeds 80% of summer peak load.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Badax Transformer 102 Addition (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 27
DGP Section:	11.2
Scope:	• Extend BADAX 40 kV Bus 2 • Install one 120-40 kV 45/60/75 MVA Transformer 102 from ITC's Bus 102 to new 40 kV position on BADAX Bus 2 • Install one 120 kV S&C 2020 circuit switcher • Install new 40kV BADAX Bus 3 • Install (4) 40kV, 2000A breakers and two 1200A • Install (8) 40kV, 1200A disconnects on new 40kV • Install new 6.6 MVAR Cap 3 on Bus 3

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Badax Transformer 102 Addition (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviate thermal loading violations, and the possibility of shedding customer load during a single contingency event. • Alleviate voltage violations, and the possibility of shedding customer load during a single contingency event. • New equipment ratings lower the percent of capacity utilized by the current system loading. • Improve system shutdown capability and operability.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x		

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

Case No.: U-20836
Exhibit: A-23
Schedule: M5 Revised
Witness: S. G. Pfeuffer

(a)	(b)			
Program:	Subtransmission Redesign & Rebuild: Badax Transformer 102 Addition (Pg. 4 of 4)			
Current Projects:	Subtransmission Redesign & Rebuild: Badax Transformer 102 Addition			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $3.6 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~278~~	~~856~~	~~1,134~~
	~~Material~~	~~56~~	~~171~~	~~227~~
	~~Other~~	~~37~~	~~114~~	~~151~~
	~~**Total**~~	~~**370**~~	~~**1,141**~~	~~**1,512**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	160	493	653
	Material	173	534	708
	Other	37	114	151
	Total	**370**	**1,141**	**1,512**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 4245 (Pg. 1 of 4)
Purpose and Necessity:	TRK 4245 cable failed and is stuck in conduit under the bridge crossing over I-94. All three subtransmission feeds to SHORS substation utilize this conduit which no longer has any spare ducts. Any future cable failure in this conduit will result in a long outage and load shed (6.2 MVA) at SHORS. Distribution Design Order-0040-003 (Substation Blocking): Substation Load blocking schemes are not acceptable
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 4245 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 28
DGP Section:	11.2
Scope:	• Install 1,000 feet of new conduit (15-5" ducts) using directional drilling under I-94 • Install 1,800 feet of new 650 EPR cable for TRK 4245 • Remove 1,700 feet of 500 CU and 750 CU PLSJ cable

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Trunk 4245 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Eliminate risk of customers experiencing a long outage due to cable failure in a duct bank with no spare conduit. • Improve system shutdown capability and operability.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:				x	x	x	x

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 4245 (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Trunk 4245
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $4.6 M

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~38~~	~~2,680~~	~~2,717~~
	~~Material~~	~~8~~	~~536~~	~~543~~
	~~Other~~	~~5~~	~~357~~	~~362~~
	~~**Total**~~	~~**50**~~	~~**3,573**~~	~~**3,623**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	40	2,069	2,109
	Material	5	1,147	1,152
	Other	5	357	362
	Total	**50**	**3,573**	**3,623**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 6602 (Pg. 1 of 4)
Purpose and Necessity:	TIE 6602 is at 110% (3.5 MVA over the allowable load) of the Summer Emergency rating upon the contingency event of breaker operation on CVTRY TRF 301. TIE 6602 is at 107% (2.5 MVA over the allowable load) of the Summer Emergency rating upon the contingency event of breaker operation on LARK TRF 101. TIE 6602 is at 101% (0.4 MVA over the allowable load) of the Summer Emergency rating upon the contingency event of breaker operation at CHLSE and APTS 1713. There is an Emergency Load Control scheme at DIMND substation that will automatically shed load to protect from overloading equipment and causing damage for a single contingency event. Distribution Design Order-0090-013 (Subtransmission Loading Criteria Violations): Allowable summer normal configuration (day to day) loading on subtransmission equipment is 100% and summer emergency loading on subtransmission equipment is 90%. Distribution Design Order-0040-003 (Substation Blocking): Substation Load blocking schemes are not acceptable
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 6602 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 29
DGP Section:	11.2
Scope:	• Rebuild approximately 3.5 miles of 3/0 ACSR with 636 AL • Rebuild all under build distribution with new conductor

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Tie 6602 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviate thermal loading violations, and the possibility of shedding customer load during a single contingency event. • New equipment ratings lower the percent of capacity utilized by the current system loading. • Improve system shutdown capability and operability						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x		

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Tie 6602 (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Tie 6602
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $0.7 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~413~~	~~413~~
	~~Material~~	~~-~~	~~83~~	~~83~~
	~~Other~~	~~-~~	~~55~~	~~55~~
	~~**Total**~~	~~**-**~~	~~**550**~~	~~**550**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	-	151	151
	Material	-	344	344
	Other	-	55	55
	Total	**-**	**550**	**550**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 4911 (Pg. 1 of 4)
Purpose and Necessity:	TRK 4911 is at 108% of the Summer Emergency rating upon the contingency event of breaker operation on TRK 4962. TRK 4911 is at 108% of the Summer Emergency rating upon the contingency event of breaker operation on TRK 7913. There is an Emergency Load Control scheme at NBALT and CHEST substations that will automatically shed load (11.5 and 11.6 MVA respectively) to protect from overloading equipment and causing damage for a single contingency event. Low voltages at IRA - 87.8%, NBALT - 88.1%, COTTN - 89.4% upon single contingency Loss of TRK 4971. Low voltages at IRA - 89.69%, NBALT - 91.76%, COTTN - 89.96% upon single contingency loss of TRK 7913. Four more single contingency events result in low voltages for the same substations in the range of 90% - 91.7%. Distribution Design Order-0090-013 (Subtransmission Loading Criteria Violations): Allowable summer normal configuration (day to day) loading on subtransmission equipment is 100% and summer emergency loading on subtransmission equipment is 90%. Distribution Design Order-0040-003 (Substation Blocking): Substation Load blocking schemes are not acceptable
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 4911 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 30
DGP Section:	11.2
Scope:	• Reconductor 4.2 miles of 350AL with 636AL SW-ST (enhanced 40kV standard, armless, steel pole construction) and 4.2 miles of distribution under build. • Reconductor 2.5 miles of 3/0ACSR with 636AL SW-ST (enhanced 40kV standard, armless, steel pole construction) and 4.2 miles of distribution under build. • Install 9.0 miles of new 636AL SW-ST (enhanced 40kV standard, armless, steel pole construction) and replace distribution under build along route. • Install (1) 40kV, 2000A breakers and two 1200A • Install (2) 40kV, 1200A disconnects on new 40kV

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Trunk 4911 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviate thermal loading violations, and the possibility of shedding customer load during a single contingency event. • Alleviate voltage violations, and the possibility of shedding customer load during a single contingency event. • New equipment ratings lower the percent of capacity utilized by the current system loading. • Improve system shutdown capability and operability. • Replace 3/0 ACSR wire known for bad condition, that is prone to failures that result in wire down events.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x			x

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 4911 (Pg. 4 of 4)
Current Projects:	Sub transmission Redesign & Rebuild: Trunk 4911 Sub transmission Redesign & Rebuild: Trunk 4911 Voltage Correction
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $0.4 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~

	~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~279~~	~~279~~
~~Material~~	~~-~~	~~56~~	~~56~~
~~Other~~	~~-~~	~~37~~	~~37~~
~~**Total**~~	~~-~~	~~**373**~~	~~**373**~~

Test Year ($000's):

	2 mos. 11/01/22 12/31/22	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
Total Labor (DTE Electric &	-	224	224
Material	-	112	112
Other	-	37	37
Total	**-**	**373**	**373**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Custer Republic (Pg. 1 of 4)
Purpose and Necessity:	Republic transformer 3 is 71 years old and carrying no load. The breaker equipment at Custer positions RS and SN is 68 years old. Reconfiguring the trunk lines between Custer and Republic will allow these under-utilized assets to be decommissioned.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Custer Republic (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 31
DGP Section:	11.2
Scope:	• Decommission Republic transformer 3 • Reconfigure TRK1456 and TRK1470 to feed Republic transformer 1 and 2. • Decommission Custer position RS and SN • Decommission TRK 1459 • Replace relay panels at Custer position RM

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Custer Republic (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce substation outage risk by replacing aging infrastructure • Reduce O&M costs by removing under-utilized equipment						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:			x	x	x	x	x

(a)	(b)			
Program:	Subtransmission Redesign & Rebuild: Custer Republic (Pg. 4 of 4)			
Current Projects:	Subtransmission Redesign & Rebuild: Custer Republic			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $0.1 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~56~~	~~56~~
	~~Material~~	~~-~~	~~11~~	~~11~~
	~~Other~~	~~-~~	~~7~~	~~7~~
	~~**Total**~~	~~**-**~~	~~**74**~~	~~**74**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	-	67	67
	Material	-	-	-
	Other	-	7	7
	Total	**-**	**74**	**74**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Pigeon Area Improvement (Pg. 1 of 4)
Purpose and Necessity:	The Pigeon Area is in the North Western part of the Thumb. This area consists of multiple class B stations in series as well as undersized conductor which has resulted in multiple thermal and voltage violations. Upon contingency events load shed is required to restore voltage to usable levels for the customer and avoid overloads. • 15 unique thermal violations for single contingency. • 66 unique voltage violations for single contingency. • 14MVA load shed required to mitigate voltage violations. The majority of the overloaded conductor in this area is 3/0ASCR.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Pigeon Area Improvement (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 32
DGP Section:	11.2
Scope:	• Extend 120kV approximately 1 mile from COSMO to PIGON utilizing 954ACSR. • Install approximately 0.5 miles 120kV 954ACSR between COSMO and BADAX. • Install 120kV breaker at BADAX, along with associated disconnects, current transformers and relay panel. • Install 120kV one way switch at new tap to PIGON. • Install 60/80/100MVA 120-40kV transformer. • Install 120kV high side circuit switcher. • Install 40k transformer secondary breaker along with associated current transformers, disconnects and trainers. • Install new transformer relay panel. • Reconductor 17 miles of various conductor sizes with 636AL SW-ST (enhanced 40kV standard, armless, steel pole construction) and 17 miles of distribution under build.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Pigeon Area Improvement (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviate thermal loading violations, and the possibility of shedding customer load during a single contingency event. • 78% reduction in total # of thermal violations for the area. • Alleviate voltage violations, and the possibility of shedding customer load during a single contingency event. • 33% reduction in total # of voltage violations for the area. • New equipment ratings lower the percent of capacity utilized by the current system loading. • Improve system shutdown capability and operability. • Replace 3/0 ACSR wire known for bad condition, that is prone to failures that result in wire down events.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x			x		

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Pigeon Area Improvement (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Pigeon Area Improvement
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $3.6 M This project is expected to continue beyond 2023

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~58~~	~~1,929~~	~~1,988~~
	~~Material~~	~~12~~	~~386~~	~~398~~
	~~Other~~	~~8~~	~~257~~	~~265~~
	~~Total~~	**~~78~~**	**~~2,573~~**	**~~2,650~~**

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	66	617	683
	Material	4	1,698	1,702
	Other	8	257	265
	Total	**78**	**2,573**	**2,650**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 2443 (Pg. 1 of 4)
Purpose and Necessity:	The underground cable ‘E’ located on section D-F on TRK 2443 was observed to be loaded to 111% of its summer emergency thermal rating when the load of Angola substation thrown over to this circuit in an emergency scenario. The limiting element causing this overload scenario is 0.9 miles of 500 cooper underground cable. This scenario violates our Distribution Design Order-0090-013 (Subtransmission Loading Criteria) which states that allowable summer normal configuration (day to day) loading on subtransmission equipment is 100% and summer emergency loading on subtransmission equipment is 90%. The current potential load shed, to protect from overloading equipment and causing damage, for a single contingency event is 7 MVA affecting 1,879 customers.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 2443 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 33
DGP Section:	11.2
Scope:	• Replace existing 0.9 miles of 500 cooper underground cable (cable ‘E’) using new 650 copper underground cable on section D-F on TRK 2443. • Use existing 5" conduit from manhole 18055 to manhole 16856 (12 MHs).

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Trunk 2443 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	The overload on the underground cable ‘E’ on TRK 2443 section D-F will be eliminated. The newly rebuilt section will have summer emergency loading reduced from 111% to 54% with total emergency capacity increased from 30 MVA to 61 MVA.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x			

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 2443 (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Trunk 2443
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $0.1 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~78~~	~~78~~
	~~Material~~	~~-~~	~~16~~	~~16~~
	~~Other~~	~~-~~	~~10~~	~~10~~
	~~**Total**~~	~~**-**~~	~~**103**~~	~~**103**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	-	93	93
	Material	-	-	-
	Other	-	10	10
	Total	**-**	**103**	**103**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 5838 (Pg. 1 of 4)
Purpose and Necessity:	An overhead wire located on section A-B on TRK 5838 is loaded to 97% of its summer emergency thermal rating when an outage event occur on TRK 5817. The limiting element causing this overload scenario is 0.43 miles of 0 aluminum conductor overhead wire. This scenario violates our Distribution Design Order-0090-013 (Subtransmission Loading Criteria) which states that allowable summer normal configuration (day to day) loading on subtransmission equipment is 100% and summer emergency loading on subtransmission equipment is 90%.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 5838 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 34
DGP Section:	11.2
Scope:	Replace existing 0.43 miles (approximately) of 0 aluminum conductor and 1.57 miles (approximately) of 0 copper overhead wire with new 636 aluminum conductor, 3/0 aluminum conductor shield wire.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Trunk 5838 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	The overload on the overhead wire on TRK5838 A-B section will be eliminated. The section loading will be reduced from 97% to 68%.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x					

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 5838 (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Trunk 5838
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $0.2 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~111~~	~~111~~
	~~Material~~	~~-~~	~~22~~	~~22~~
	~~Other~~	~~-~~	~~15~~	~~15~~
	~~**Total**~~	~~-~~	~~**148**~~	~~**148**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	-	134	134
	Material	-	-	-
	Other	-	15	15
	Total	**-**	**148**	**148**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 2419 (Pg. 1 of 4)
Purpose and Necessity:	An underground cable located on section B-G on TRK 2419 is loaded to 97% of its summer emergency thermal rating when an outage event occur on TRK 2404. The limiting element causing this overload scenario is 0.32 miles of 350 cooper underground cable. This scenario violates our Distribution Design Order-0090-013 (Subtransmission Loading Criteria) which states that allowable summer normal configuration (day to day) loading on subtransmission equipment is 100% and summer emergency loading on subtransmission equipment is 90%.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Trunk 2419 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 35
DGP Section:	11.2
Scope:	• Replace existing 0.32 miles of 350 copper underground cable using new 600 copper underground cable on section B-G on TRK 2419. • Use existing 5" conduit from MH 14246 to MH 13938 (7 Manholes).

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Trunk 2419 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	The overload on the underground cable on TRK 2419 will be eliminated. The loading on section B-G will decrease from 97% to 58% of its summer emergency thermal rating. The circuit capacity on this section will increase from 14.5 MVA to 24.3 MVA.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x			

(a)	(b)			
Program:	Subtransmission Redesign & Rebuild: Trunk 2419 (Pg. 4 of 4)			
Current Projects:	Subtransmission Redesign & Rebuild: Trunk 2419			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $0.2 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~106~~	~~106~~
	~~Material~~	~~-~~	~~21~~	~~21~~
	~~Other~~	~~-~~	~~14~~	~~14~~
	~~**Total**~~	~~-~~	~~**141**~~	~~**141**~~
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	-	127	127
	Material	-	-	-
	Other	-	14	14
	Total	**-**	**141**	**141**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild : Small Projects & Reserve (Pg. 1 of 4)
Purpose and Necessity:	This category includes small projects aimed at addressing thermal overloads and voltage violations on the Subtransmission system. Circuits Identified violate Subtransmission Planning Criteria and Distribution Design Order-0090-013 or Distribution Design Order-0070-00.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild : Small Projects & Reserve (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 36
DGP Section:	11.2
Scope:	This category represents a blanket to address small and localized overload conditions and voltage violations on the Subtransmission system Individual project scope will be small, such as upgrade a relay panel, reconductor approximately 0.2 miles of overhead conductor, replace approximately 0.1 miles of cable, replace trainers, etc. Some examples identified for this program include: • TRK 2559 – Replace 0.003 miles of 350 Copper PLJ cable to eliminate thermal overload. • TIE 5611 – Replace Relay Panel at Neff • TRK 2508 – Replace 0.1 miles of 500 Copper PLJ cable to eliminate thermal overload • TRK 5127 – Replace 0.1 miles of 350 Copper PLJ cable to eliminate thermal overload.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild : Small Projects & Reserve (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Eliminate thermal loading violation of the Subtransmission Planning Criteria and Distribution Design Order-0090-013. • Eliminate customer low voltage events and violations of the Subtransmission Planning Criteria and Distribution Design Order-0070-008. • Prevent customer load shed for a single contingency event.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x		

(a)	(b)
Program:	Subtransmission Redesign & Rebuild : Small Projects & Reserve (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild : Small Projects & Reserve
Budget Basis:	• Blanket funding
Cost:	Estimated project spend in 2021-2023: $3.5 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~	~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~2,188~~	~~2,188~~
~~Material~~	~~-~~	~~438~~	~~438~~
~~Other~~	~~-~~	~~292~~	~~292~~
~~**Total**~~	~~-~~	~~**2,917**~~	~~**2,917**~~

Test Year ($000's):	**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
Total Labor (DTE Electric &	-	1,896	1,896
Material	-	788	788
Other	-	233	233
Total	**-**	**2,917**	**2,917**

(a)	(b)
Program:	Subtransmission Breaker Short Circuit Violations (Pg. 1 of 4)
Purpose and Necessity:	In 2020 Fault duties were evaluated at approximately 989 subtransmission breaker locations on the DTE Electric System. Momentary and Interrupting fault duties were determined for comparison to each breaker's capabilities. Twenty breakers could be exposed to fault currents higher than their interrupting ratings. Stations include: Badax, Elm, Erin, Evergreen, Lincoln, Milford, Northwest, and Red Run. Of these 20 breakers, 9 work orders were issued in 2020 under the breaker replacement program to upgrade these breakers.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Breaker Short Circuit Violations (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 37
DGP Section:	11.2
Scope:	• Erin: Replace breaker at position SA with 48PM31-20. • Evergreen: Install 1.5 ohm grounding device on EVRGN TRF 101, TRF 102, & TRF 103. • Lincoln: Replace breakers at positions RG & RP with 72PM44-20. • Northwest: Replace breaker at position RZ with ABB 72PM44-20. • Red Run: Replace breakers at position RI, RN, & RO with ABB 48PM31-20. • Include relay panel replacements with breaker replacements. • Temporary operating mitigations will be necessary to reduce the fault current these breakers are exposed to, to prevent breaker failure. The proposed temporary mitigations include: • Badax: Disable automatic reclosing on TIE 3416, TIE 3402, TIE 3417, & TIE 3410 to prevent testing of the line during permanent faults. • Elm: Open SB1-2, ERIN: Open SB2-3, EVRGN: Open SB3-4, need to evaluate the Evergreen Capacitors 1, 2, 4, & 6 ON / OFF switching times to ensure adequate voltage / Var flows on the 40kV & 120kV system depending on the system load. • Lincoln: TBD, MILFD: Disable automatic reclosing on TIE 6117 & TIE 6147 to prevent testing of the line during permanent faults. • Northwest: Open SB2-3, REDRN: Open SB1-2

(a)	(b)						
Program:	Subtransmission Breaker Short Circuit Violations (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Subtransmission breakers will not be exposed to faults they are not capable to interrupt based on the existing breaker's ratings. • Eliminate the possibility for a breaker failure at these locations. • Upgrade breakers and relay panels at these locations to meet current design standards.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x	x		x

(a)	(b)			
Program:	Subtransmission Breaker Short Circuit Violations (Pg. 4 of 4)			
Current Projects:	Subtransmission Breaker Short Circuit Violations			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $6.1 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~364~~	~~1,500~~	~~1,864~~
	~~Material~~	~~73~~	~~300~~	~~373~~
	~~Other~~	~~49~~	~~200~~	~~249~~
	~~**Total**~~	~~**486**~~	~~**2,000**~~	~~**2,486**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	325	1,340	1,665
	Material	121	500	621
	Other	39	160	199
	Total	**486**	**2,000**	**2,486**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Slocum (Pg. 1 of 4)
Purpose and Necessity:	The Trenton Channel Power Plant, including all outlying structures and buildings are planned for retirement in 2022 and subsequent demolition. TRK 1110, TRK 1116, TRK 1140 will be redesigned to remove all unused equipment.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Slocum (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 38
DGP Section:	11.2
Scope:	TRK 1116 Scope: • Decommission and remove approximately 0.8 miles of 40kV overhead conductor from Slocum tap to system service 71 transformer. • Decommission and remove approximately 0.41 miles of 24kV underground cable from cable pole 1 to system service 60 transformer. • Decommission and remove pole top switch (PTS) 542 and pole top switch (PTS) 556. • Decommission and remove cable pole 1 and fuse on cable pole 1. TRK 1140 Scope (will be decommissioned): • Decommission and remove TRK 1140. • Decommission and remove approximately 2,530 feet of 24kV 350 paper and lead cable from Slocum position RF to system service 62 pothead at Trenton Channel Power Plant. SLOCM Station Scope: • Remove section breaker 1-2 and tie bus 1 and bus 2. • Jumper both busses together after removed of section breaker. • Remove disconnect switch at position RH. • Install 150 feet of 3x4-5" duct.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: Slocum (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	The redesign of the subtransmission circuits will help improve the reliability by eliminating unnecessary exposure to potential outages in the electric system and by removing unused aging infrastructure. The removal of unused underground cables will also free up underground ducts that can be used for future projects in the area.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x		

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: Slocum (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: Slocum
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $2.2 M

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~63~~	~~1,088~~	~~1,150~~
	~~Material~~	~~13~~	~~218~~	~~230~~
	~~Other~~	~~8~~	~~145~~	~~153~~
	~~**Total**~~	~~**83**~~	~~**1,450**~~	~~**1,533**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	75	1,160	1,235
	Material	-	145	145
	Other	8	145	153
	Total	**83**	**1,450**	**1,533**

(a)	(b)
Program:	Station Upgrade: Cortland Station Expansion (Pg. 1 of 4)
Purpose and Necessity:	In the event of a transformer failure at Cortland, removing and replacing a failed transformer would take an excessive amount of time due to the station configuration which puts the customers served from the station at risk (approximately 115 MVA, 49,255 customers & two industrial customers). The station currently posses' physical restrictions that will not allow the installation of new equipment following current design standards.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Station Upgrade: Cortland Station Expansion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 39
DGP Section:	11.2
Scope:	• Install two new 120-24 kV TRF 104 and TRF 105 to replace existing Cortland transformers 101 and 102 on property adjacent to Cortland Station with provisions to relocate Cortland TRF 103 on new property at a future date. • Install two S&C 2020 120kV circuit switchers • Install approximately 300 feet of 3x4 5" conduit from transformer 104 to 24kV position RJ • Install approximately 300 feet of 24kV secondary cable from transformer 104 to 24kV position RJ • Install approximately 300 feet of 3x4 5" conduit from transformer 105 to Cortland position SJ • Install approximately 300 feet of 24kV secondary cable from transformer 105 to Cortland position SJ

(a)	(b)						
Program:	Station Upgrade: Cortland Station Expansion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	Significantly reduce the risk of losing approx. 49,255 customers & two industrial substations in Highland Park and Detroit served from Cortland transformer 101, 102, and 103.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x		x

(a)	(b)			
Program:	Station Upgrade: Cortland Station Expansion (Pg. 4 of 4)			
Current Projects:	Station Upgrade: Cortland Station Expansion			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $9.4 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~236~~	~~3,972~~	~~4,208~~
	~~Material~~	~~47~~	~~794~~	~~842~~
	~~Other~~	~~31~~	~~530~~	~~561~~
	~~**Total**~~	~~**314**~~	~~**5,296**~~	~~**5,610**~~
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	165	2,780	2,945
	Material	118	1,986	2,104
	Other	31	530	561
	Total	**314**	**5,296**	**5,610**

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: 40kV Capacitor Banks at Armada and Adair (Pg. 1 of 4)
Purpose and Necessity:	TIE 810 is a three ended tie line consisting of 50 miles of overhead lines serving 10 substations. Low voltages are currently seen on this circuit due to significant circuit mileage and load. This work is necessary to maintain adequate voltage along TIE 810 for multiple emergency contingencies and to help facilitate shutdowns for the TIE 810 GRAMER project.
Category:	Infrastructure Redesign & Modernization

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: 40kV Capacitor Banks at Armada and Adair (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 40
DGP Section:	11.2
Scope:	Install a new 40kV 9.6MVAR capacitor bank at Adair substation: Install new control house, extend substation fence and a new 40kV 9.6MVAR capacitor bank at Armada substation.

(a)	(b)						
Program:	Subtransmission Redesign & Rebuild: 40kV Capacitor Banks at Armada and Adair (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	The voltage on the circuit will be improved increasing operational flexibility on TIE 810. This project will also help facilitate the circuit shutdowns needed to construct TIE 810 reconductoring project.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x			

(a)	(b)
Program:	Subtransmission Redesign & Rebuild: 40kV Capacitor Banks at Armada and Adair (Pg. 4 of 4)
Current Projects:	Subtransmission Redesign & Rebuild: 40kV Capacitor Banks at Armada and Adair
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $3.3 M

~~**Test Year ($000's):**~~

	~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
~~Total Labor (DTE Electric & Contractors)~~	~~284~~	~~-~~	~~284~~
~~Material~~	~~57~~	~~-~~	~~57~~
~~Other~~	~~38~~	~~-~~	~~38~~
~~**Total**~~	~~**378**~~	~~**-**~~	~~**378**~~

Test Year ($000's):

	2 mos. 11/01/22 12/31/22	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
Total Labor (DTE Electric &	246	-	246
Material	95	-	95
Other	38	-	38
Total	**378**	**-**	**378**

(a)	(b)
Program:	CODI: Charlotte Network Upgrade (Pg. 1 of 4)
Purpose and Necessity:	Charlotte substation is over 90 years old. A significant portion of the associated infrastructure (system cable, netbank transformers) are at end-of-life and unable to support potential load increases in the downtown area of Detroit.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	CODI: Charlotte Network Upgrade (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 41
DGP Section:	11.4
Scope:	• Convert and consolidate existing Charlotte 4.8kV Network to 13.2kV from Temple Substation • Transfer radial power line customers to adjacent substations • Eliminate network service in areas where it makes sense to provide a different method of service (i.e. URD, OH, etc.) • Decommission Charlotte substation

(a)	(b)						
Program:	CODI: Charlotte Network Upgrade (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide sufficient capacity to serve growing Detroit core downtown areas • Reduce network cable failures and improve manhole safety • Decommission aging infrastructure and reduce major event risk • Increase protection for the distribution system • Enhance grid technology and automation • Reduce new customer connection timeframe and cost						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)			
Program:	CODI: Charlotte Network Upgrade (Pg. 4 of 4)			
Current Projects:	CODI: Charlotte Network Upgrade			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $32.8 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~1,454~~	~~8,045~~	~~9,500~~
	~~Material~~	~~291~~	~~1,609~~	~~1,900~~
	~~Other~~	~~194~~	~~1,073~~	~~1,267~~
	~~**Total**~~	~~**1,939**~~	~~**10,727**~~	~~**12,666**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	1,202	6,651	7,853
	Material	543	3,004	3,547
	Other	194	1,073	1,267
	Total	**1,939**	**10,727**	**12,666**

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	CODI: Targeted Network Secondary Cable Replacement (Pg. 1 of 4)
Purpose and Necessity:	This cable program is designed to replace targeted 4.8 kV secondary network cable system in Detroit that have a higher probability of failure. This will reduce the secondary network cable failures and manhole events in downtown City of Detroit.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	CODI: Targeted Network Secondary Cable Replacement (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 42
DGP Section:	11.4
Scope:	• Replace targeted sections of the secondary network cable system that have a higher probability of failure

(a)	(b)						
Program:	CODI: Targeted Network Secondary Cable Replacement (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce secondary network cable failures and enhance manhole safety • Replace aging infrastructure and reduce major event risk • Enhance safety, reliability and power quality • Reduce reactive costs associated with secondary cable failures						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x	x	x

(a)	(b)
Program:	CODI: Targeted Network Secondary Cable Replacement (Pg. 4 of 4)
Current Projects:	CODI: Targeted Network Secondary Cable Replacement
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $6.9 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~231~~	~~2,375~~	~~2,606~~
	~~Material~~	~~46~~	~~475~~	~~521~~
	~~Other~~	~~31~~	~~317~~	~~348~~
	~~**Total**~~	~~**308**~~	~~**3,167**~~	~~**3,475**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	207	2,122	2,328
	Material	71	728	799
	Other	31	317	348
	Total	**308**	**3,167**	**3,475**

(a)	(b)
Program:	CODI: Corktown Substation (Pg. 1 of 4)
Purpose and Necessity:	Corktown is a general purpose substation that was proposed as part of the CODI upgrade to provide capacity needed to serve fast growing Detroit core downtown areas. This substation will also help consolidate, convert and eliminate the 4.8 kV distribution and 24 kV subtransmission system in the Corktown/West River Front area. A significant portion of the associated infrastructure (system cable/conductor, circuit breakers,) are at end-of-life.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	CODI: Corktown Substation (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 43
DGP Section:	11.4
Scope:	• Install a 120/13.2 kV Class 'A' general purpose substation with two 24/32/40MVA transformers • Install one twelve position switchgear • Install two capacitor banks • Install two circuit breakers • Install two house service transformers • Install 400 feet of 9-5" concrete encased duct bank • Install four three-way manholes • Two (2) duct break-ins (1-labrosse & 1-Porter) • Misc. costs (manhole/duct break-in, permit fees, traffic control, etc.) • Install fiber optic cable between Corktown and downtown complex

(a)	(b)					
Program:	CODI: Corktown Substation (Pg. 3 of 4)					
Customer benefit / Effect on cost of operation and reliability:	• Provide sufficient capacity needed to serve fast growing Detroit core downtown areas • Provide load relief for existing and new customers • Provide sufficient capacity to serve fast growing Detroit core downtown areas • Decommission aging infrastructure and reduce major event risk • Enhance safety, reliability and power quality for upgraded circuits - approximately 90% reduction in circuit wire down events - approximately 85% reduction in circuit customer interruptions - approximately 85% reduction in circuit customer minute interruptions • Reduce trouble events and reactive costs for upgraded circuits - approximately 80% reduction in circuit tree related reactive capital - approximately 90% reduction in circuit non-tree related reactive capital • Increase protection & sectionalizing capabilities for the distribution system • Enhance grid technology and automaton, including DER integration, SCADA capabilities , and fault detection/location					
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x		

(a)	(b)
Program:	CODI: Corktown Substation (Pg. 4 of 4)
Current Projects:	CODI: Corktown Substation
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $14.1 M

~~**Test Year ($000's):**~~

	~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
~~Total Labor (DTE Electric & Contractors)~~	~~162~~	~~-~~	~~162~~
~~Material~~	~~32~~	~~-~~	~~32~~
~~Other~~	~~22~~	~~-~~	~~22~~
~~**Total**~~	~~**216**~~	~~**-**~~	~~**216**~~

Test Year ($000's):

	2 mos. 11/01/22 12/31/22	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
Total Labor (DTE Electric &	93	-	93
Material	102	-	102
Other	22	-	22
Total	**216**	**-**	**216**

(a)	(b)
Program:	CODI: Islandview Substation (Pg. 1 of 4)
Purpose and Necessity:	New customer load has been added along the Detroit riverfront and additional development is anticipated in the future. The new substation is to be sited east of downtown Detroit near the riverfront and allow for the decommissioning of Walker substation and half of Pulford substation. Both Pulford and Walker substations have been in service since the 1920's and cannot reliably serve new load. The new substation will also provide capacity to serve customers being transitioned from the Detroit Public Lighting Department system to the DTE Electric system.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	CODI: Islandview Substation (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 44
DGP Section:	11.4
Scope:	• Construct a new Class 'A' 13.2 kV substation with two transformers and a setup for a future third transformer position • Pre-Convert existing 4.8 kV circuits from Walker Substation - 22 circuits • Pre-Convert existing 4.8 kV circuits from Pulford Substation - 10 circuits • Convert and transfer WALKR and PULFD circuits to new substation • Decommission cable for four trunk lines (24 kV) • Decommission WALKR Substation

(a)	(b)						
Program:	CODI: Islandview Substation (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide sufficient capacity to serve growing areas • Decommission aging infrastructure and reduce major event risk • Enhance safety, reliability and power quality for upgraded circuits by reducing 85% of circuit wire down events, customer interruptions, and customer minutes • Reduce trouble events and reactive costs for upgraded circuits by 85% for both circuit tree related and non-tree related reactive capital • Increase protection for the distribution system • Enhance grid technology and automation • Reduce new customer connection timeframe and cost						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)
Program:	CODI: Islandview Substation (Pg. 4 of 4)
Current Projects:	CODI: Islandview Substation
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $42.4 M This project is expected to continue beyond 2023

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~2,000~~	~~15,715~~	~~17,715~~
	~~Material~~	~~400~~	~~3,143~~	~~3,543~~
	~~Other~~	~~267~~	~~2,095~~	~~2,362~~
	~~**Total**~~	~~**2,667**~~	~~**20,954**~~	~~**23,621**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	1,787	14,458	16,245
	Material	613	4,400	5,014
	Other	267	2,095	2,362
	Total	**2,667**	**20,954**	**23,621**

(a)	(b)
Program:	CODI: CATO Substation Expansion (Pg. 1 of 4)
Purpose and Necessity:	CATO is a 2 transformer Class 'A' general purpose substation that serves downtown Detroit New Center and Midtown areas and is currently 74% of its firm rating. Future load will cause the substation to exceed its firm rating. Reliability issues have been identified due to only two underground 120kV lines feeding the substation causing planned switching for customers during ITC work and extensive contingency plans.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	CODI: CATO Substation Expansion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 45
DGP Section:	11.4
Scope:	• Expand CATO substation building to accept a third 120kV line and space on the second floor for third 13.2kV transformer and second 13.2kV PDC • Install a third 120/13.2 kV 24/32/40 MVA transformer • Install a second 12 position 13.2kV PDC and 13.2kV cap bank • Transfer existing 13.2kV circuit to new PDC • Replace the existing PDC and transfer four 13.2kV circuits to the replaced PDC • Install SCADA on 4.8kV transformers and PDC

(a)	(b)						
Program:	CODI: CATO Substation Expansion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Eliminate need for contingency planning during ITC work on 120kV lines feeding CATO sub and reduced substation outage risk • Sufficient capacity needed to serve fast growing Detroit core downtown areas • Provide load relief for existing and new customers • Decommission aging infrastructure and reduce major event risk • Enhance safety, reliability and power quality for upgraded circuits						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x		

(a)	(b)
Program:	CODI: CATO Substation Expansion (Pg. 4 of 4)
Current Projects:	CODI: CATO Substation Expansion
Budget Basis:	• Engineering estimate
Cost:	Estimated project spend in 2021-2023: $11.1 M This project is expected to continue beyond 2023

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~81~~	~~6,505~~	~~6,586~~
	~~Material~~	~~16~~	~~1,301~~	~~1,317~~
	~~Other~~	~~11~~	~~867~~	~~878~~
	~~**Total**~~	~~**108**~~	~~**8,673**~~	~~**8,782**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	98	4,684	4,781
	Material	-	3,122	3,122
	Other	11	867	878
	Total	**108**	**8,673**	**8,782**

(a)	(b)
Program:	CODI: Howard Conversion (Pg. 1 of 4)
Purpose and Necessity:	Howard is a 4.8 kV substation commissioned in 1930 and has aging equipment that is at end of life. Aging equipment such as oil breakers hold higher risk of failure, potentially causing extensive outages. In order to provide sufficient capacity to serve the growing Detroit areas and improve reliability and power quality, this substation will be converted and consolidated to the new 13.2 kV Corktown substation.
Category:	Infrastructure Redesign & Modernization

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	CODI: Howard Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 46
DGP Section:	11.4
Scope:	• Rebuild 6 miles of network feeder cable • Rebuild 12 miles of radial powerline system cable • Replace or remove 89 netbank transformers • Convert 26 primary customers from 4.8kV to 13.2kV • Convert 3 miles of overhead from 4.8kV to 13.2kV • Convert and consolidate the circuits to 13.2 kV fed by Corktown, Temple, St. Antoine, and Cato substations • Decommission Howard substation

(a)	(b)						
Program:	CODI: Howard Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce network cable failures and improve manhole safety • Decommission aging infrastructure and reduce major event risk • Enhance safety, reliability and power quality for upgraded circuits • Reduce trouble events and reactive costs for upgraded circuits • Approximately 90% reduction in circuit non-tree related reactive capital • Increase protection for the distribution system • Reduce new customer connection timeframe and cost of completing this project. • Increase protection & sectionalizing capabilities for the distribution system • Enhance grid technology and automaton, including DER integration, SCADA capabilities , and fault detection/location						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)			
Program:	CODI: Howard Conversion (Pg. 4 of 4)			
Current Projects:	CODI: Howard Conversion			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $0.7 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~438~~	~~438~~
	~~Material~~	~~-~~	~~88~~	~~88~~
	~~Other~~	~~-~~	~~58~~	~~58~~
	~~**Total**~~	~~**-**~~	~~**583**~~	~~**583**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	-	525	525
	Material	-	-	-
	Other	-	58	58
	Total	**-**	**583**	**583**

(a)	(b)
Program:	CODI: Midtown Substation Expansion (Pg. 1 of 4)
Purpose and Necessity:	Midtown (MIDTN) is a 2 transformer Class 'A' general purpose substation constructed in 1973 that serves downtown Detroit New Center and Midtown areas and is currently 81% of firm. MIDTN's current configuration cannot support approximately 20MVA of future known load growth. Without any substation work, this will take the substation to 146% of firm, excluding CODI conversions.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	CODI: Midtown Substation Expansion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 9, Line 47
DGP Section:	11.4
Scope:	• Install a third 120/13.2kV 24/32/40MVA transformer • Install 12 position switchgear • Install (2) capacitors • Install ~1,300 feet of 15-5” concrete encased duct bank • Install (7) new three-way manholes • Misc. costs (manhole/duct break-in, permit fees, traffic control, etc.)

(a)	(b)						
Program:	CODI: Midtown Substation Expansion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide sufficient capacity needed to serve fast growing Detroit core downtown areas • Provide load relief for existing and new customers • Increase SCADA capabilities at Midtown substation						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x			x		

(a)	(b)
Program:	CODI: Midtown Substation Expansion (Pg. 4 of 4)
Current Projects:	CODI: Midtown Substation Expansion
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $9.5 M

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~376~~	~~-~~	~~376~~
	~~Material~~	~~75~~	~~-~~	~~75~~
	~~Other~~	~~50~~	~~-~~	~~50~~
	~~Total~~	**~~502~~**	**~~-~~**	**~~502~~**

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	426	-	426
	Material	25	-	25
	Other	50	-	50
	Total	**502**	**-**	**502**

(a)	(b)
Program:	CODI: Alfred Substation Expansion (Pg. 1 of 4)
Purpose and Necessity:	Alfred (ALFRD) is a 2 transformer Class 'A' general purpose substation constructed in 1968 that serves Detroit's Central Business District and East Riverfront Areas. ALFRD's current configuration cannot support the 9MVA of known future load and the anticipated 9MVA load in Eastern Market's Core Development. Doing so would take the substation to 153% of firm, excluding CODI conversions.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	CODI: Alfred Substation Expansion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 48
DGP Section:	11.4
Scope:	• Install a third 120/13.2kV 24/32/40MVA transformer • Install 12 position switchgear • Install (2) capacitors • Install ~1,300 feet of 15-5” concrete encased duct bank • Install (7) New three-way manholes • Misc. costs (manhole/duct break-in, permit fees, traffic control, etc.)

(a)	(b)						
Program:	CODI: Alfred Substation Expansion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide sufficient capacity needed to serve fast growing Detroit core downtown areas • Provide load relief for existing and new customers • Increase SCADA capabilities at Alfred substation						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x			x		

(a)	(b)			
Program:	CODI: Alfred Substation Expansion (Pg. 4 of 4)			
Current Projects:	CODI: Alfred Substation Expansion			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $9.5 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~951~~	~~883~~	~~1,834~~
	~~Material~~	~~190~~	~~177~~	~~367~~
	~~Other~~	~~127~~	~~118~~	~~245~~
	~~**Total**~~	~~**1,268**~~	~~**1,178**~~	~~**2,446**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	652	838	1,490
	Material	489	221	711
	Other	127	118	245
	Total	**1,268**	**1,178**	**2,446**

(a)	(b)
Program:	CODI: Garfield Network Upgrade (Pg. 1 of 4)
Purpose and Necessity:	Garfield substation is a 4.8 kV substation that is over 90 years old. It serves the Eastern Market, Forest Park and parts of Art Center and Midtown. Due to its aging infrastructure and loading limitations, it is unable to provide sufficient capacity to serve potential developments in the City of Detroit. Garfield substation is to be decommissioned and its circuits converted to the newly constructed Stone Pool 13.2 kV substation.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	CODI: Garfield Network Upgrade (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 49
DGP Section:	11.4
Scope:	• Replace 36 miles of network feeder cable • Replace or remove 78 netbank transformers • Convert 26 primary customers from 4.8 kV to 13.2 kV • Convert 24 miles of overhead from 4.8 kV to 13.2 kV • Convert and consolidate the circuits to 13.2 kV fed by Stone Pool substation • Decommission Garfield substation

(a)	(b)						
Program:	CODI: Garfield Network Upgrade (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide sufficient capacity to serve growing Detroit core downtown areas • Reduce network cable failures and improve manhole safety • Decommission aging infrastructure and reduce major event risk • Enhance safety, reliability and power quality for upgraded circuits by reducing 85% of circuit wire down events, customer interruptions, and customer minutes • Reduce trouble events and reactive costs for upgraded circuits by 85% for both circuit tree related and non-tree related reactive capital • Increase protection for the distribution system • Enhance grid technology and automation • Reduce new customer connection timeframe and cost						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)
Program:	CODI: Garfield Network Upgrade (Pg. 4 of 4)
Current Projects:	CODI: Garfield Network Upgrade
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $54.10 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~1,875~~	~~18,750~~	~~20,625~~
	~~Material~~	~~375~~	~~3,750~~	~~4,125~~
	~~Other~~	~~250~~	~~2,500~~	~~2,750~~
	~~**Total**~~	~~**2,500**~~	~~**25,000**~~	~~**27,500**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	1,750	14,500	16,250
	Material	500	8,000	8,500
	Other	250	2,500	2,750
	Total	**2,500**	**25,000**	**27,500**

(a)	(b)
Program:	CODI: Kent/Gibson Conversion (Pg. 1 of 4)
Purpose and Necessity:	Kent substation was built in 1958 and Gibson substation was built in 1927. Both have reached end of life. Kent and Gibson substations have limited capacity and are unable to support strong load growth in downtown Detroit.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	CODI: Kent/Gibson Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 50
DGP Section:	11.4
Scope:	Kent Substation • Rebuild 6 miles of radial powerline system cable • Convert one primary customer from 4.8 kV to 13.2 kV • Convert 7 miles of overhead from 4.8 kV to 13.2 kV • Convert and consolidate the circuits to 13.2 kV fed by Corktown substation • Decommission and remove 11,000 feet of 4.8 kV cable • Remove six 4.8 kV breakers and decommission Kent substation Gibson Substation • Rebuild 10 miles of radial powerline system cable • Convert 22 miles of overhead from 4.8 kV to 13.2 kV • Convert and consolidate the circuits to 13.2 kV fed by Corktown substation • Decommission and remove 21,000 feet of 4.8 kV cable • Remove eight 4.8 kV breakers and decommission Gibson substation • Removal of 24kV cables and equipment

(a)	(b)						
Program:	CODI: Kent/Gibson Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce substation outage risk by replacing aging infrastructure • Enhance safety, reliability, and power quality • Provide sufficient capacity to serve existing and new customer load						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)
Program:	CODI: Kent/Gibson Conversion (Pg. 4 of 4)
Current Projects:	CODI: Kent/Gibson Conversion
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $16.1 M This project is expected to continue beyond 2023

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~875~~	~~5,547~~	~~6,422~~
	~~Material~~	~~175~~	~~1,109~~	~~1,284~~
	~~Other~~	~~117~~	~~740~~	~~856~~
	~~**Total**~~	~~**1,167**~~	~~**7,396**~~	~~**8,563**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	700	4,438	5,138
	Material	350	2,219	2,569
	Other	117	740	856
	Total	**1,167**	**7,396**	**8,563**

(a)	(b)
Program:	4.8 kV CC: Hilton Substation and Circuit Conversion (Pg. 1 of 4)
Purpose and Necessity:	Both Ferndale and Hazel Park substations are 60-90 years old and represent a significant reliability and reputational risk. Both substations are significantly over their firm ratings. A large portion of the underlying assets are considered "at risk" due to both age and persistent overloads. There are limited options to restore customers in the event of a major equipment failure.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: Hilton Substation and Circuit Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 51
DGP Section:	11.3
Scope:	• Construct a two transformer 24/32/40 MVA 13.2 kV Class 'A' substation • Project completion entails construction of a modern 13.2kV infrastructure and removal of the old 5kV class infrastructure • Rebuild and convert ten existing 4.8 kV circuits (37 miles of overhead) into four 13.2 kV circuits • This is phase one of a two phase project to fully decommission Ferndale and Hazel Park substations - Phase two will convert the remaining circuits out of Ferndale and Hazel Park to 13.2kV and decommission the substations

(a)	(b)						
Program:	4.8 kV CC: Hilton Substation and Circuit Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviates the loading issue on Ferndale and Hazel Park substations, leading to: - Elimination of loading related safety risks - Improved reliability - Reduction of long duration outage risks - Reduced O&M and Capital expenses • Elimination of aging OH infrastructure, leading to: - Improved reliability - Fewer truck roles - Reduced Capital expenses - Reduced O&M expenses • Reduce new customer connection timeframe and cost						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)			
Program:	4.8 kV CC: Hilton Substation and Circuit Conversion (Pg. 4 of 4)			
Current Projects:	4.8 kV CC: Hilton Substation and Circuit Conversion			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.1 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

(a)	(b)
Program:	4.8 kV CC: Zenon Substation and Circuit Conversion (Pg. 1 of 4)
Purpose and Necessity:	McKinstry is an antiquated substation with much of the equipment beyond normal service life and with unavailable replacement or spare parts. A large portion of the underlying assets are considered "at risk" due to age. The infrastructure is experiencing more frequent planned and trouble related outages, both of which reduces system availability, reliability, and customer satisfaction.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: Zenon Substation and Circuit Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 52
DGP Section:	11.3
Scope:	• Construct a two 24/32/40 MVA transformer 4.8 kV & 13.2 kV Class 'A' substation • Project completion entails construction of a modern 13.2kV infrastructure and removal of the old 5kV class infrastructure • Convert nine 4.8kV circuits to four 13.2kV circuits and transfer the remaining four 4.8kV circuits to Zenon • This is phase one of a three phase project - Phase two will decommission McKinstry Substation - Phase three will convert the remaining four 4.8kV Zenon ckts to 13.2kV

(a)	(b)						
Program:	4.8 kV CC: Zenon Substation and Circuit Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Elimination of aging OH infrastructure, leading to: - Improved reliability - Fewer truck roles - Reduced Capital expenses - Reduced O&M expenses • Removal of antiquated substation equipment at McKinstry leading to: - Elimination of safety risks - Improved reliability - Reduction of long duration outage risks - Reduced equipment to be maintained - Reduced O&M and Capital expenses						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x			

(a)	(b)
Program:	4.8 kV CC: Zenon Substation and Circuit Conversion (Pg. 4 of 4)
Current Projects:	4.8 kV CC: Zenon Substation and Circuit Conversion
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $0.0 M
Test Year ($000's):	

	2 mos. 11/01/22 12/31/22	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
Total Labor (DTE Electric & Contractors)	-	-	-
Material	-	-	-
Other	-	-	-
Total	**-**	**-**	**-**

(a)	(b)
Program:	4.8 kV CC: Cortland / Oakman / Linwood Consolidation (Pg. 1 of 4)
Purpose and Necessity:	Linwood and Oakman substations, and their associated circuits, are significantly under loaded. To eliminate this underutilization, Linwood and Oakman substations will be decommissioned and their circuits will be consolidated into Cortland Substation. Cortland is a much newer 120kV fed substation and will provide a higher level of reliability. Consolidation of these substations; and subsequent removal of the associated breakers, system cable, regulators, and transformers; will eliminate the need for preventive maintenance on this equipment.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: Cortland / Oakman / Linwood Consolidation (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 53
DGP Section:	11.3
Scope:	• Consolidate Linwood & Oakman circuits into Cortland Substation • Remove twenty-seven breakers, cables and OH wire from the associated circuits, six induction regulators, and six substation transformers • Decommission Linwood and Oakman Substations

(a)	(b)						
Program:	4.8 kV CC: Cortland / Oakman / Linwood Consolidation (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Eliminating old cable, breakers, and transformers will: - Eliminate safety risks associated with the obsolete equipment - Reduce the overall substation outage risk - Avoid maintenance related O&M expenses - Reduce failure related O&M & Capital expenses • Transferring the load to a newer substation will: - Improve reliability • Eliminating overhead primary and secondary on circuits will: - Reduce truck rolls - Reduce O&M and Capital expenses						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)
Program:	4.8 kV CC: Cortland / Oakman / Linwood Consolidation (Pg. 4 of 4)
Current Projects:	4.8 kV CC: Cortland / Oakman / Linwood Consolidation
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $4.3 M

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~356~~	~~-~~	~~356~~
	~~Material~~	~~71~~	~~-~~	~~71~~
	~~Other~~	~~48~~	~~-~~	~~48~~
	~~**Total**~~	~~**475**~~	~~**-**~~	~~**475**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	333	-	333
	Material	95	-	95
	Other	48	-	48
	Total	**475**	**-**	**475**

(a)	(b)
Program:	4.8 kV CC: Ariel Substation and Circuit Conversion (Pg. 1 of 4)
Purpose and Necessity:	BIHAM is a one line-up switchgear substation (exposed to 26.8 MVA of stranded load) neighboring a smaller heavily loaded DUDLY substation. This project is in progress to complete conversion and transfer load of BIHAM and DUDLY circuits to new ARIEL overhead circuits (DC 9893, DC 9815) and underground (DC 9879) ARIEL circuits.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: Ariel Substation and Circuit Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 54
DGP Section:	11.3
Scope:	• Completed overhead conversion and transfer of 3.1 MVA of load (from PL 0487 and 0141 Dudley to distribution DC 9893 Ariel) • Complete underground conversion and transfer of 4.3 MVA of load (from DC 2734, 2720, and 1867 Birmingham to DC 9879 Ariel) • Removal of 4.8 kV cables (DC 2665 and 2734 Birmingham, DC 1669, 1650, 0487, and 0141 Dudley) from converted 13.2KV system area - 2.4 miles of 4.8 kV system cables • Project completion entails construction of a modern 13.2kV infrastructure and removal of the old 5kV class infrastructure

(a)	(b)					
Program:	4.8 kV CC: Ariel Substation and Circuit Conversion (Pg. 3 of 4)					
Customer benefit / Effect on cost of operation and reliability:	• Commercial load (east of Old Woodward) continuous expansion to be reliably served by new Ariel substation • BIHAM load to be reduced from 98% to 78% firm • DUDLY 4.8KV load to be reduced from 89% to 43% firm - This firm reduction will decrease the potential stranded load and risk of a major event at both substations • Fewer truck roles due to elimination of aging OH infrastructure, leading to: - Improved reliability - Reduced Capital expenses - Reduced O&M expenses • Reduce new customer connection timeframe and cost					
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x			x		

(a)	(b)			
Program:	4.8 kV CC: Ariel Substation and Circuit Conversion (Pg. 4 of 4)			
Current Projects:	4.8 kV CC: Ariel Substation and Circuit Conversion			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.9 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

(a)	(b)
Program:	4.8 kV CC: I-94 Substation and Circuit Conversion (Pg. 1 of 4)
Purpose and Necessity:	The Detroit Economic Growth Corporation (DEGC) has assembled the I-94 Industrial Park site – a 186-acre site north of I-94 between Mt. Elliott and Van Dyke on Detroit's east side. It is part of the 3,203-acre Mt. Elliot Development Zone, which is the single largest industrial district in Detroit and encompasses automotive, metal, transportation and logistics clusters. It offers access to major transportation assets. The site is a federally designated Historically Underutilized Business (HUB) Zone and a state designated Renaissance Zone. Recent new loads were fed from the aging Lynch and Lambert 4.8 kV substations. These substations have little capacity for additional load, have limited throw-over and jumpering options and cannot reliably serve the new load coming to the I-94 industrial park. The new substation is required to serve the load growth in and around I-94 industrial park and allows for decommissioning of the aging Lynch, Lambert, and Pulford 4.8 kV substations. Recent new loads were fed from the aging Lynch and Lambert 4.8 kV substations. These substations have little capacity for additional load, have limited throw-over and jumpering options and cannot reliably serve the new load coming to the I-94 industrial park. The new substation is required to serve the load growth in and around I-94 industrial park and allows for decommissioning of the aging Lynch and Lambert 4.8 kV substations.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: I-94 Substation and Circuit Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 55
DGP Section:	11.3
Scope:	• Project completion entails construction of a modern 13.2kV infrastructure and removal of the old 5kV class infrastructure • Construct a new Class 'A', two transformer, 12 position switchgear 13.2 kV substation with 2- capacitor banks with option to add third transformer, second set of switchgear, and one capacitor bank. • Convert 24 existing 4.8 kV circuits and three throw over circuits from Lynch, Lambert, and Pulford substations to 4-13.2 kV circuits with one throw over circuit. • Decommission Lynch (78 years old), Lambert (88 years old), and Pulford (88 years old) • Convert 112 miles of 4.8kV OH • Decommission 14.5 miles of 4.8kV cable • Decommission 31 miles of 24kV cable (trunk lines from Essex and NEAST) • Convert 40 primary service customers • Deconductor blighted areas The substation site prep and below grade is performed under a separate Promenade Site project

(a)	(b)						
Program:	4.8 kV CC: I-94 Substation and Circuit Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide sufficient capacity to serve new load growth and Economic Development • Elimination of aging OH infrastructure, leading to: - Improved reliability - Fewer truck roles - Reduced Capital expenses - Reduced O&M expenses • Removal of antiquated substation equipment leading to: - Elimination of safety risks - Improved reliability - Reduction of long duration outage risks - Reduced equipment to be maintained - Reduced O&M and Capital expenses • Reduce new customer connection timeframe and cost						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)
Program:	4.8 kV CC: I-94 Substation and Circuit Conversion (Pg. 4 of 4)
Current Projects:	4.8 kV CC: I-94 Substation and Circuit Conversion
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $4.10 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~3,107~~	~~3,107~~
	~~Material~~	~~-~~	~~621~~	~~621~~
	~~Other~~	~~-~~	~~414~~	~~414~~
	~~**Total**~~	~~**-**~~	~~**4,142**~~	~~**4,142**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	-	2,311	2,311
	Material	-	1,417	1,417
	Other	-	414	414
	Total	**-**	**4,142**	**4,142**

(a)	(b)
Program:	4.8 kV CC: Almont Relief and Circuit Conversion (Midas) (Pg. 1 of 4)
Purpose and Necessity:	Almont substation is 3.4 MVA over its substation firm rating. Both of its circuits are at or above their day-to-day ratings during summer peak hours. Limited/No jumpering options are available because Almont is a 4.8 kV substation surrounded by 13.2 kV substations. Five new Method of Service requests (MOS) have been received for new sub divisions and grow houses, with no capacity to feed them. Commitments to the community have been made to improve reliability. Breakers are 1956 and spare parts are not available. Each circuit is over 55 overhead miles. A cable failure occurred in 2019 caused breaker to fail and extensive outage for the Almont area due to no jumpering available and, due to high loads, the substation was being blocked from automatic throwover
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: Almont Relief and Circuit Conversion (Midas) (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 56
DGP Section:	11.3
Scope:	• Build a new Class 'R' 13.2 kV substation with 4 circuits • Reconductor 2.7 miles of overhead primary • Convert 21 miles of overhead primary • Establish new jumpering points • Reconfigure Almont circuits • Transfer Almont load to the new substation • Convert and transfer remaining Almont load to the new substation • Decommission Almont substation

(a)	(b)						
Program:	4.8 kV CC: Almont Relief and Circuit Conversion (Midas) (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviates the loading issue on Almont substation, leading to: - Elimination of loading related safety risks - Improved reliability - Reduction of long duration outage risks - Reduced O&M and Capital expenses • Elimination of aging OH infrastructure, leading to: - Improved reliability - Fewer truck roles - Reduced Capital expenses - Reduced O&M expenses • Reduce new customer connection timeframe and cost						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

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(a)	(b)			
Program:	4.8 kV CC: Almont Relief and Circuit Conversion (Midas) (Pg. 4 of 4)			
Current Projects:	4.8 kV CC: Almont Relief and Circuit Conversion (Midas Sub) - MEP 4.8 kV CC: Almont Relief and Circuit Conversion (Midas OH) - DO			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $21.4 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~1,701~~	~~664~~	~~2,365~~
	~~Material~~	~~340~~	~~133~~	~~473~~
	~~Other~~	~~227~~	~~88~~	~~315~~
	~~**Total**~~	~~**2,268**~~	~~**885**~~	~~**3,153**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	1,481	796	2,277
	Material	560	-	560
	Other	227	88	315
	Total	**2,268**	**885**	**3,153**

(a)	(b)
Program:	4.8 kV CC: Buckler Circuit Conversion (Pg. 1 of 4)
Purpose and Necessity:	Ann Arbor continues to see economic growth resulting in increased loads. Argo substation is not capable of serving downtown Ann Arbor due to the loading limitations of the 4.8kV system. Argo circuits are 4.8 kV circuits limited to 3.0 MVA. ARGO is currently at 92% of firm. Argo substation load will continue to rise, circuits will become overloaded and the substation will be above firm. Buckler substation was built to support the current and future loads of Argo and the surrounding substations.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: Buckler Circuit Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 57
DGP Section:	11.3
Scope:	• Establish distribution circuit 9936 Buckler transferring a portion of distribution circuit 2942 Argo • Establish distribution circuit 9927 Buckler by converting and transferring distribution circuit 326 Argo • Convert and transfer distribution circuits 321 & 323 Argo to distribution circuit 9927 Buckler • Establish distribution circuit 9984 Buckler by converting and transferring distribution circuits 319 & 333 Argo • Establish distribution circuit 9978 Buckler • Establish Burton PL 0070

(a)	(b)						
Program:	4.8 kV CC: Buckler Circuit Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide sufficient capacity to serve new load growth and Economic Development • Elimination of aging OH infrastructure, leading to: - Improved reliability - Fewer truck roles - Reduced Capital expenses - Reduced O&M expenses • Removal of aged substation equipment leading to: - Elimination of safety risks - Improved reliability - Reduction of long duration outage risks - Reduced equipment to be maintained - Reduced O&M and Capital expenses • Reduce new customer connection timeframe and cost						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x	x	x

(a)	(b)
Program:	4.8 kV CC: Buckler Circuit Conversion (Pg. 4 of 4)
Current Projects:	4.8 kV CC: Buckler Circuit Conversion
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $19.10 M

~~**Test Year ($000's):**~~

	~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
~~Total Labor (DTE Electric & Contractors)~~	~~1,444~~	~~3,832~~	~~5,276~~
~~Material~~	~~289~~	~~766~~	~~1,055~~
~~Other~~	~~192~~	~~511~~	~~703~~
~~**Total**~~	~~**1,925**~~	~~**5,109**~~	~~**7,034**~~

Test Year ($000's):

	2 mos. 11/01/22 12/31/22	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
Total Labor (DTE Electric &	593	3,423	4,016
Material	1,140	1,175	2,315
Other	192	511	703
Total	**1,925**	**5,109**	**7,034**

(a)	(b)
Program:	4.8 kV CC: Calla Circuit Conversion (Pg. 1 of 4)
Purpose and Necessity:	Diamond substation is well over its firm rating. DIMND9875 is significantly impacted by poor reliability. Customers at the end of this circuit are about ten miles from the substation and regularly experience low voltage/power quality issues. DIMND9874 also has a pocket of poor reliability in an ISO down area.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: Calla Circuit Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 58
DGP Section:	11.3
Scope:	• DIMND9875 (future CALLA9330): Install approximately 2400 feet of new infrastructure to serve as future CALLA9330 backbone • DIMND9875 (future CALLA9330): Install regulators and reclosers • DIMND9874: Replace 10,000 feet overhead to convert the 'M4' iso down - Project completion entails construction of a modern 13.2kV infrastructure and removal of the old 5kV class infrastructure

(a)	(b)						
Program:	4.8 kV CC: Calla Circuit Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Relieves load off DIMND, thus reducing percent over firm • Splits DIMND9875 which spans to just under 10 miles, thus: - Improving customer power quality - Allowing for more jumpering in the area - Improving reliability • Fewer truck roles due to elimination of aging 4.8kV OH infrastructure, leading to: - Reduced Capital expenses - Reduced O&M expenses - Improving reliability						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x			x		

(a)	(b)			
Program:	4.8 kV CC: Calla Circuit Conversion (Pg. 4 of 4)			
Current Projects:	4.8 kV CC: Calla Circuit Conversion			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.3 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

(a)	(b)
Program:	4.8 kV CC: Northville Decommissioning and Circuit Conversion (Pg. 1 of 4)
Purpose and Necessity:	The 4.8 kV switchgear at Northville substation is sixty years old and is at the end of its life. Westinghouse no longer supports this equipment. Three positions have failed and spares are no longer available. The foundation has settled and run off drains towards the switchgear, causing water intrusion issues.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: Northville Decommissioning and Circuit Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 59
DGP Section:	11.3
Scope:	• Convert and transfer three circuits to the Northville 13.2kV side • Project completion entails construction of a modern 13.2kV infrastructure and removal of the old 5kV class infrastructure • Convert and transfer remaining load to surrounding 13.2kV substations • Remove the 4.8 kV substation equipment, including: transformers, switchgear, and cable

(a)	(b)						
Program:	4.8 kV CC: Northville Decommissioning and Circuit Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Elimination of aging OH infrastructure, leading to: - Improved reliability - Fewer truck roles - Reduced Capital expenses - Reduced O&M expenses • Removal of antiquated and failing substation equipment leading to: - Elimination of safety risks - Improved reliability - Reduction of long duration outage risks - Reduced equipment to be maintained - Reduced O&M and Capital expenses • Increased jumpering between circuits due to all circuits being the same operating voltage						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x	x	x	x

(a)	(b)
Program:	4.8 kV CC: Northville Decommissioning and Circuit Conversion (Pg. 4 of 4)
Current Projects:	4.8 kV CC: Northville Decommissioning and Circuit Conversion
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $0.0 M

Test Year ($000's):

	2 mos. 11/01/22 12/31/22	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
Total Labor (DTE Electric & Contractors)	-	-	-
Material	-	-	-
Other	-	-	-
Total	**-**	**-**	**-**

(a)	(b)
Program:	4.8 kV CC: Lapeer - Elba Expansion and Circuit Conversion (Apollo) (Pg. 1 of 4)
Purpose and Necessity:	This project is to provide capacity to serve existing and new customer load and address various issues associated with aging infrastructure and the islanded 4.8 kV system at Lapeer and Elba substations. In addition, this project will transfer part of Hunter's Creek load onto the new substation to assist with reliability issues. • Lapeer substation is at 107% of the firm rating • One of its circuits is over day-to-day rating with the other approaching its day-to-day rating. • Elba substation is at or slightly above its transformer day to day rating during summer peak hours. • The general load growth has been strong in the area (6-8% in 2017 and 2018). • Elba has problematic subtransmission infrastructure that has a history of poor reliability performance and limits shutdown capability for operation and maintenance • The Lapeer-Elba area has experienced a number of low voltage and power quality issues • Limited jumpering options are available at the Elba substation since it is a 4.8 kV substation surrounded by 13.2 kV substations
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: Lapeer - Elba Expansion and Circuit Conversion (Apollo) (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 60
DGP Section:	11.3
Scope:	• Build a new Class 'A' 13.2 kV substation named Apollo • Convert and consolidate 4.8 kV circuits from Elba and Lapeer substations to 13.2 kV • Decommission 4.8 kV portion of Lapeer substation • Decommission Elba and 6.2 miles of 40 kV tap to the substation • Transfer part of Hunter's Creek to the new substation to improve reliability

(a)	(b)						
Program:	4.8 kV CC: Lapeer - Elba Expansion and Circuit Conversion (Apollo) (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Alleviates the loading issue on Lapeer and Elba substations, leading to: - Elimination of loading related safety risks - Improved reliability - Reduction of long duration outage risks - Reduced O&M and Capital expenses • Elimination of aging OH infrastructure, leading to: - Improved reliability - Fewer truck roles - Reduced Capital expenses - Reduced O&M expenses • Reduce new customer connection timeframe and cost • Increased jumpering between circuits due to all circuits being the same operating voltage						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)			
Program:	4.8 kV CC: Lapeer - Elba Expansion and Circuit Conversion (Apollo) (Pg. 4 of 4)			
Current Projects:	4.8 kV CC: Lapeer - Elba Expansion and Circuit Conversion (Apollo)			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $27.9 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~817~~	~~13,051~~	~~13,868~~
	~~Material~~	~~163~~	~~2,610~~	~~2,774~~
	~~Other~~	~~109~~	~~1,740~~	~~1,849~~
	~~**Total**~~	~~**1,089**~~	~~**17,401**~~	~~**18,490**~~
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	821	11,843	12,665
	Material	159	3,817	3,976
	Other	109	1,740	1,849
	Total	**1,089**	**17,401**	**18,490**

(a)	(b)
Program:	4.8 kV CC: McKinstry Sub Decommission (Pg. 1 of 4)
Purpose and Necessity:	• Decommission McKinstry substation • This completes phase two of three of the Zenon Substation construction project • In support of the Gordie Howe International Bridge Project, all load has been transferred to Zenon Substation or Westend Substation
Category:	Infrastructure Redesign & Modernization

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(a)	(b)
Program:	4.8 kV CC: McKinstry Sub Decommission (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 61
DGP Section:	11.3
Scope:	• McKinstry Substation will be decommissioned and equipment will be removed.

(a)	(b)						
Program:	4.8 kV CC: McKinstry Sub Decommission (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Eliminate aging infrastructure substation • This completes phase two of three of the Zenon Substation construction project						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x					x	

(a)	(b)
Program:	4.8 kV CC: McKinstry Sub Decommission (Pg. 4 of 4)
Current Projects:	4.8 kV CC: McKinstry Sub Decommission
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $5.2 M

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~574~~	~~294~~	~~868~~
	~~Material~~	~~115~~	~~59~~	~~174~~
	~~Other~~	~~77~~	~~39~~	~~116~~
	~~**Total**~~	~~**765**~~	~~**392**~~	~~**1,158**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	688	353	1,041
	Material	0	0	0
	Other	77	39	116
	Total	**765**	**392**	**1,158**

(a)	(b)
Program:	4.8 kV CC: White Lake Decommissioning and Circuit Conversion (Pg. 1 of 4)
Purpose and Necessity:	White Lake Substation is an older class T-T substation with multiple at-risk equipment that needs to be upgraded or replaced. There are two transformers each with a single circuit, but operate at two different operating voltages (13.2kV and 4.8kV). The two circuits cannot be jumpered to one another. 13.2kV White Lake Class 'T' substation is 101% of the firm rating. DC 307 White Lake is 102% of its day to day rating. 4.8 kV White Lake Class 'T' substation peak load is 194% of its firm rating. There is also a 40kV capacitor (CAP1-1) that also has multiple at-risk equipment which needs to be upgraded or replaced. The existing substation site is too small to support replacing major equipment at the White Lake Substation.
Category:	Infrastructure Redesign & Modernization

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: White Lake Decommissioning and Circuit Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 62
DGP Section:	11.3
Scope:	• Purchased property in 2019 • Build a new 40kv fed Class 'R-R' substation with four load carrying circuits • Convert DC 307 White Lake to a 13.2 kV circuit • Establish four load carrying circuits supporting White Lake Substation load and a portion of Clyde Substation • Establish new jumpering points and loop schemes between the new substation and Clyde, Widlow, Teggerdine, Placid, and Osprey substations • Convert ISO down locations on DC 8255 Wardlow and DC 8265 Osprey • Decommission White Lake substation

(a)	(b)						
Program:	4.8 kV CC: White Lake Decommissioning and Circuit Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce equipment risk by providing load relief • Provide sufficient capacity to serve existing and new customers • Create circuit jumpering point to improve operability • Elimination of aging OH infrastructure, leading to: - Improved reliability - Fewer truck roles - Reduced Capital expenses - Reduced O&M expenses • Removal of antiquated and failing substation equipment leading to: - Elimination of safety risks - Improved reliability - Reduction of long duration outage risks - Reduced equipment to be maintained - Reduced O&M and Capital expenses						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x					

(a)	(b)			
Program:	4.8 kV CC: White Lake Decommissioning and Circuit Conversion (Pg. 4 of 4)			
Current Projects:	4.8 kV CC: White Lake Decommissioning and Circuit Conversion			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.0 M This project is expected to continue beyond 2023			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

(a)	(b)
Program:	4.8 kV CC: Quincy Conversion (Pg. 1 of 4)
Purpose and Necessity:	Transformer has been leaking for a few years and has a very small amount of oil in it. There are numerous leaks located at various spots. There is no oil containment on site which exposes us to environmental issues. Transformer was installed on top of railroad ties. These railroad ties have rotted and are breaking down (some part crumble as you touch) causing the transformer to list to one side. Because of the list/tilt, it's stretching the conductor causing strain on the cross arms and insulators that guide the conductors to the transformer bushings.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: Quincy Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 63
DGP Section:	11.3
Scope:	• Install a pad mount STDF (Subtransmission Distribution Facility) at existing Quincy property • Install ~ 3 miles of neutral conductor • Reconductor ~2 miles • Install 8 ISO down transformers • Replace ~ 20 transformers • Decommission QUINCY Substation

(a)	(b)						
Program:	4.8 kV CC: Quincy Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Replace damage/high risk equipment • Setup to relieve Lexington substations which are 120% (13.2KV) and 97% (4.8kV) of firm, or Worth that is at 88% and possibly Lake Port substation at 112% • Replace leaking transformer with new transformer • Eliminate environmental risk						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)			
Program:	4.8 kV CC: Quincy Conversion (Pg. 4 of 4)			
Current Projects:	4.8 kV CC: Quincy Conversion			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $4.5 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~444~~	~~-~~	~~444~~
	~~Material~~	~~89~~	~~-~~	~~89~~
	~~Other~~	~~59~~	~~-~~	~~59~~
	~~**Total**~~	~~**592**~~	~~**-**~~	~~**592**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	285	-	285
	Material	248	-	248
	Other	59	-	59
	Total	**592**	**-**	**592**

(a)	(b)
Program:	4.8 kV CC: Pinegrove Substation Relocation and Conversion (Pg. 1 of 4)
Purpose and Necessity:	To accommodate MDOT request to relocate Pinegrove Substation to make way for the expansion of the Blue water bridge Plaza.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: Pinegrove Substation Relocation and Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 64/ Exhibit A-12, Schedule B5.4, Page 10, Line 65
DGP Section:	11.3
Scope:	• The current substation will need to be decommissioned and a new substation will be built. Pinegrove is currently a three transformer 4.8kV Class 'A' substation. A two transformer 13.kV Class 'A' substation will replace it.

(a)	(b)						
Program:	4.8 kV CC: Pinegrove Substation Relocation and Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Improved and additional capacity • Creates Capacity to improve load growth • Replaced aging infrastructure to improve substation operability and reliability • Creates circuit jumpering options to utilize for planned construction or outage restoration						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x			x		

(a)	(b)			
Program:	4.8 kV CC: Pinegrove Substation Relocation and Conversion (Pg. 4 of 4)			
Current Projects:	4.8 kV CC: Pinegrove Substation Relocation and Conversion 4.8 kV CC: Pinegrove Substation Relocation and Conversion CIAC			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $56.3 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~1,188~~	~~8,456~~	~~9,644~~
	~~Material~~	~~238~~	~~1,691~~	~~1,929~~
	~~Other~~	~~158~~	~~1,128~~	~~1,286~~
	~~**Total**~~	~~**1,583**~~	~~**11,275**~~	~~**12,858**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	950	6,765	7,715
	Material	475	3,383	3,858
	Other	158	1,128	1,286
	Total	**1,583**	**11,275**	**12,858**

(a)	(b)
Program:	4.8 kV CC: Promenade Site Prep and Below Grade (Pg. 1 of 4)
Purpose and Necessity:	The Detroit Economic Growth Corporation (DEGC) has assembled the I-94 Industrial Park site – a 186-acre site north of I-94 between Mt. Elliott and Van Dyke on Detroit's east side. It is part of the 3,203-acre Mt. Elliot Development Zone, which is the single largest industrial district in Detroit and encompasses automotive, metal, transportation and logistics clusters. It offers access to major transportation assets. The site is a federally designated Historically Underutilized Business (HUB) Zone and a state designated Renaissance Zone. Recent new loads were fed from the aging Lynch and Lambert 4.8 kV substations. These substations have little capacity for additional load, have limited throw-over and jumpering options and cannot reliably serve the new load coming to the I-94 industrial park. The new substation is required to serve the load growth in and around I-94 industrial park and allows for decommissioning of the aging Lynch, Lambert, and Pulford 4.8 kV substations.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: Promenade Site Prep and Below Grade (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 66
DGP Section:	11.3
Scope:	• Construct a new Class 'A', two transformer, 12 position switchgear 13.2 kV substation with 2- capacitor banks with option to add third transformer, second set of switchgear, and one capacitor bank. • Convert 24 existing 4.8 kV circuits and three throw over circuits from Lynch, Lambert, and Pulford substations to 4-13.2 kV circuits with one throw over circuit. • Decommission Lynch (78 years old), Lambert (88 years old), and Pulford (88 years old) • Convert 112 miles of 4.8kV OH • Decommission 14.5 miles of 4.8kV cable • Decommission 31 miles of 24kV cable (trunk lines from Essex and NEAST) • Convert 40 primary service customers • Deconductor blighted areas This project scope is limited to prepare the substation site and below grade work for I-94 Substation project. Electrical infrastructure work is included in I-94 substation project.

(a)	(b)						
Program:	4.8 kV CC: Promenade Site Prep and Below Grade (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provides additional capacity for load growth in the area • Convert thirteen 4.8kV circuits to 13.2kV and decommission the associated high risk system cables with known failures • Relieve load on the Subtransmission by 22.1MVA and decommission 7 trunk lines • Retire Lynch, Lambert, and Pulford Substations • Increase protection & sectionalizing capabilities for the distribution system • Enhance grid technology and automaton, including DER integration, SCADA capabilities , and fault detection/location						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

Case No.: U-20836
Exhibit: A-23
Schedule: M5 Revised
Witness: S. G. Pfeuffer

(a)	(b)
Program:	4.8 kV CC: Promenade Site Prep and Below Grade (Pg. 4 of 4)
Current Projects:	4.8 kV CC: Promenade Site Prep and Below Grade
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $13.1 M

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~1,504~~	~~18~~	~~1,522~~
	~~Material~~	~~301~~	~~4~~	~~304~~
	~~Other~~	~~201~~	~~2~~	~~203~~
	~~**Total**~~	~~**2,005**~~	~~**24**~~	~~**2,030**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	1,203	18	1,221
	Material	602	4	606
	Other	201	2	203
	Total	**2,005**	**24**	**2,030**

(a)	(b)
Program:	4.8 kV CC: Hawthorne Relief and Circuit Conversion (Pg. 1 of 4)
Purpose and Necessity:	Hawthorne substation area is a dense, 4.8 kV service territory with many commercial and residential customers. The substation's load exceeds 130% of its firm rating and must be addressed. Adjacent substations are Daly, Biltmore, Villa, and Glendale. Daly, Biltmore, and Villa all have excessive loads. Glendale has some capacity, but it is a significant distance away from most Hawthorne substation circuits.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: Hawthorne Relief and Circuit Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 67
DGP Section:	11.3
Scope:	Near-Term 1: Mallard OH Work • Build approximately 4,200 feet overhead extension from MALRD9375 along Ann Arbor Trail • Reconductor approximately 1,060 feet backbone on MALRD9375 and 2,380 feet of backbone MALRD9384 • Convert approximately 78,000 feet of overhead lines on HAWTH1392 on HAWTH2112 from 4.8 kV to 13.2 kV • Convert approximately 71,000 feet of overhead lines on GLEND1974 and GLEND 2213 from 4.8 kV to 13.2 kV Near-Term 2: Biltmore Substation • Convert 13.2 kV Class 'F' substation to temporary overhead Class 'R', then convert Class 'F' to Class 'A' substation. • Convert approximately 99,000 feet of overhead lines on BLTMR1442, BLTMR2050, and HAWTH1176 from 4.8 kV to 13.2 kV • Install approximately 7,500 feet of new cable for three (3) new distribution circuits Near-Term 3: Villa PDC Replacement • Install new 12-position PDC. Cut over circuits from old PDC and install onto new PDC. • Cutover around 1,000 feet of cable from old PDC to new PC Near-Term 4: Property Procurement • Purchase two (2) properties for future substations Near-Term 5: Non-Wires Alternatives (NWA) for Villa • Develop NWA solution for Villa substation to address loads during peak hours. Long-Term 1: Mallard Substation Expansion • Expand substation to accommodate 2-24/32/40 MVA transformers and 12-position PDC • Complete below grade for future third transformer, future second PDC, and two (2) replacement PDC locations Long-Term 2: New General-Purpose Class 'A' substation along Warren Ave. • Build new Class 'A' with 3-24/32/40 MVA transformers, two (2) 12-positions PDC locations and two (2) PDC replacement locations Long-Term 3: New General-Purpose substation near Glendale and Villa substations • Develop new substation and integrate new substation and circuits near Glendale and Villa substations.

(a)	(b)						
Program:	4.8 kV CC: Hawthorne Relief and Circuit Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Convert dense 4.8 kV service territory to 13.2 kV. • Remove aging infrastructure and replace with new equipment in line with DDO standards. • Install poles tall enough for clearances that will allow for conversion. • Prepare area for load transfer off of Hawthorne substation. • Expanded Mallard substation provides additional circuit capacity for area covered by the Hawthorne Initiative. • Purchasing property allows DTE to plan new substations and integrate them into the existing power grid. • Integrate NWA solutions into the power grid to assist during peak load hours. • Eliminate stranded load east of Telegraph Rd. and north of Hines Park. • New substations provide for capacity coming from the east to support the impacted area.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x			x	x	

(a)	(b)			
Program:	4.8 kV CC: Hawthorne Relief and Circuit Conversion (Pg. 4 of 4)			
Current Projects:	4.8 kV CC: Hawthorne Relief and Circuit Conversion			
Budget Basis:	• High Level Conceptual Estimate			
Cost:	Estimated project spend in 2021-2023: $6.4 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~45~~	~~3,750~~	~~3,795~~
	~~Material~~	~~9~~	~~750~~	~~759~~
	~~Other~~	~~6~~	~~500~~	~~506~~
	~~**Total**~~	~~**60**~~	~~**5,000**~~	~~**5,060**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	54	3,070	3,124
	Material	-	1,430	1,430
	Other	6	500	506
	Total	**60**	**5,000**	**5,060**

(a)	(b)
Program:	4.8 kV CC: Birmingham Decommissioning and Circuit Conversion (Pg. 1 of 4)
Purpose and Necessity:	Birmingham substation, mainly serving downtown Birmingham, has a high substation outage risk. The substation's outage risk (probability of experiencing a loss of the entire substation) is estimated at 2.3%; the stranded load is estimated at 21 MVA after possible load transfers and 19 MVA after mobile fleet deployments. The substation is operating at its substation firm rating. Any new customer load or hot summer days will place the substation over its firm rating and in violation of DTE Electric's Distribution Design Standards. This project is to address the loading, aging infrastructure and substation outage risk at Birmingham substation. In addition Quarton Rd. substation is a 1948 vintage switchgear. QTNRD circuits will be left as an island with no jumper capability after BIHAM conversion. QTNRD has significant number of customer complaints due to aging infrastructure.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8 kV CC: Birmingham Decommissioning and Circuit Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 68
DGP Section:	11.3
Scope:	• Purchase property • Build new 40/13.2 kV substation in the Birmingham area • Convert existing 4.8 kV circuits to 13.2 kV • Transfer customer load from Birmingham and Quarton Road to the new substation • Decommission Birmingham and Quarton Road substations

(a)	(b)						
Program:	4.8 kV CC: Birmingham Decommissioning and Circuit Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide sufficient capacity to serve 42.1MVA load presently supported by aging infrastructure • Provide load relief to Birmingham and Quarton Rd substations to be compliant with DTE Electric's Distribution Design Standards • Create jumper points with new ARIEL substation and existing, LNGLK, SAVGE substations • Reduce substation outage risk by replacing aging infrastructure • Enhance safety, reliability and power quality for upgraded circuits • Reduce non-storm events and reactive costs for upgraded circuits • Enhance grid technology and automaton, including DER integration						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

Case No.: U-20836
Exhibit: A-23
Schedule: M5 Revised
Witness: S. G. Pfeuffer

(a)	(b)			
Program:	4.8 kV CC: Birmingham Decommissioning and Circuit Conversion (Pg. 4 of 4)			
Current Projects:	4.8 kV CC: Birmingham Decommissioning and Circuit Conversion			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $2.1 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~28~~	~~1,158~~	~~1,187~~
	~~Material~~	~~6~~	~~232~~	~~237~~
	~~Other~~	~~4~~	~~154~~	~~158~~
	~~**Total**~~	~~**38**~~	~~**1,544**~~	~~**1,582**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	34	1,313	1,347
	Material	-	77	77
	Other	4	154	158
	Total	**38**	**1,544**	**1,582**

(a)	(b)
Program:	4.8kV CC: ISO Camden (Pg. 1 of 4)
Purpose and Necessity:	The 4.8kV ISO down circuits are already fed from a 13.2kV substation which removes the substation firm rating and the substation risk ranking from prioritization consideration. Without need to consider substation factors, safety (wire down reduction), reliability (customer minute interruptions), and costs (avoided O&M and capital) become the driving factors for prioritization of 4.8kV ISO down circuits.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8kV CC: ISO Camden (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 69
DGP Section:	11.3
Scope:	• Installing controls and automation on the circuits to our latest design standards • Completing overhead conversion work including rebuilding pole tops, replacing poles and transformers as needed, and installing neutral wire. • Rebuilding underground infrastructure. • Reconductoring overhead lines as needed. • Reconfiguring circuits and establishing new jumpering points. • Removing ISO down transformers. • Rebuilding underground infrastructure as needed

(a)	(b)						
Program:	4.8kV CC: ISO Camden (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• The 4.8kV ISO down conversion projects are expected to bring multi-faceted benefits of safety improvements, reliability improvements, technology modernization, potential circuit load relief and cost reduction. • Elimination of aging OH infrastructure, leading to: - Improved reliability - Fewer truck roles - Reduced Capital expenses - Reduced O&M expenses • Removal of antiquated and failing substation equipment leading to: - Elimination of safety risks - Improved reliability - Reduction of long duration outage risks - Reduced equipment to be maintained - Reduced O&M and Capital expenses						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x			x	x	x

(a)	(b)			
Program:	4.8kV CC: ISO Camden (Pg. 4 of 4)			
Current Projects:	4.8kV CC: ISO Camden			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.5 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~313~~	~~313~~
	~~Material~~	~~-~~	~~63~~	~~63~~
	~~Other~~	~~-~~	~~42~~	~~42~~
	~~**Total**~~	~~**-**~~	~~**417**~~	~~**417**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	-	292	292
	Material	-	83	83
	Other	-	42	42
	Total	**-**	**417**	**417**

(a)	(b)
Program:	4.8kV CC: ISO Gilbert (Pg. 1 of 4)
Purpose and Necessity:	The 4.8kV ISO down circuits are already fed from a 13.2kV substation which removes the substation firm rating and the substation risk ranking from prioritization consideration. Without need to consider substation factors, safety (wire down reduction), reliability (customer minute interruptions), and costs (avoided O&M and capital) become the driving factors for prioritization of 4.8kV ISO down circuits.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	4.8kV CC: ISO Gilbert (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 70
DGP Section:	11.3
Scope:	• Installing controls and automation on the circuits to our latest design standards • Completing overhead conversion work including rebuilding pole tops, replacing poles and transformers as needed, and installing neutral wire. • Rebuilding underground infrastructure. • Reconductoring overhead lines as needed. • Reconfiguring circuits and establishing new jumpering points. • Removing ISO down transformers. • Rebuilding underground infrastructure as needed.

(a)	(b)						
Program:	4.8kV CC: ISO Gilbert (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• The 4.8kV ISO down conversion projects are expected to bring multi-faceted benefits of safety improvements, reliability improvements, technology modernization, potential circuit load relief and cost reduction. • Elimination of aging OH infrastructure, leading to: - Improved reliability - Fewer truck roles - Reduced Capital expenses - Reduced O&M expenses • Removal of antiquated and failing substation equipment leading to: - Elimination of safety risks - Improved reliability - Reduction of long duration outage risks - Reduced equipment to be maintained - Reduced O&M and Capital expenses						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x			x	x	x

(a)	(b)
Program:	4.8kV CC: ISO Gilbert (Pg. 4 of 4)
Current Projects:	4.8kV CC: ISO Gilbert
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $0.5 M This project is expected to continue beyond 2023

~~Test Year ($000's):~~

	~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
~~Total Labor (DTE Electric & Contractors)~~	~~-~~	~~313~~	~~313~~
~~Material~~	~~-~~	~~63~~	~~63~~
~~Other~~	~~-~~	~~42~~	~~42~~
~~Total~~	**~~-~~**	**~~417~~**	**~~417~~**

Test Year ($000's):

	2 mos. 11/01/22 12/31/22	10 mos. 01/01/23 10/31/23	Test Year 12 mos. ending 10/31/23
Total Labor (DTE Electric &	-	292	292
Material	-	83	83
Other	-	42	42
Total	**-**	**417**	**417**

(a)	(b)
Program:	8.3 kV CC: Pontiac Overhead Conversion (Pg. 1 of 4)
Purpose and Necessity:	DTE Electric did not construct the 8.3 kV system but acquired it from CMS Energy in the 1980s. Because the 8.3 kV system is an island surrounded by the 13.2 kV system, it is impossible to transfer load from 8.3 kV circuits to neighboring facilities. This results in a high risk for stranded load in the event of an 8.3kV substation outage event. In addition, replacement parts are no longer available for 8.3 kV breakers, other substation equipment and equipment in the underground vaults due to their obsolescence. Non-standard clearances require substation shutdowns for operations and maintenance. This leads to extended customer interruptions during outage events and leaves the system in an abnormal state for extended periods of time if any 8.3 kV equipment fails. Crews must be trained to operate and maintain the 8.3 kV system, adding to training, operation and maintenance costs. Meanwhile, the City of Pontiac is experiencing an economic rebound, with an estimated 40 MVA (37 percent) load growth in the next five to ten years. Catalina Phase 2 & 3: Aging Infrastructure - Substation at Risk - 8.3KV circuit conversion. Steady diminishing capacity. Incompatible, obsolete, at risk, failing 8.32KV distribution system infrastructure supports the City of Pontiac (29.5MVA of load / 7,001 customers). Current substantial stranded load exposure (13.9MVA) Added exposure: BLMFD (2nd highest at-risk switchgear) supports 3MVA of transferred 8.32KV load. Unable to perform needed breaker replacements. Potential exposure: six breakers operating to failure Disconnect switches (at multiple substations) exhibit visibly damaged insulators Spare substation transformers (40-8.3kV) are not available Massive footprint to implement portable substation support (ISO DN trailer required) CAIDI - Combined unfavorable factors (unavailable replacement parts, multiple abnormal configurations, unfamiliar configuration) significantly impact duration of shutdowns and restoration efforts Overhead extension will enhance reliability (loop schemes) for deployed CATLI circuits Significant UG Automation investment ($26.1M) supported by failing substations
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	8.3 kV CC: Pontiac Overhead Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 71
DGP Section:	11.5
Scope:	Catalina Phase 2: • Extend / replace 5.2 miles conductors with 3-636, B to transfer (converted) Paddock circuits to Catalina substation • Establish two new loop schemes and sectionalizing points Catalina Phase 3 • Extend (~6,550 feet) of conduit (eight 2 way MHs, four 3 way MHs, two PMH-11 PSCs) • Extend (~14,720 feet) of 1000, EPR cables to extend DC 9131 CATLI UG to support conversion and partial transfer of PL 4030 STKWL and DC 9147 CATLI to establish throw over capabilities and supports conversion and partial transfer of PL 4014 STKWL • Extend / replace (50,250 feet) of undersized (smaller than #2CU) conductors; replace 268 OH service transformers. DC 9131 CATLI OH extension enables conversion and transfer of DC 4010 STKWL, and spatial conversion and transfer of DC 4002 STKWL, DC 4011 BARTL, DC 8276 CAMDN (8.3KV) load. DC 9147 CATLI establishes three <J1> points for extended CATLI circuits. Replace (~6340 feet) of URD cable and 27 pad-mounted transformers. Establish eight loop-scheme reclosers Establish infrastructure to support decommission of (8.3KV) substations: • Expand 120-13.2KV Wheeler Substation • Extend conduit (~7,250 feet) and cables to transfer all Bloomfield circuits (~32MVA of load) to expanded Wheeler substation • Extend cables and conductors to transfer (converted) Rapid Street circuits to expanded Wheeler substation • Extend cables and conductors to transfer (converted) Bartlett circuits to expanded Wheeler substation • Decommission end-of-life PADOK, RAPST, BARTL, STKWL, BLMFD substations

(a)	(b)						
Program:	8.3 kV CC: Pontiac Overhead Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide sufficient capacity to serve growing areas • Decommission aging infrastructure and reduce major event risk • Enhance safety, reliability and power quality for upgraded circuits by reducing 85% of circuit wire down events, customer interruptions, and customer minutes • Reduce trouble events and reactive costs for upgraded circuits by 85% for both circuit tree related and non-tree related reactive capital • Increase protection for the distribution system • Enhance grid technology and automaton, including DER integration • Reduce new customer connection timeframe and cost • Corrects front line employees' exposure to unsafe work environments						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)			
Program:	8.3 kV CC: Pontiac Overhead Conversion (Pg. 4 of 4)			
Current Projects:	8.3 kV CC: Catalina Phase 2 8.3 kV CC: Catalina Phase 3 8.3 kV CC: Infrastructure to support decommission of (8.3kV) substations			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $15.2 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~426~~	~~6,844~~	~~7,270~~
	~~Material~~	~~85~~	~~1,369~~	~~1,454~~
	~~Other~~	~~57~~	~~913~~	~~969~~
	~~**Total**~~	~~**568**~~	~~**9,125**~~	~~**9,693**~~
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	415	5,475	5,890
	Material	97	2,738	2,834
	Other	57	913	969
	Total	**568**	**9,125**	**9,693**

(a)	(b)
Program:	8.3 kV CC: Pontiac Underground Conversion (Pg. 1 of 4)
Purpose and Necessity:	City of Pontiac supporting substations (failing, end-of-life 8.3kV, supporting 29.5MVA of load / 7,001 customers) will be decommissioned and replaced with 13.2kV facilities. Largest services are delivered through 8.3 kV rated UG equipment. These services contain customer owned switchgear, fuses and transformers. Replacement of 8.3kV substations with 13.2KV infrastructure requires replacement of these services with 15kV class equipment. Extension of four 13.2kV distribution circuits will secure vital redundant sources for UG Automation ($26.1M investment upgrade). Safety related working conditions at remaining service vaults: Below grade confined space which is subject to frequent water and debris intrusion; contains energized, exposed, primary voltage overhead equipment; large amounts of combustible fuel are present.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	8.3 kV CC: Pontiac Underground Conversion (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 72
DGP Section:	11.5
Scope:	• Pre-convert current 8.3KV system to enable deployment of scheduled 13.2kV substation expansion • In preparation for 8.3KV substations upgrade to 13.2KV substations, create ability to support 15KV class services (i.e. McLaren Hospital). • Establish strong working relationships with affected businesses and City officials to secure optimal services & infrastructure replacement cadence Equipment will be removed and replaced based on field inspections and may include some or all of the following: • Replace customer equipment: 4 switchgears, 2 metal clad switchgear, 4 fuse positions • Replace customer transformers: twenty-eight single-phase, ten three-phase, fourteen special order (>750KVA) transformers • Replace eighteen customer cables (estimated 800 feet per site) rated less than 15KV class • Coordinate efforts to deploy DGs (2 weeks minimum) to support conversion and transfer at Redundant Services - Critical Customer facilities

(a)	(b)						
Program:	8.3 kV CC: Pontiac Underground Conversion (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Replacement of non-compatible, outdated, non-repairable, non-standard voltage class infrastructure, leading to: - Elimination of safety risks - Improved reliability - Reduction of long duration outage risks - Reduced equipment to be maintained & stocked - Reduced O&M and Capital expenses • Increased jumpering between circuits due to all circuits being the same operating voltage • Reduce new customer connection timeframe and cost						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x			x	x	

Michigan Public Service Commission
DTE Electric Company
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(a)	(b)			
Program:	8.3 kV CC: Pontiac Underground Conversion (Pg. 4 of 4)			
Current Projects:	8.3 kV CC: Pontiac Underground Conversion			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $2.1 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~100~~	~~755~~	~~855~~
	~~Material~~	~~20~~	~~151~~	~~171~~
	~~Other~~	~~13~~	~~101~~	~~114~~
	~~**Total**~~	~~**133**~~	~~**1,007**~~	~~**1,140**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	69	521	590
	Material	51	385	436
	Other	13	101	114
	Total	**133**	**1,007**	**1,140**

(a)	(b)
Program:	System Loading: Prior Year (Pg. 1 of 4)
Purpose and Necessity:	DTE Electric evaluates system loading on a regular basis as part of its annual area load analysis (ALA). Based on DTE Electric's recent ALA studies, approximately 30 percent of distribution substations have various loading constraints, either substations being over their firm ratings or equipment being over its day-to-day rating during peak hours. As such, additional capacity is needed to prevent customer interruptions during a single contingency event and help maintain the useful life of the existing equipment.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	System Loading: Prior Year (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 73
DGP Section:	Not Available
Scope:	• BRAZL 8402 Overload: Establish new distribution circuit 8495 BRAZL and split the load of distribution circuit 8402 • Milford Substation Project: Convert Milford to a Class A substation with 9 position switchgear

(a)	(b)						
Program:	System Loading: Prior Year (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Enhance safety • Improve customer reliability and power quality • Reduce major customer outages by eliminating failing subtransmission line • Reduce reactive costs by replacing aging or defective infrastructure						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x		

(a)	(b)			
Program:	System Loading: Prior Year (Pg. 4 of 4)			
Current Projects:	BRAZL 8402 Overload Milford Substation Project-C			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $0.0 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

(a)	(b)
Program:	System Loading: Brest Substation (Pg. 1 of 4)
Purpose and Necessity:	Operators are concerned about safety as the switchgear pad deteriorates further and causes the switchgear to shift (on the 4.8kV side of the substation). Several concrete equipment mats require replacement or significant repair. Switchgear breakers have reached end-of-life and the manufacturer no longer supports this breaker product.
Category:	Infrastructure Redesign & Modernization

Michigan Public Service Commission
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Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	System Loading: Brest Substation (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 74
DGP Section:	Not Available
Scope:	• Convert the substation from a Class 'E' 4.8 kV substation and a Class 'T' 13.2kV substation to a Class 'A' 13.2kV substation.

(a)	(b)						
Program:	System Loading: Brest Substation (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce safety concerns at the substation • Reduce stranded load • Provide capacity for future load growth						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x		

(a)	(b)			
Program:	System Loading: Brest Substation (Pg. 4 of 4)			
Current Projects:	System Loading: Brest Substation			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.1 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

(a)	(b)
Program:	System Loading: Carleton (Pg. 1 of 4)
Purpose and Necessity:	Carleton is approximately 190% of the maximum loadability. TRF 2 is at 106% of its day to day rating. DC 312 CARLT is at 117% of its day to day rating.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	System Loading: Carleton (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 75
DGP Section:	11.1
Scope:	• Reroute 4.8kV and 40kV overhead on the substation property • Expand substation fence on the north side • Install new control center • Replace both transformers with 5/6.3MVA transformers and upgrade associated equipment • Re-establish J1 point between the two circuits

(a)	(b)						
Program:	System Loading: Carleton (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce equipment risk by alleviating the day to day overloads on the circuit, bus, and transformer • Re-establish the J1 point between the two circuits						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x		

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Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)			
Program:	System Loading: Carleton (Pg. 4 of 4)			
Current Projects:	System Loading: Carleton			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $2.1 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~0~~	~~-~~	~~0~~
	~~Material~~	~~0~~	~~-~~	~~0~~
	~~Other~~	~~0~~	~~-~~	~~0~~
	~~**Total**~~	~~**0**~~	~~**-**~~	~~**0**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	0	-	0
	Material	-	-	-
	Other	0	-	0
	Total	**0**	**-**	**0**

(a)	(b)
Program:	System Loading: Grayling (Pg. 1 of 4)
Purpose and Necessity:	Loading at Grayling Substation was approximately 68.1 MVA in 2020, which is 119% of FIRM and is expected to rise over the next five years to as much as 138% of FIRM. DC 8517 GRAYL and DC 8539 GRAYL circuits are over the 12.0 MVA DDO Emergency Limit with the largest circuit at 13.8 MVA. The average circuit loading across all seven load carrying circuits is approximately 10.5 MVA. Additionally, there is new business that is still being developed across the Grayling Substation service area. The project includes constructing a new 120-13.2kV Class 'A' Substation, which has been named Sigma (SIGMA) Substation to relieve Grayling Substation, constructing six load carrying distribution circuits and one throw-over circuit.
Category:	Infrastructure Redesign & Modernization

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	System Loading: Grayling (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 76
DGP Section:	11.1
Scope:	• Build a new 120/13.2 kV Class 'A' substation. • Build approximately six miles of cable • Build approximately two and a half miles of conduit with manholes • Build approximately four miles of overhead lines • Install one primary switch cabinet

(a)	(b)						
Program:	System Loading: Grayling (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide load relief to Grayling substation and its circuits to be compliant with DTE Electric Distribution Design Standards • Provide capacity to serve existing and new customer load • Reduce major substation outage risk • Create circuit jumpering point to improve operability						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x		

(a)	(b)			
Program:	System Loading: Grayling (Pg. 4 of 4)			
Current Projects:	System Loading: Grayling			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.0 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

(a)	(b)
Program:	System Loading: Prospect (Pg. 1 of 4)
Purpose and Necessity:	Prospect substation was at 131% of substation loading before 0.7 MVA was temporarily transferred to DC 9789 MOTT. The transformer is currently at 112% of its D-D rating and experienced higher loads in summer of 2020 due to many customers working from home. The transformer is expected to rise to 144% overloaded once the 0.7 MVA is transferred back. DC 0306 PROSP is currently at 130% of its D-D Rating. The transformer replacement is to relieve existing overload conditions at the substation and provide additional capacity for existing and new customer load. In the summer of 2018, the load at PROSP exceeded emergency rating of the transformer. Load shedding was required until a DG unit was installed from June - October. DO spend approximately $107K on the DG installation.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	System Loading: Prospect (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 77
DGP Section:	11.1
Scope:	• Upgrade existing transformer • Extend the width of the substation fence and relocate 40kV line entrance to allow space for the new transformer • Install reclosers on pole outside of substation fence to serve as protection for the substation

(a)	(b)						
Program:	System Loading: Prospect (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce equipment risk by providing load relief to Prospect substation • Create circuit jumpering points to improve operability • Reduce customer complaints from DC 9789 MOTT once able to transfer load back to PROSP after transformer is replaced						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x			

(a)	(b)
Program:	System Loading: Prospect (Pg. 4 of 4)
Current Projects:	System Loading: Prospect
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $0.5 M

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~67~~	~~-~~	~~67~~
	~~Material~~	~~13~~	~~-~~	~~13~~
	~~Other~~	~~9~~	~~-~~	~~9~~
	~~**Total**~~	~~**90**~~	~~**-**~~	~~**90**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	31	-	31
	Material	49	-	49
	Other	9	-	9
	Total	**90**	**-**	**90**

(a)	(b)
Program:	System Loading: Mandy 307 Load Transfer (Pg. 1 of 4)
Purpose and Necessity:	Mandalay substation is over firm due to overloads on circuits fed from TRF 1. (MANDY0307 and MANDY1390) Project driver is to permanently transfer 0.9MVA of load from MANDY0307 to ARIEL9893.
Category:	Infrastructure Redesign & Modernization

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	System Loading: Mandy 307 Load Transfer (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 78
DGP Section:	11.1
Scope:	• Convert 7,600 feet of 4.8kV distribution circuit 307 Mandalay and transfer to distribution circuit 9893 Ariel • Transfer approximately 1.5 MVA from Mandalay substation to Ariel substation

(a)	(b)						
Program:	System Loading: Mandy 307 Load Transfer (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Bring Substation under firm rating • Bring TRF1, MANDY0307, and MANDY1390 under D-D Ratings • Provide capacity to emerging businesses and subdivisions • Reduce substation outage risk by replacing aging infrastructure • Enhance safety, power quality and reliability for upgraded circuit						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x			x	x	x

(a)	(b)			
Program:	System Loading: Mandy 307 Load Transfer (Pg. 4 of 4)			
Current Projects:	System Loading: Mandy 307 Load Transfer			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.9 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

(a)	(b)
Program:	System Loading: Brown City (Pg. 1 of 4)
Purpose and Necessity:	Marlette 13.2kV is 113% of Firm, Brown City is 103% of firm, Tacoma is 79% of Firm and Shaw is 122% of Firm. Marlette 13.2kV is 95% of Emergency, Brown City is 92% of Emergency, Tacoma is at 65% of Emergency and Shaw is 100% of Emergency. MARL8281 is 101% of is DD rating and 95% of Emergency Rating. BRCTY0305 is 101% of is DD rating and 73% of Emergency Rating. SHAW0312 is at 120% if its DD rating and 92% of Emergency Rating. Brown City is an islanded 4.8kV Class 'T' substation surrounded by Tacoma 13.2kV circuit/substation and has no jumpering options. Tacoma substation is a 13.2kV Class 'T' substation with one load carrying circuit. With a recent method of service request, Tacoma substation is expected to be at 100% of its firm rating in 2021. Customers are not moving forward with requests to add load due to high C.I.A.C . Tacoma8311 has had many PQ complaints due to being 176 OH miles and conductor size is primarily #2 or 1/0 ACSR. Expected to have more load growth in Tacoma/Shaw area. TIE 9205 is not reliable and would require extensive reconductoring and a 40kV cap to allow for a load transfer of 1.2MVA from SHAW to TCOMA. TIE 3241 also has low voltage issues at SHAW and STDF4. With additional projected load growth, we will need to install 2 of 40kV Caps, Relay Upgrades, and some 40kV OH work.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	System Loading: Brown City (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 79
DGP Section:	11.1
Scope:	• Install 120-13.2kV 15/20/25MVA Class 'T' substation at Peck & Gosline Rd. Property purchase will be required • Reconductor approximately 4 miles on TCOMA8311, install iso-dn (2) at Peck and Maple Valley • Reconductor approximately 3.75 miles on MARLT8281 • Replace existing 41.6-13.2, 5MVA transformer at Tacoma Substation with 41.6-13.2kV, 10/12.5MVA transformer • Rebuild and convert approximately 8 miles of Brown City distribution circuits from 4.8 kV to 13.2 kV • Transfer the load from Brown City Substation to Tacoma Substation • Decommission Brown City Substation • Reconductor and convert approximately 5 miles TCOMA to transfer 1.2MVA from SHAW

(a)	(b)						
Program:	System Loading: Brown City (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide capacity to allow load growth • Decommission aging infrastructure and reduce major event risk • Enhance safety, reliability and power quality for upgraded circuits • Provide capacity for potential new developments in areas surrounding BRCTY, TCOMA and SHAW Substations • Relief SHAW from being 122% of Firm and 100% of EM to 78% of firm and 63% of EM • Relief SHAW DC312 from 123% of Firm and 92% of EM to 70% of DD and 52% of EM • Relief MARLT DC8281 from being 101% of DD and 95% of EM to 64% of DD and 60% of EM • Relief MARLT Substation being 117% of firm and 95% of EM to 74% of firm and 60% EM • Convert existing 4.8kV distribution circuits to 13.2kV • Provide jumpering options when currently there is limited/none jumpering options in the area						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x			x	x	x

(a)	(b)
Program:	System Loading: Brown City (Pg. 4 of 4)
Current Projects:	System Loading: Brown City
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $10.3 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~342~~	~~4,676~~	~~5,018~~
	~~Material~~	~~68~~	~~935~~	~~1,004~~
	~~Other~~	~~46~~	~~623~~	~~669~~
	~~**Total**~~	~~**456**~~	~~**6,234**~~	~~**6,690**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	322	4,415	4,737
	Material	88	1,196	1,284
	Other	46	623	669
	Total	**456**	**6,234**	**6,690**

(a)	(b)
Program:	System Loading: Mack Transformer 102 (Pg. 1 of 4)
Purpose and Necessity:	The load tap changers on TRF 101 and TRF 104 at Mack are currently inoperable. Maintenance to make necessary repairs requires lengthy shutdowns. Loss of an energized transformer while the other is shutdown for maintenance will cause significant stranded load to the system.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	System Loading: Mack Transformer 102 (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 80
DGP Section:	11.1
Scope:	• Install a new 60/80/120 MVA, 120kV-24KV TRF 102 to allow for the repair of the inoperable load tap changers and to allow for shutdowns in the future • Install 24kV secondary breaker

(a)	(b)						
Program:	System Loading: Mack Transformer 102 (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduction in substation outage risk • Improve system operability under contingency conditions or planned work						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x			

(a)	(b)			
Program:	System Loading: Mack Transformer 102 (Pg. 4 of 4)			
Current Projects:	System Loading: Mack Transformer 102			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $0.2 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

(a)	(b)
Program:	System Loading: Port Sanilac (Pg. 1 of 4)
Purpose and Necessity:	Port Sanilac substation is 106% of its firm and Foster substation is at 117% of firm. Both Port Sanilac substation and Foster substation are Class 'T'. DC 301 Foster is at 97% of its day to day rating and 100kVA from its emergency rating and DC 302 Port Sanilac is at 129% of its day to day rating and is 200kVA from its emergency rating. The area surrounding Port Sanilac hasn't seen significant load growth in recent years, but the loading on it and surrounding substations has increased to a point at which new loading cannot be adequately served. Also, there is limited/no jumpering options during peak since Port Sanilac is surrounded by Forester and Applegate substations - both of which are approaching/exceeding their substation transformer limits.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	System Loading: Port Sanilac (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 81
DGP Section:	11.1
Scope:	• Install new Skidmount STDF between Foster & Port Sanilac Substations • Install one 40kV PTS and one 40kV Cable pole • Install one distribution cable pole • Install two triple single reclosers • Install 150 feet of 3-5" conduit and 1000AL cable for 40kV and 13.2kV • Rebuild/convert 3 miles of DC301 FOSTR • Rebuild/convert 3 miles of DC302 PTSAN • Relocate existing 40kV LSB at FOSTR • Decommission FOSTR

(a)	(b)						
Program:	System Loading: Port Sanilac (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide sufficient capacity to serve existing and new customer load • Provide load relief to the substation to be compliant with DTE Electric Distribution Design Standards • Reduce substation outage risk by replacing aging infrastructure • Increase jumpering capability and eliminate stranded load associated with the islanded 4.8 kV system • Relocate aging 40kV from deep ROW to more truck accessible location • Enhance safety, reliability and power quality for upgraded circuits • Reduce non-storm events and reactive costs for upgraded circuits • Enhance grid technology and automaton, including DER integration						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x			x	x	x

(a)	(b)
Program:	System Loading: Port Sanilac (Pg. 4 of 4)
Current Projects:	System Loading: Port Sanilac
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $3.7 M This project is expected to continue beyond 2023

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~56~~	~~2,024~~	~~2,080~~
	~~Material~~	~~11~~	~~405~~	~~416~~
	~~Other~~	~~7~~	~~270~~	~~277~~
	~~**Total**~~	~~**75**~~	~~**2,698**~~	~~**2,773**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	67	1,592	1,659
	Material	-	837	837
	Other	7	270	277
	Total	**75**	**2,698**	**2,773**

(a)	(b)
Program:	System Loading: Richmond/Armada (Pg. 1 of 4)
Purpose and Necessity:	Richmond 4.8 kV antiquated switchgear is the only oil filled truck type outdoor switchgear that we have left on our system. The switchgear is 1956 vintage equipped with oil filled circuit breakers along with CT's and other pieces that there are no spare parts for. The nine position switchgear at Spokane was installed about 10 years ago, but has no load connected. Richmond 4.8 kV substation is at 108% of its firm, rising to 117% by end of summer. Distribution circuit 2496 Richmond is at 94% of its day to day rating. Armada 4.8 kV substation is at 113% of firm with distribution circuit 302 at 112% of its day to day rating. Armada 13.2 kV substation is at 96% of firm and its transformer is at 95% of its day to day rating. Due to limited/no jumpering options, when the substation needs a shutdown for maintenance, a portable substation is required.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	System Loading: Richmond/Armada (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 82
DGP Section:	11.1
Scope:	Upgrade Richmond substation to a 40kV-13.2kV Class 'A' substation with 9 position switchgear (utilizing unused switchgear at Spokane substation): • Relocate Spokane switchgear to Richmond substation • Install new 15/20/25 transformer • Replace existing 7.5MVA transformer with 15/20/25 XFMR • Install 2 new circuit switchers • Install 1,000 feet of 3x4-5" duct • Install 2,000 feet of 1000AL cables to cut the 4.8kV and 13.2kV circuits to the new switchgear • Reroute about 500 feet of 40 kV overhead (include 2 new poles) • Decommission the existing Richmond 4.8kV substation and switchgear • Reconductor and convert 15 miles of overhead circuit • Decommission Armada 4.8kV Substation

(a)	(b)						
Program:	System Loading: Richmond/Armada (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Eliminates insertion and removal of breakers using a cart set on an outdoor elevated platform. Breakers rack out directly outdoors. • Replaces old oil filled breakers with modern vacuum style breakers. • Reduces time and cost to perform a breaker inspection • Substation will be more reliable with the ability to pickup load from a dedicated T.O. circuit • Decommission 4.8kV substations and bring ARMAD substation and RICHM substation • All circuits will be below 90% of DD Rating • Provide reliable jumpering option to ARMAD 13.2kV instead of using the portable substation for any work require shutdown of the substation • Provides more capacity for growth and relieve adjacent substations • Cost reduction for pre conversion scope due to incorporating TIE810 subtransmission project (Distribution project will include 9 miles of pre-conversion instead of 16.1 miles) • Provide more capacity for growth and relieve adjacent substations						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x	x	x

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

Case No.: U-20836
Exhibit: A-23
Schedule: M5 Revised
Witness: S. G. Pfeuffer

(a)	(b)			
Program:	System Loading: Richmond/Armada (Pg. 4 of 4)			
Current Projects:	System Loading: Richmond/Armada			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $9.4 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~626~~	~~2,406~~	~~3,033~~
	~~Material~~	~~125~~	~~481~~	~~607~~
	~~Other~~	~~84~~	~~321~~	~~404~~
	~~**Total**~~	~~**835**~~	~~**3,208**~~	~~**4,043**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	427	2,096	2,523
	Material	325	792	1,116
	Other	84	321	404
	Total	**835**	**3,208**	**4,043**

(a)	(b)
Program:	System Loading: Cody (Pg. 1 of 4)
Purpose and Necessity:	Two of the distribution circuits at Cody substation are loaded above 14.0 MVA. According to the DDO standard, circuits should not be loaded above 8.0 MVA. One of the circuits is loaded so high that it could cause false trip on breakers.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	System Loading: Cody (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 83
DGP Section:	11.1
Scope:	• Circuit phase balancing • Circuit load transfers/reconfigurations • Rebuild 2.6 miles 13.2kV, 3-phase, overhead conductor to 636,B to support current circuit backbone • Rebuild 1.7 miles 13.2kV, single-phase, OH conductor to 3-phase, 636,B to create new circuit backbone • Convert a half mile of single-phase, 4.8kV to 3-phase, 13.2kV, 636 OH conductor to create new circuit backbone • Install sectionalizing and voltage correction equipment

(a)	(b)						
Program:	System Loading: Cody (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Balance phasing of circuits to avoid breaker operation caused by high-phase load • Relieve heavy loaded circuits to avoid circuit ratings						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x					

(a)	(b)
Program:	System Loading: Cody (Pg. 4 of 4)
Current Projects:	System Loading: Cody
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $0.2 M This project is expected to continue beyond 2023

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~6~~	~~103~~	~~109~~
	~~Material~~	~~1~~	~~21~~	~~22~~
	~~Other~~	~~1~~	~~14~~	~~15~~
	~~Total~~	**~~8~~**	**~~137~~**	**~~145~~**

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	8	123	131
	Material	-	-	-
	Other	1	14	15
	Total	**8**	**137**	**145**

(a)	(b)
Program:	System Loading: Otsego/Capac/Shaw (Pg. 1 of 4)
Purpose and Necessity:	OTSGO existing class 'R' 13.2kV substation is loaded at 20.9MVA at 138% of Firm and 77% of EM rating. 3.7MVA additional load is expected by this year which will cause the substation to be at 163% of firm and 90% of EM rating. There is limited to no jumpering options to surrounding circuits. OTSGO has a blocking scheme and is set at 15.1MVA Summer, with load substation will be 4-9MVA stranded CAPAC existing class 'R' 13.2kV substation is loaded at 15.7MVA at 116% of firm and 73% of EM rating. There has been 7 Method of Service requests (approximately total 2MVA) in the CAPAC area in 2020. The majority of them are small so we are expecting the load at CAPAC to increase. CAPAC has a blocking scheme and is set at 13.5MVA summer, with load, substation will be 2-5MVA stranded. There is no jumpering option outside of the CAPAC circuits SHAW is an existing class 'T' 4.8kV substation equipped with a 2.5MVA transformer. Substation is 123% of Firm and 100% of EM Rating. The Brown City/TCOMA project will help relieve the northern portion of SHAW and this will help relieve the Southern portion of Shaw.
Category:	Infrastructure Redesign & Modernization

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Infrastructure Redesign & Modernization

(a)	(b)
Program:	System Loading: Otsego/Capac/Shaw (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 84
DGP Section:	11.1
Scope:	• Install a new 120kV fed Skidmount substation. Property Purchase will be required. • Pre-convert and convert about 10 miles (includes part of CAPAC, OTSGO, and SHAW). New substation load initial load will be ~5MVA • Transfer ~0.76MVA of load from SHAW312 • Transfer ~2.4MVA of load from CAPAC8756 (open at R2) • Transfer ~1.7MVA of load from OTSGO8803 (open at L) • Transfer ~2MVA of load from CAPAC 8013 to new MIDAS circuit and pre-convert/Convert and about 2 miles • Transfer ~1.5MVA of load from OTSGO to ALMOT. Pre-convert/convert ~1 mile

(a)	(b)						
Program:	System Loading: Otsego/Capac/Shaw (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• With the new Class 'R' substation, we will be able to relieve a lot more load from SHAW, CAPAC, and OTSGO. OTSGO 13.2kV substation is projected to be at 163% of Firm this year, after this project, OTSGO will be at 114% of firm. Another project will be required on the west in maybe 10 years to further relief OTSGO, ROBIN, and SDF4 and perhaps decommission SHAW and IMLAY4.8kV. CAPAC 13.2kV substation is at 116% of firm and after load transfer it will be at 82% of firm. Shaw will be at about 70% of firm after the Brown City project and this project						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x	x	x

(a)	(b)
Program:	System Loading: Otsego/Capac/Shaw (Pg. 4 of 4)
Current Projects:	System Loading: Otsego/Capac/Shaw
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $1.5 M This project is expected to continue beyond 2023

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~41~~	~~714~~	~~755~~
	~~Material~~	~~8~~	~~143~~	~~151~~
	~~Other~~	~~5~~	~~95~~	~~101~~
	~~**Total**~~	~~**54**~~	~~**953**~~	~~**1,007**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	49	815	863
	Material	-	43	43
	Other	5	95	101
	Total	**54**	**953**	**1,007**

(a)	(b)
Program:	System Loading: Macomb/Golf (Pg. 1 of 4)
Purpose and Necessity:	GOLF is a 3 transformer class 'A' substation with 85MVA of load. It's at 89% of firm. Six out of 10 circuits are over 90% of DD rating. MACMB Sub is class 'TT' at 112% of Firm High Load Density Area - MACMB and GOLF carry 143 MVA combined. No capacity for new load on distribution system. Energized 1.1 MVA of new customers in 2020 on MACMB (MACMB8277). 3.1 MVA MOS requested but unable to serve due to capacity limitations on MACMB
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	System Loading: Macomb/Golf (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 85
DGP Section:	11.1
Scope:	• Upgrade the existing Macomb substation to three transformers with 2 PDC Class 'A' sub. (Keep the existing 2 transformers). Add 1 more transformer, two 12 position PDC's, 4 substation 13.2kV distribution caps at sub. • Install 25,000 feet underground distribution cable for circuit exits and throw over cable • Install 15,000 feet of conduit • Circuit 1: Rebuild 2.5 miles of overhead infrastructure with 636AL double build and install 3 reclosers to operate as a loop scheme. • Circuit 2: Install 1.5 miles of neutral to convert 13.2 kV • Circuit 3: Rebuild 1.5 miles of overhead with 636 AL • Circuit 4: Rebuild and convert 1 mile with 636 AL double build • Circuit 5: Install a recloser

(a)	(b)						
Program:	System Loading: Macomb/Golf (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• MACMB SUB 112% of firm to 79% of firm • GOLF SUB 89% of firm to 75% • GOLF 8552 from 112% D-D to 32% D-D • GOLF8531 from 103% D-D to 85% D-D • MACMB 8510 from 109% D-D to 54% D-D • BURBK2438 from 130% D-D to 91% D-D • Relieve overloads in the area • Support load growth • Eliminate 4.8kV area • Provide Jumpering options in the area						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x	x	x	

(a)	(b)
Program:	System Loading: Macomb/Golf (Pg. 4 of 4)
Current Projects:	System Loading: Macomb/Golf
Budget Basis:	• Project Management Estimate
Cost:	Estimated project spend in 2021-2023: $2.8 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~90~~	~~1,314~~	~~1,403~~
	~~Material~~	~~18~~	~~263~~	~~281~~
	~~Other~~	~~12~~	~~175~~	~~187~~
	~~**Total**~~	~~**120**~~	~~**1,752**~~	~~**1,871**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	108	1,577	1,684
	Material	-	-	-
	Other	12	175	187
	Total	**120**	**1,752**	**1,871**

(a)	(b)
Program:	System Loading: Grenada (Pg. 1 of 4)
Purpose and Necessity:	This project aligns with the proactive area plan. There is increased load within the existing GRENA substation area.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	System Loading: Grenada (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 86
DGP Section:	11.1
Scope:	This is preliminary scope and will be refined during detailed engineering: • Install a new 120-13.2kV Class 'A' substation by installing (2) 24/32/40MVA transformers and a 12-position switchgear • Install 5,000 feet of new 5" conduit • Install 10,000 feet of new cable • Rebuild 10,000 feet of backbone • Convert iso pockets on GRENA9813 by replacing 50,000 feet of overhead conductors • Rebuild and convert up to 1000,000 feet of overhead from PROSP • Install sectionalizing and operating devices

(a)	(b)						
Program:	System Loading: Grenada (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide capacity for existing and new customers • Bring firm below 100%, eliminating the risk of stranded load • Help eliminate 4.8kV circuits						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x		x			

(a)	(b)
Program:	System Loading: Grenada (Pg. 4 of 4)
Current Projects:	System Loading: Grenada
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $2.8 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~93~~	~~1,250~~	~~1,343~~
	~~Material~~	~~19~~	~~250~~	~~269~~
	~~Other~~	~~12~~	~~167~~	~~179~~
	~~**Total**~~	~~**125**~~	~~**1,667**~~	~~**1,791**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	112	1,145	1,257
	Material	-	355	355
	Other	12	167	179
	Total	**125**	**1,667**	**1,791**

(a)	(b)
Program:	Pilot: Strategic and Service Undergrounding (Pg. 1 of 4)
Purpose and Necessity:	One of the planning scenarios described in the 2021 DGP considers changing weather patterns that lead to an increasing number of catastrophic storms. Although storm resiliency programs like tree trimming, hardening, PTMM, and customer excellence are established to provide customers the needed reliability for this scenario, in some areas they may not completely resolve the issue. In these situations, Strategic Underground may be a good option. Furthermore, the Company's customers have been impacted by an unusually high number of severe weather events during the summer of 2021. This has driven significant customer interest in undergrounding, and the Company is developing plans to partner with communities to implement based on their interest.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Pilot: Strategic and Service Undergrounding (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 87
DGP Section:	11.6
Scope:	• Apply lessons learned from Appoline pilot undergrounding to developing pilots. • Replacing overhead services with underground services • Replacing overhead laterals with URD • Working with communities that have specific needs, and those who may be willing to partner in funding projects

(a)	(b)						
Program:	Pilot: Strategic and Service Undergrounding (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce tree trim costs • Improve safety by reducing wire down events • Improve reliability						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x	x	x

(a)	(b)
Program:	Pilot: Strategic and Service Undergrounding (Pg. 4 of 4)
Current Projects:	Pilot: Strategic and Service Undergrounding
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $61.0 M

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~2,587~~	~~25,000~~	~~27,587~~
	~~Material~~	~~517~~	~~5,000~~	~~5,517~~
	~~Other~~	~~345~~	~~3,333~~	~~3,678~~
	~~**Total**~~	~~**3,450**~~	~~**33,333**~~	~~**36,783**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	2,415	21,000	23,415
	Material	759	9,667	10,426
	Other	276	2,667	2,943
	Total	**3,450**	**33,333**	**36,783**

(a)	(b)
Program:	Pilot: Primary Deconductoring (Pg. 1 of 4)
Purpose and Necessity:	This is a pilot to deconductor specific circuits, in areas that have seen significant population decline with a goal of removing underutilized infrastructure that is no longer needed. Work is being done to reduce the number of wire downs and assets in unoccupied areas. This work will decrease the wire down exposure and outage events. This program will reduce the number of assets which will result in lower tree trimming and PTM costs. This program will also reduce the scope of 4.8kV hardening by reducing the number of pole tops. Circuits will be evaluated based on their peak demand and vacant parcels to determine if they fit this program. After selecting circuits, voltage drop will be calculated per lateral to see effects of removing primary conductor and transformers. After determining voltage drop, primary conductor and transformers on laterals will be removed, secondary will be reconductored where necessary, and transformers will be installed in truck accessible circuit backbone.
Category:	Infrastructure Redesign & Modernization

(a)	(b)
Program:	Pilot: Primary Deconductoring (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 10, Line 88
DGP Section:	11.6
Scope:	• Deconductor pockets of sparsely occupied areas within the City of Detroit by removing primary wire and hardware. • Remove approximately 19,000 feet of small primary wire and arc circuit in rear lots along with pole tops • Remove rear lot distribution transformers • Install truck accessible transformers • Reconductor approximately 10,500 feet of secondary conductor • Perform necessary spot line clearance

(a)	(b)						
Program:	Pilot: Primary Deconductoring (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce the number of wire downs • Reduce the number of outage events • Lower tree trimming and PTM costs • Reduce the need for 4.8kV hardening • To reduce restoration timing						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x	x	

(a)	(b)
Program:	Pilot: Primary Deconductoring (Pg. 4 of 4)
Current Projects:	Pilot: Primary Deconductoring Pilot: WAYBN 1163 Deconductor
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $2.0 M

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~171~~	~~-~~	~~171~~
	~~Material~~	~~34~~	~~-~~	~~34~~
	~~Other~~	~~23~~	~~-~~	~~23~~
	~~Total~~	**~~228~~**	**~~-~~**	**~~228~~**

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	182	-	182
	Material	23	-	23
	Other	23	-	23
	Total	**228**	**-**	**228**

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

Case No.: U-20836
Exhibit: A-23
Schedule: M6 Revised
Witness: S. G. Pfeuffer
M. Elliott Andahazy 1/
P.Smith 2/

(a)		(b)
Category		**Distribution Plant Capital Project Detail - Technology and Automation**
		Capital Exhibit:
pages: 3-6 of 158	1/	Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 2 ADMS: DMS/OMS
pages: 7-10 of 158	1/	Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 3 ADMS: Network Management System
pages: 11-14 of 158	1/	Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 4 SOC Modernization:ESOC
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pages: 19-22 of 158		Exhibit A-13, Schedule B5.5, Page 11 of 12, Line 6 Grid Automation Telecommunications (13.2kV Telecommunications)
pages: 23-26 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 7 Distribution Sensing and Monitoring (incldg Line Sensors)
pages: 27-30 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 8 SCADA / AMI Enhancements
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pages: 75-78 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 20 Technology Programs & NWA
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Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

Case No.: U-20836
Exhibit: A-23
Schedule: M6 Revised
Witness: S. G. Pfeuffer
M. Elliott Andahazy 1/
P. Smith 2/

(a)		(b)
Category		**Distribution Plant Capital Project Detail - Technology and Automation**
		Capital Exhibit:
pages: 87-90 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 23 Mobile Technology
pages: 91-94 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 24 Work Management & Scheduling Upgrades
pages: 95-98 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 25 Substation Design Tool Upgrades
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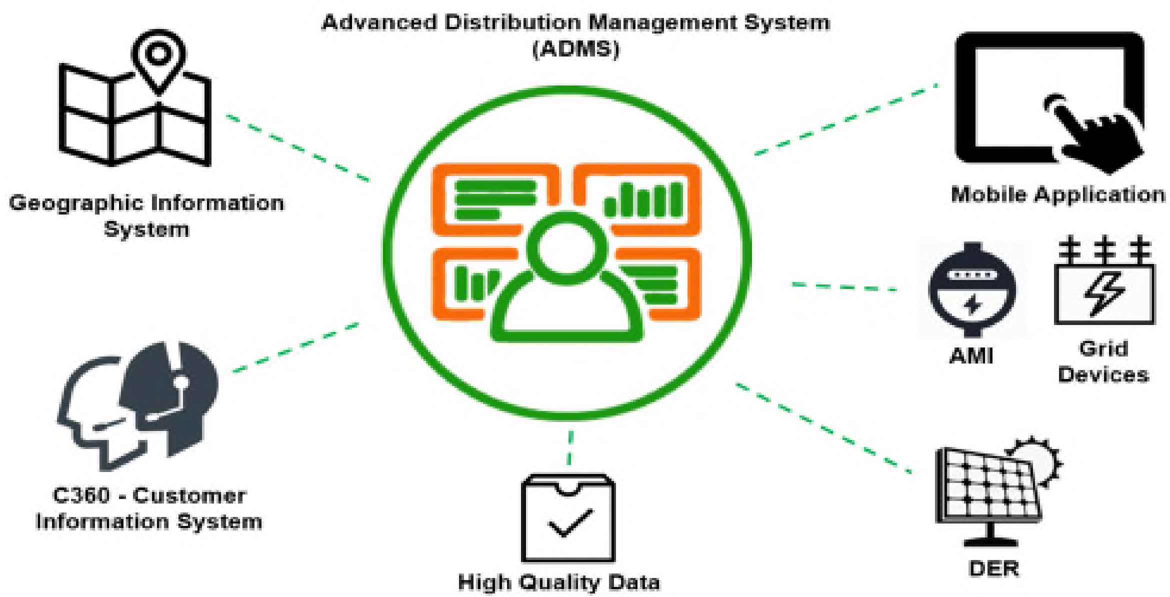
pages: 103-106 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 27 Load Forecasting & Analytics
pages: 107-110 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 28 Interconnection Process Enablement
pages: 111-114 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 29 Hosting Capacity Enablement
pages: 115-118 of 158	2/	Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 30 AMI: Installations
pages: 119-122 of 158	2/	Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 31 AMI: Meter Communications Upgrades
pages: 123-126 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 32 Microwave End of Life
pages: 127-130 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 33 SCADA Remote Access and Configuration Platform
pages: 131-134 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 34 Automation Configuration and Test Record Database
pages: 135-138 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 35 Grid Edge Insights & New Technology
pages: 139-142 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 36 Sensor, Network and Algorithm Development (Solar Deployment)
pages: 143-146 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 37 Other Modernize Grid Management
pages: 147-150 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 38 Substation Cybersecurity
pages: 151-154 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 39 Operational Technology and Error Free Communication
pages: 155-158 of 158		Exhibit A-12, Schedule B5.4, Page 11 of 12, Line 40 Analog Lines Elimination

(a)	(b)
Program:	ADMS: DMS/OMS (Pg. 1 of 4)
Purpose and Necessity:	The current DMS and OMS systems are outdated, non-integrated and with partial functionality. The current DMS system is at end of life. The existing infrastructure supporting the software is no longer commercially available, increasing the risk of recoverability from system failures and putting the safe operation of the electric system at risk. The current DMS and OMS were developed by separate companies and not built on a common data platform. The OMS is not connected to the DMS, which makes real time operation and analysis inefficient and difficult. The Company cannot upgrade further without replacing the hardware (which is ~15 years old) and performing a significant upgrade of the application software. The hardware and software support is currently being phased out by vendors, which increases risks due to the lack of replacement hardware, software patches, and support.
Category:	Technology and Automation

(a)	(b)
Program:	ADMS: DMS/OMS (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 2
DGP Section:	12.1
Scope:	• Purchase software and hardware for DMS/OMS systems • Install DMS/OMS portion of the ADMS to integrate various operational technologies and analytical tools • Integrate new systems with other key systems, such as mapping and customer information systems like AMI to provide potential switching and dispatching solutions to these personnel to reduce the cost and time of outages • Install functions to perform all electrical system analysis from a single view of the system • Install functions to perform digital switch orders to enhance employee safety in the field



(a)	(b)						
Program:	ADMS: DMS/OMS (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Enhance safety and restoration times by providing real-time situational awareness to all resources • Enhance safety, reliability, and efficiency by eliminating paper maps and switching orders • Provide platform for Fault Location, Isolation and Restoration • Enable remote switching operations • Support integration of Distributed Energy Resources						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)
Program:	ADMS: DMS/OMS (Pg. 4 of 4)
Current Projects:	ADMS: DMS/OMS
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $64.2 M

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~4,267~~	~~5,055~~	~~9,323~~
	~~Material~~	~~853~~	~~1,011~~	~~1,865~~
	~~Other~~	~~569~~	~~674~~	~~1,243~~
	~~**Total**~~	~~**5,690**~~	~~**6,741**~~	~~**12,430**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	4,722	5,999	10,722
	Material	171	-	171
	Other	797	741	1,538
	Total	**5,690**	**6,741**	**12,430**

(a)	(b)
Program:	ADMS: Network Management System (Pg. 1 of 4)
Purpose and Necessity:	The foundation for the evolving Distribution Planning processes is a high-quality network model including grid topology and electrical characteristics. Network model investments include technology to better align field conditions and maps to the digital representation of the grid, integrations between asset systems, new data models to support planning and operations topology and characteristics, and advanced analytics to leverage sensor data to continuously improve the network model.
Category:	Technology and Automation

(a)	(b)
Program:	ADMS: Network Management System (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 3
DGP Section:	12.9
Scope:	• Common platform operating maps - Configuration and software scripts developed to support cartographic representations of subtransmission, AC Network, and URD maps. Transfer, reconciliation, and field validation of the new configuration within the ESRI platform. • Asset data integrations - software integration among enterprise asset systems (Maximo, ESRI, SAP) for electric asset data. • Network model enhancements - additional detailed data model configuration and initial attribution to support electronic switching and tagging, as well as future distribution planning processes such as hosting capacity and scenario analysis. • Grid model analytics - leverage the enterprise data platform to explore and develop machine learning algorithms to address data quality gaps based on existing and derived information. Once the algorithms are tested and proven, DTEE will integrate the machine learning workflow with source systems to raise overall data effectiveness. • Network Model orchestrator (beyond 2025) - select and implement software solution to manage network model versions for planned work, including scenario configurations

(a)	(b)						
Program:	ADMS: Network Management System (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provide foundation needed to deploy advanced grid simulations and analytics called for by the evolving distribution network. • Improve situational awareness by generating operating maps used in the field from the same source that is powering planning and operations electronic tools • Perform data input and maintenance efficiently through asset data integrations and algorithms to address data quality gaps						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x	x	

(a)	(b)			
Program:	ADMS: Network Management System (Pg. 4 of 4)			
Current Projects:	Network Model			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $6.3 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~350~~	~~1,813~~	~~2,163~~
	~~Material~~	~~70~~	~~363~~	~~433~~
	~~Other~~	~~47~~	~~242~~	~~288~~
	~~**Total**~~	~~**467**~~	~~**2,417**~~	~~**2,883**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	415	2,151	2,566
	Material	-	-	-
	Other	51	266	317
	Total	**467**	**2,417**	**2,883**

(a)	(b)
Program:	SOC Modernization:ESOC (Pg. 1 of 4)
Purpose and Necessity:	SOC is the most critical facility in Distribution Operations. Personnel in the SOC operate the generation, subtransmission, and distribution systems in southeast Michigan, monitor alarms and system conditions, and direct field personnel to operate electrical elements for routine switching, risk mitigation, and outage restoration. SOC also works with Central Dispatch personnel to ensure appropriate crews are assigned to address system issues. The current SOC poses several limitations which the utilities DTE Electric has benchmarked have already addressed. Outdated facility: The facility lacks the redundancy in mechanical and electrical systems that are necessary to ensure continued operations in the event of a crisis. Outdated technology: SOC utilizes a magnetic tile representation of the electric network, as opposed to an electronic display board of the transmission, subtransmission and distribution network as is now very common in the industry. This severely limits situational awareness, which is critical at all times, but particularly during periods of crisis (for example during large storms). The current tile map board is also running out of space to accommodate growth of the system. The lack of modern technology also limits training opportunities. Space limitations: DTE Electric's SOC and dispatch personnel are currently physically separated, and their primary method of interaction is through repeated phone calls to share information and collaborate on dispatching field resources. The current SOC does not have sufficient space to achieve the co-location of these resources that manage the system and dispatch field personnel to resolve operational issues. The co-location of SOC and dispatch personnel is a well-established best practice, as it provides significant customer benefits in terms of the speed at which issues can be addressed and electric service can be restored. Limited visibility of telecommunication infrastructure performance: The reliability of telecommunication paths from field devices to the SOC is critical for the effective monitoring of the grid and for remote operations. Developing the ability to separately monitor the condition of the telecommunication network through the construction of a Smart Grid Network Operation Center (SGNOC) is part of the SOC Modernization project.
Category:	Technology and Automation

(a)	(b)
Program:	SOC Modernization:ESOC (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 4
DGP Section:	12.2
Scope:	• Complete design and construct primary • Complete design and construct the Smart Grid Network Operation Center

(a)	(b)						
Program:	SOC Modernization:ESOC (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Upgrade System Operations Center (SOC) to meet industry standards • Support faster restoration times during outages and improve system resiliency during major storms • Focused monitoring capabilities for hardware, software, network, security, endpoints, and field devices specific to the operation of the electric system through the SGNOC						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)			
Program:	SOC Modernization:ESOC (Pg. 4 of 4)			
Current Projects:	SOC Modernization:ESOC			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $14.4 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~46~~	~~-~~	~~46~~
	~~Material~~	~~9~~	~~-~~	~~9~~
	~~Other~~	~~6~~	~~-~~	~~6~~
	~~**Total**~~	~~**62**~~	~~**-**~~	~~**62**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	54	-	54
	Material	-	-	-
	Other	7	-	7
	Total	**62**	**-**	**62**

(a)	(b)
Program:	SOC Modernization:ASOC (Pg. 1 of 4)
Purpose and Necessity:	Though it does meet minimum regulatory requirements for NERC regulated Balancing Authority and Generator Operator tasks, managing the distribution system and recovering from a storm or other disaster from the existing backup SOC would be extraordinarily challenging and lead to very slow restoration of the distribution system. The new backup SOC, also known as the Alternate System Operations Center (ASOC) will have the appropriate square footage required to collocate personnel and will have the appropriate mechanical and electrical system redundancies. In addition, the new ASOC will also be outfitted with the same ADMS technology (including a video wall) as the new ESOC for seamless operations during the transition between facilities. This will allow the Company to continue the use of the electronic records of the Network Model rather than reverting to a paper version as is used in the current backup facility
Category:	Technology and Automation

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)
Program:	SOC Modernization:ASOC (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 5
DGP Section:	12.2
Scope:	• Complete design and construct an Alternative SOC site

(a)	(b)						
Program:	SOC Modernization:ASOC (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Upgraded Alternative System Operations Center (ASOC) to meet industry standards • Supports faster restoration times during outages and improve system resiliency during major storms						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)			
Program:	SOC Modernization:ASOC (Pg. 4 of 4)			
Current Projects:	SOC Modernization:ASOC			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $34.5 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~1,248~~	~~14,979~~	~~16,227~~
	~~Material~~	~~250~~	~~2,996~~	~~3,245~~
	~~Other~~	~~166~~	~~1,997~~	~~2,164~~
	~~**Total**~~	~~**1,664**~~	~~**19,972**~~	~~**21,636**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	1,005	12,982	13,987
	Material	478	5,908	6,386
	Other	181	1,082	1,263
	Total	**1,664**	**19,972**	**21,636**

(a)	(b)
Program:	Grid Automation Telecommunications (13.2kV Telecommunications) (Pg. 1 of 4)
Purpose and Necessity:	Many devices, such as pole-top and substation equipment, on DTE Electric's system are either not connected for remote monitoring and control or are connected through a communication network that has been developed in patchwork fashion over many decades. Where the communication network is available, it is frequently made up of diverse equipment and technology, such as fiber, microwave, leased phone lines, radio and other. Furthermore, much of the communication available is completed through a point-to-point network that is less reliable than current mesh technologies. Also, because the equipment that enables the current network has been installed over an extended timeframe, some of the equipment has become obsolete and spare parts are no longer available. The Grid Automation Telecommunication program is designed to address these communication gaps and to deploy a consistent channel with sufficient and reliable bandwidth to meet the current and growing requirements of a modern electrical system and to allow the deployment of the appropriate cybersecurity protocols.
Category:	Technology and Automation

(a)	(b)
Program:	Grid Automation Telecommunications (13.2kV Telecommunications) (Pg. 2 of 4)
Line Number:	Exhibit A-13, Schedule B5.5, Page 11, Line 6
DGP Section:	12.3
Scope:	• Extend the telecommunication network through a combination of supplementing the existing Wi-Fi Mesh, building fiber to existing substations sites, and establishing a telecommunications network inside existing substations to connect relays and metering • Install standardized telecommunications and SCADA cabinets in each substation and build the telecommunications path to the substations • Replace microwave tower transmitters and WiMAX pole top transmitters with transmitters operating on different frequencies (5G & Wi-Fi upgrade) (FCC mandated reassignment of Microwave and WiMAX frequencies to 5G cellular and Wi-Fi devices)

(a)	(b)						
Program:	Grid Automation Telecommunications (13.2kV Telecommunications) (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Allows for SCADA upgrades and automation • Allows for ADMS to monitor and control devices • Enhances cyber security and resiliency • Forms the basis of a smart grid • Allows for greater resiliency during weather events and in cases of equipment failure • Eliminates dial-up modems for substation remote access • Enables many future use cases and technologies beyond grid devices						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x	x	x

(a)	(b)			
Program:	Grid Automation Telecommunications (13.2kV Telecommunications) (Pg. 4 of 4)			
Current Projects:	Grid Automation Telecommunications Communication Upgrade - TCHPP Demo			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $43.0 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~1,850~~	~~11,938~~	~~13,788~~
	~~Material~~	~~370~~	~~2,388~~	~~2,758~~
	~~Other~~	~~247~~	~~1,592~~	~~1,838~~
	~~**Total**~~	~~**2,467**~~	~~**15,917**~~	~~**18,383**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	1,480	9,551	11,031
	Material	740	4,775	5,516
	Other	246	1,590	1,836
	Total	**2,467**	**15,917**	**18,383**

(a)	(b)
Program:	Distribution Sensing and Monitoring (incldg Line Sensors) (Pg. 1 of 4)
Purpose and Necessity:	Line sensors (smart fault indicators) and low-cost substation monitoring equipment provides key situational awareness data to Distribution Operations, such as real time fault status and magnitude as well as near-real-time (5 minute) circuit loading information. These tools allow DTE to gain important visibility into parts of the grid where there is no existing SCADA solution and can defer costly equipment upgrades needed to implement a long-term SCADA solution. Furthermore, in an operational context, these devices enable shorter restoration times through a better understanding of the causes and locations of outages throughout our distribution system.
Category:	Technology and Automation

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DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)
Program:	Distribution Sensing and Monitoring (incldg Line Sensors) (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 7
DGP Section:	12.4
Scope:	• Install overhead line sensors on distribution circuits that do not have any source of fault locating data • Replace defective line sensors and currently-installed sensors that have obsolete telecommunication technology (cellular 3G) • Install low-cost substation monitoring equipment at 4.8kV substations that don't have SCADA, including both feeder and transformer positions • Deploy voltage-sensing smart fault indicators at key distribution locations, particularly those with high DER penetration • Deploy underground smart fault indicators on underground circuits or portions of circuits with no other source of fault locating data • Deploy underground smart fault indicators on A/C Network netbanks that don't have SCADA monitoring capability • Integrate PQ data from existing and new ION meters installed at low-cost monitoring substation transformer positions

(a)	(b)						
Program:	Distribution Sensing and Monitoring (incldg Line Sensors) (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Help identify and locate faults and dispatch crews to the right location • Reduce patrol time and time to perform switching analysis and load jumpering • Provide more accurate load data for system planning and design • Enhance grid-wide situational awareness as a low-cost alternative to SCADA • Understand DER impacts to customer voltage and power quality • Improve customer reliability by avoiding approximately 20 M customer minute interruptions annually by 2026						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:					x	x	

(a)	(b)
Program:	Distribution Sensing and Monitoring (incldg Line Sensors) (Pg. 4 of 4)
Current Projects:	Line Sensors Underground Line Sensor Technology Voltage-Sensing Smart Fault Indicator Technology Low-Cost Substation Monitoring Ion Meter Data Integration
Budget Basis:	• Engineering estimate
Cost:	Estimated project spend in 2021-2023: $17.4 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~608~~	~~6,562~~	~~7,171~~
	~~Material~~	~~122~~	~~1,312~~	~~1,434~~
	~~Other~~	~~81~~	~~875~~	~~956~~
	~~**Total**~~	~~**811**~~	~~**8,750**~~	~~**9,561**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	284	3,062	3,346
	Material	446	4,812	5,258
	Other	81	875	956
	Total	**811**	**8,750**	**9,561**

(a)	(b)
Program:	SCADA / AMI Enhancements (Pg. 1 of 4)
Purpose and Necessity:	DTEE's deployment of an Advanced Distribution Management System (ADMS), along with an anticipated Distributed Energy Resource Management System (DERMS), will have a profound impact on the operation of the grid to provide safer, more reliable power to its customers. These tools provide advanced applications that require timely, accurate and available data sources in order to inform correct operating decisions. Two of the most vital sources of system data are SCADA and AMI.
Category:	Technology and Automation

(a)	(b)
Program:	SCADA / AMI Enhancements (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 8
DGP Section:	12.4
Scope:	• SCADA on all 3-phase operating devices: • Substation transformer data enhancements: DTEE plans to equip all substation and station transformers with breaker duty monitoring for asset health, and sequence of events recording. • SCADA on all voltage regulating equipment: Voltage regulating equipment, such as regulators and capacitors, can be found both in the substations and on the overhead circuits. As part of the Sensing and Monitoring strategy, DTEE expects to outfit all equipment with 2-4 second interval SCADA data. • C&I and large customer meter data enhancement • Push notifications for AMI near DER or CVR/VVO

(a)	(b)						
Program:	SCADA / AMI Enhancements (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• In addition to the remote-control capabilities SCADA provides, the variety of available data and alarms from all remote SCADA-enabled field devices provides crucial situational awareness and feedback to System Operations. • AMI provides key data directly from the customer • Provides safer, more reliable power to its customers						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x		

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Distribution Plant Capital Project Detail - Technology and Automation

Case No.: U-20836
Exhibit: A-23
Schedule: M6 Revised
Witness: S. G. Pfeuffer

(a)	(b)
Program:	SCADA / AMI Enhancements (Pg. 4 of 4)
Current Projects:	SCADA / AMI Enhancements
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $2.3 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~94~~	~~938~~	~~1,031~~
	~~Material~~	~~19~~	~~188~~	~~206~~
	~~Other~~	~~13~~	~~125~~	~~138~~
	~~**Total**~~	~~**125**~~	~~**1,250**~~	~~**1,375**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	39	388	426
	Material	73	725	798
	Other	14	138	151
	Total	**125**	**1,250**	**1,375**

(a)	(b)
Program:	Automation: Substation (Pg. 1 of 4)
Purpose and Necessity:	Distribution automation technologies can achieve substantial grid impacts including improved Fault Location, Isolation and Service Restoration (FLISR) capabilities, improved distribution system resilience to extreme weather, more effective equipment monitoring and preventative maintenance, more efficient use of repair crews and truck rolls and improved grid integration of selected distributed energy resources (DER). Distribution Automation, spanning from automated field devices, advanced protection, to SCADA, is identified as one of the core components for grid modernization as seen in the DOE’s DSPx framework, referenced in Part III of my direct testimony. Distribution Automation provides immediate system benefits, while also supporting other functional capabilities in the DSPx framework that may be added in the future, as discussed above.
Category:	Technology and Automation

(a)	(b)
Program:	Automation: Substation (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 9
DGP Section:	12.5
Scope:	Substation Automation • Control panel replacements with modern, standardized relays • Installation of Remote Terminal Units (RTU) • Incorporation of the RTUs and automation controls in the same substation network • Breaker replacements as needed

(a)	(b)						
Program:	Automation: Substation (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduction in the number customer interruptions and outage duration • Improved distribution system resilience to extreme weather • More effective equipment monitoring and preventative maintenance • More efficient use of repair crews and truck rolls and improved grid integration of selected distributed energy resources (DER)						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)
Program:	Automation: Substation (Pg. 4 of 4)
Current Projects:	Automation: Substation
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $5.2 M This project is expected to continue beyond 2023

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~255~~	~~1,875~~	~~2,130~~
	~~Material~~	~~51~~	~~375~~	~~426~~
	~~Other~~	~~34~~	~~250~~	~~284~~
	~~**Total**~~	~~**340**~~	~~**2,500**~~	~~**2,840**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	256	1,833	2,089
	Material	50	418	467
	Other	34	250	284
	Total	**340**	**2,500**	**2,840**

(a)	(b)
Program:	Automation: Distribution (Pg. 1 of 4)
Purpose and Necessity:	The Smart Grid Investment Grant Projects, as discussed in the DOE report "Distribution Automation: Results from the Smart Grid Investment Grant Program", demonstrated distribution automation technologies can achieve substantial grid impacts including improved Fault Location, Isolation and Service Restoration (FLISR) capabilities, improved distribution system resilience to extreme weather, more effective equipment monitoring and preventative maintenance, more efficient use of repair crews and truck rolls and improved grid integration of selected distributed energy resources (DER). Distribution Automation, spanning from automated field devices, advanced protection, to SCADA, is identified as one of the core components for grid modernization as seen in the DOE's DSPx framework, referenced in Figure 3, Part III of my direct testimony and discussed in detail in the EPRI report included in this testimony as Exhibit A-23, Schedule M9. Distribution Automation provides immediate system benefits, while also supporting other functional capabilities in the DSPx framework that may be added in the future.
Category:	Technology and Automation

(a)	(b)
Program:	Automation: Distribution (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 10
DGP Section:	12.5
Scope:	• Installation of remotely controllable / automatic reclosers and sensing devices • Reconductoring as needed to enable circuit load transfer during outage conditions

(a)	(b)						
Program:	Automation: Distribution (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduction in the number customer interruptions and outage duration • Improved distribution system resilience to extreme weather • More effective equipment monitoring and preventative maintenance • More efficient use of repair crews and truck rolls and improved grid integration of selected distributed energy resources (DER)						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)
Program:	Automation: Distribution (Pg. 4 of 4)
Current Projects:	Circuit Automation
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $7.0 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~253~~	~~3,125~~	~~3,378~~
	~~Material~~	~~51~~	~~625~~	~~676~~
	~~Other~~	~~34~~	~~417~~	~~450~~
	~~**Total**~~	~~**337**~~	~~**4,167**~~	~~**4,504**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	172	2,138	2,310
	Material	131	1,613	1,744
	Other	34	417	450
	Total	**337**	**4,167**	**4,504**

(a)	(b)
Program:	CVR/VVO (Pg. 1 of 4)
Purpose and Necessity:	Volt Var Optimization (VVO) manages system-wide voltage levels and reactive power flow to achieve one or more specific operating objectives. The objectives can include reducing losses, managing voltage volatility due to intermittent renewable generation, optimizing operating parameters and/or optimizing power factors, etc. Conservation Voltage Reduction (CVR), as one of the VVO options, is designed to maintain customer voltage levels in the lower portion of the allowable voltage ranges, thus reducing system losses, peak demand or energy consumption.
Category:	Technology and Automation

(a)	(b)
Program:	CVR/VVO (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 11
DGP Section:	12.6
Scope:	Pilot CVR/VVO on six distribution circuits by end of 2020: • Installing Remote Terminal Units and SCADA at substations in order to lower bus voltage • Installing advanced line sensors on circuits • Installing remote controllable capacitor banks to improve circuit voltage profile during peak hours • Upgrading existing capacitor banks to improve circuit voltage during peak hours Scope for 2021/2022 program that leverages ADMS to achieve advanced CVR/VVO: • Upgrade substation transformer load tap changers (LTC) with remote control capability in order to control bus voltage • Install remote controls for existing overhead capacitor banks or install new smart capacitor banks at targeted locations on the circuits • Install remote controls for line regulators • Install voltage sensors at strategic locations to monitor primary voltage levels • Implement the Volt-Var Control (VVC) module from the ADMS to allow real-time voltage control and optimization

(a)	(b)						
Program:	CVR/VVO (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	Pilot CVR VVO: • 0.9%-1.4% for peak demand and 0.7%-1.0% on energy consumptions on substations installed with pilot CVR/VVO Advanced CVR VVO: • 1.5-3.5% savings in energy consumption and peak demand on substations installed with advanced CVR/VVO						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x				x	

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)			
Program:	CVR/VVO (Pg. 4 of 4)			
Current Projects:	CVR/VVO Capacitor Placement and Control Program			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $28.9 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~875~~	~~10,876~~	~~11,751~~
	~~Material~~	~~175~~	~~2,175~~	~~2,350~~
	~~Other~~	~~117~~	~~1,450~~	~~1,567~~
	~~**Total**~~	~~**1,167**~~	~~**14,502**~~	~~**15,668**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	688	8,556	9,244
	Material	362	4,495	4,857
	Other	117	1,450	1,567
	Total	**1,167**	**14,502**	**15,668**

(a)	(b)
Program:	NWA: O'Shea Energy Storage (Pg. 1 of 4)
Purpose and Necessity:	O'Shea Park in Detroit is the site of a 2MW solar array connected to Chicago Substation. The solar generation frequently exceeds circuit load, causing power to flow back through the substation. During periods where solar generation is intermittent or changing rapidly, voltage data as reported by the AMI meters indicates there is some potential for small over-voltages or flickers.
Category:	Technology and Automation

(a)	(b)
Program:	NWA: O'Shea Energy Storage (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 12
DGP Section:	12.7
Scope:	• Install a 1MW x 1MWh battery co-located with the solar array.

(a)	(b)						
Program:	NWA: O'Shea Energy Storage (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Improve power quality in the area by addressing voltage instability						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:					x		

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)			
Program:	NWA: O'Shea Energy Storage (Pg. 4 of 4)			
Current Projects:	NWA: O'Shea Energy Storage			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $1.4 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~16~~	~~-~~	~~16~~
	~~Material~~	~~3~~	~~-~~	~~3~~
	~~Other~~	~~2~~	~~-~~	~~2~~
	~~**Total**~~	~~**21**~~	~~-~~	~~**21**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	17	-	17
	Material	2	-	2
	Other	2	-	2
	Total	**21**	**-**	**21**

(a)	(b)
Program:	NWA: Battery Trailer (Pg. 1 of 4)
Purpose and Necessity:	Explore and understand non-wire alternatives to provide relief to the electrical system.
Category:	Technology and Automation

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)
Program:	NWA: Battery Trailer (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 13
DGP Section:	12.7
Scope:	• Build a 1MW x 4MWh trailer-mounted mobile battery storage unit • Test the unit and develop documentation and required operating procedures to deploy the mobile battery in the field • Purchase 4 additional trailers by 2025 pending results of initial evaluation of the equipment

(a)	(b)					
Program:	NWA: Battery Trailer (Pg. 3 of 4)					
Customer benefit / Effect on cost of operation and reliability:	• Use in place of traditional generators • Support system needs during shutdowns or maintenance • Use at substations or on circuits to reduce peak load as part of a broader NWA project					
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x					

(a)	(b)			
Program:	NWA: Battery Trailer (Pg. 4 of 4)			
Current Projects:	NWA: Battery Trailer			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $2.0 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~63~~	~~938~~	~~1,000~~
	~~Material~~	~~13~~	~~188~~	~~200~~
	~~Other~~	~~8~~	~~125~~	~~133~~
	~~**Total**~~	~~**83**~~	~~**1,250**~~	~~**1,333**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	24	88	112
	Material	50	1,025	1,075
	Other	9	138	147
	Total	**83**	**1,250**	**1,333**

(a)	(b)
Program:	NWA: Omega Load Relief (Pg. 1 of 4)
Purpose and Necessity:	Recently in the Harrison Twp./Mount Clemens area there has seen a large influx of indoor agriculture operations. Omega substation currently feeds this area. The 40kv truck lines feeding Omega substation are currently exceeding their emergency ratings increasing the risk of stranded load in the area. the Blocking at this sub is currently set at 10.9 MVA. The 2020 peak at OMEGA was 16.3 MVA with over 980 hours of blocking. There has been a total of 19 load requests in this area since 2019. There is an additional 1.5 MVA of committed new customer load expected to energize in 2021. There is an additional 3.6 MVA expected by Q2 2022. The current system in the area cannot handle the expected load growth without increasing the risk of stranded load and equipment overloads. This project will utilize NWA's to reduce loading on OMEGA substation and mitigate overloads on the subtransmissions feeds.
Category:	Technology and Automation

(a)	(b)
Program:	NWA: Omega Load Relief (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 14
DGP Section:	12.7
Scope:	• Purchase 2 mobile batteries for Omega • Install mobile batteries at Omega Substation • 2MW utility scale solar site at Gibraltar trade center. If site not available rooftop solar options will be pursued

(a)	(b)						
Program:	NWA: Omega Load Relief (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Provides approximately 1 MVA of load relief at peak times • Reduces blocking hours and the risk of stranded load						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x					

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

Case No.: U-20836
Exhibit: A-23
Schedule: M6 Revised
Witness: S. G. Pfeuffer

(a)	(b)
Program:	NWA: Omega Load Relief (Pg. 4 of 4)
Current Projects:	NWA: Omega Load Relief
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $7.8 M

~~**Test Year ($000's):**~~

	~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
~~Total Labor (DTE Electric & Contractors)~~	~~503~~	~~-~~	~~503~~
~~Material~~	~~101~~	~~-~~	~~101~~
~~Other~~	~~67~~	~~-~~	~~67~~
~~**Total**~~	~~**670**~~	~~**-**~~	~~**670**~~

Test Year ($000's):

	2 mos. 11/01/22 12/31/22	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
Total Labor (DTE Electric &	201	-	201
Material	375	-	375
Other	94	-	94
Total	**670**	**-**	**670**

(a)	(b)
Program:	NWA: Fisher Load Relief (Pg. 1 of 4)
Purpose and Necessity:	Fisher Substation is over firm by approximately 2.5 MVA. In addition, two circuits served by Fisher are over or expected to be over the 8MVA design standard for 13.2kV circuits.
Category:	Technology and Automation

(a)	(b)
Program:	NWA: Fisher Load Relief (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 15
DGP Section:	12.7
Scope:	• EWR Scope - Residential implementation, incentives and installation labor, C&I (commercial and industrial) implementation and incentives • DR Scope - Program implementation for Smart Savers and Cool Currents, technology platform and IAC equipment upgrades • STDF Scope - Establish STDF along same subtransmission line that feeds Fisher Substation, split DC 8188 FISHR with STDF circuit, install new cable and conduit

(a)	(b)						
Program:	NWA: Fisher Load Relief (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce equipment risk by providing load relief • Provide sufficient capacity to serve existing and new customers • Defer traditional load relief projects						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x			x		

(a)	(b)			
Program:	NWA: Fisher Load Relief (Pg. 4 of 4)			
Current Projects:	NWA: Fisher Load Relief			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $4.3 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~105~~	~~2,114~~	~~2,219~~
	~~Material~~	~~21~~	~~423~~	~~444~~
	~~Other~~	~~14~~	~~282~~	~~296~~
	~~**Total**~~	~~**140**~~	~~**2,819**~~	~~**2,958**~~
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	36	733	769
	Material	89	1,804	1,893
	Other	14	282	296
	Total	**140**	**2,819**	**2,958**

(a)	(b)
Program:	NWA: Port Austin Load Relief (Pg. 1 of 4)
Purpose and Necessity:	Port Austin substation is over its firm rating and one circuit is over its day-to-day rating. The traditional investment to alleviate load in this area would be to upgrade the substation and some of the circuits to 13.2kV. This program is to explore and understand non-wire alternatives to provide load relief to the electrical system.
Category:	Technology and Automation

(a)	(b)
Program:	NWA: Port Austin Load Relief (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 16
DGP Section:	12.7
Scope:	• Install 500kW solar site • Use one existing 1MW x 4MWh battery from Omega • Explore feasibility of microgrid equipment and controls that could serve about 200 kVA

(a)	(b)						
Program:	NWA: Port Austin Load Relief (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce equipment risk by providing load relief						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x			x		

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

Case No.: U-20836
Exhibit: A-23
Schedule: M6 Revised
Witness: S. G. Pfeuffer

(a)	(b)
Program:	NWA: Port Austin Load Relief (Pg. 4 of 4)
Current Projects:	NWA: Port Austin Load Relief
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $4.5 M

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~237~~	~~1,563~~	~~1,801~~
	~~Material~~	~~47~~	~~313~~	~~360~~
	~~Other~~	~~32~~	~~208~~	~~240~~
	~~**Total**~~	~~**317**~~	~~**2,084**~~	~~**2,401**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	120	1,126	1,246
	Material	165	750	915
	Other	32	208	240
	Total	**317**	**2,084**	**2,401**

(a)	(b)
Program:	NWA: Veridian (Pg. 1 of 4)
Purpose and Necessity:	Veridian is a planned development in Ann Arbor. The area is served by Regent substation, which is a 4.8kV substation. While the substation loading is not the primary concern, the overall load of the development is expected to approach 1.5MVA, and none of the existing circuits would have capacity to accommodate that load.
Category:	Technology and Automation

(a)	(b)
Program:	NWA: Veridian (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 17
DGP Section:	12.7
Scope:	• Leverage customer owned solar and storage • Create community microgrid utilizing demand response and grid controls

(a)	(b)						
Program:	NWA: Veridian (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduce equipment risk by providing load relief • Provide capacity to serve new development • Defers conversion to 13.2kV						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x			x		

(a)	(b)
Program:	NWA: Veridian (Pg. 4 of 4)
Current Projects:	NWA: Veridian
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $7.4 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~

	~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
~~Total Labor (DTE Electric & Contractors)~~	~~230~~	~~3,484~~	~~3,714~~
~~Material~~	~~46~~	~~697~~	~~743~~
~~Other~~	~~31~~	~~465~~	~~495~~
~~**Total**~~	~~**307**~~	~~**4,645**~~	~~**4,952**~~

Test Year ($000's):

	2 mos. 11/01/22 12/31/22	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
Total Labor (DTE Electric &	276	2,462	2,738
Material	-	1,719	1,719
Other	31	465	495
Total	**307**	**4,645**	**4,952**

(a)	(b)
Program:	NWA: Small Solar and Storage Testbed (Pg. 1 of 4)
Purpose and Necessity:	Many residential and small commercial rooftop solar interconnections are being proposed with some level of battery storage. The MPSC has requested DTEE provide a solution to properly meter and integrate these storage solutions into the grid and allow battery systems to export onto the grid while still maintaining compliance with distributed generation, net metering and other tariffs.
Category:	Technology and Automation

(a)	(b)
Program:	NWA: Small Solar and Storage Testbed (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 18
DGP Section:	12.7
Scope:	• Install solar arrays, commonly used inverters, storage units, switching and metering systems, and utility gateway communication systems at a DTEE site and allow for understanding the impact it will have on the electric grid.

(a)	(b)						
Program:	NWA: Small Solar and Storage Testbed (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Allows for validation of behavior, interaction and compliance of the new features for smart inverters and acts as a location to test future new features and capabilities while also serving as a training platform for DTEE field services, engineers and technicians • Standards can be developed around these technologies to ensure safety and reliable operation						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x			x		

(a)	(b)			
Program:	NWA: Small Solar and Storage Testbed (Pg. 4 of 4)			
Current Projects:	NWA: Small Solar and Storage Testbed			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $1.0 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~47~~	~~172~~	~~219~~
	~~Material~~	~~9~~	~~34~~	~~44~~
	~~Other~~	~~6~~	~~23~~	~~29~~
	~~**Total**~~	~~**63**~~	~~**229**~~	~~**292**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	25	66	91
	Material	31	138	169
	Other	6	25	31
	Total	**63**	**229**	**292**

(a)	(b)
Program:	NWA: EV Charging Demonstration at ACM (Pg. 1 of 4)
Purpose and Necessity:	The purpose of this project is to explore and understand the impacts of EV charging on the electrical gild.
Category:	Technology and Automation

(a)	(b)
Program:	NWA: EV Charging Demonstration at ACM (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 19
DGP Section:	12.7
Scope:	• ACM (American Center for Mobility) has the capability to test autonomous electric vehicles. DTEE is supporting the implementation of the Delta Power Electronics DC Xtreme fast charger when it becomes available in 2021 as part of a DOE project. • DTEE will use this partnership to understand the impacts on the electrical grid.

(a)	(b)						
Program:	NWA: EV Charging Demonstration at ACM (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Ability to develop monitoring and control capabilities with smart charge controls and inductive road charging to ensure reliable and secure interfaces • Enhance knowledge of these new technologies on grid impacts						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x			x		

(a)	(b)
Program:	NWA: EV Charging Demonstration at ACM (Pg. 4 of 4)
Current Projects:	NWA: EV Charging Demonstration at ACM
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $2.6 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~100~~	~~813~~	~~913~~
	~~Material~~	~~20~~	~~163~~	~~183~~
	~~Other~~	~~13~~	~~108~~	~~122~~
	~~**Total**~~	~~**133**~~	~~**1,083**~~	~~**1,217**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	48	444	492
	Material	73	553	626
	Other	12	87	99
	Total	**133**	**1,083**	**1,217**

(a)	(b)
Program:	Technology Programs & NWA (Pg. 1 of 4)
Purpose and Necessity:	Test new technologies and concepts on a small scale to ensure system compatibility and economic justification before executing them system-wide.
Category:	Technology and Automation

(a)	(b)
Program:	Technology Programs & NWA (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 20
DGP Section:	12.9
Scope:	• Automatic pole top devices for the 4.8 kV system • SCADA-enabled overhead capacitors • SCADA-enabled overhead regulators

(a)	(b)						
Program:	Technology Programs & NWA (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Test new technology for compatibility and economic justification prior to system-wide implementation • Develop experience and knowledge base on new technologies • Provide learning prior to system wide deployment to improve project execution						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:					x		x

(a)	(b)			
Program:	Technology Programs & NWA (Pg. 4 of 4)			
Current Projects:	Pilot: Secondary and Service Undergrounding IST Solar Energy Storage New Technology Pilots Trip Saver Program Capacitor Placement & Control Program			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.0 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

(a)	(b)
Program:	DERMS (Pg. 1 of 4)
Purpose and Necessity:	This program aims to modernize the company's existing telemetry and control capabilities for medium and large Distributed Energy Resources using industry-standard equipment to lower the cost, maximize visibility and ultimately support the safe and efficient integration of these resources.
Category:	Technology and Automation

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DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)
Program:	DERMS (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 21
DGP Section:	12.8
Scope:	• DERA integration and ICCP connectivity

(a)	(b)						
Program:	DERMS (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Improved visibility into DER output translates into more efficient operations of the distribution circuits to which these units are connected. More timely data acquisition supports the situational awareness of the control room, which translates into safer and more reliable operation. • Refer to the testimony of Pankaj Sharma for further explanation of customer benefits						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x			x		

(a)	(b)			
Program:	DERMS (Pg. 4 of 4)			
Current Projects:	Large / Medium Sized DER Monitoring & Control Upgrade DR-SOC Monitored Solar Sites to RTAC RTU Viper Reclosing Sensing / Data			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $5.1 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~318~~	~~1,588~~	~~1,905~~
	~~Material~~	~~64~~	~~318~~	~~381~~
	~~Other~~	~~42~~	~~212~~	~~254~~
	~~**Total**~~	~~**423**~~	~~**2,117**~~	~~**2,540**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	199	995	1,194
	Material	182	910	1,092
	Other	42	212	254
	Total	**423**	**2,117**	**2,540**

(a)	(b)
Program:	DER Control (Pg. 1 of 4)
Purpose and Necessity:	This program is intended to provide the SCADA and back-office side of the changes required to support dispatchable DER integration at scale, for support of FERC Orders 2222 and 841.
Category:	Technology and Automation

(a)	(b)
Program:	DER Control (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 22
DGP Section:	12.8
Scope:	• DER Control installed in over thirty solar sites

(a)	(b)						
Program:	DER Control (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• DERMS are designed to streamline the integration of large amounts of DER into utility systems. This integration improves the data fed to Contingency Analysis and State Estimator systems, permitting them to converge more readily and provide solutions that more accurately reflect the distribution network's power flow. In turn, this improves the Control Room's situational awareness, which translates into safer and more reliable operation of the distribution system.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x	x		x		

(a)	(b)			
Program:	DER Control (Pg. 4 of 4)			
Current Projects:	DERA Monitoring Integration ICCP Connectivity DERs in a DERA ICCP Connectivity - Load shed in a DERA AMI, Secondary, De-Aggregated Load Data OSI DERMS Module OSI DERMS Module Modeling OSE Enterprise Customer Agreement			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.6 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~36~~	~~181~~	~~218~~
	~~Material~~	~~7~~	~~36~~	~~44~~
	~~Other~~	~~5~~	~~24~~	~~29~~
	~~**Total**~~	~~**48**~~	~~**242**~~	~~**290**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	7	36	44
	Material	39	193	232
	Other	2	12	15
	Total	**48**	**242**	**290**

(a)	(b)
Program:	Mobile Technology (Pg. 1 of 4)
Purpose and Necessity:	Mobile technology allows collecting and distributing data at the point of activity through mobile devices, across all personas and use cases. Mobile capabilities include both devices and applications that are engineered for mobile access and usage. Applications include dispatch, work execution and forms digitization, location tracking, route navigation, analytics and secure file sharing. Additionally, with the onset of the Covid-19 pandemic, Distribution Operations has accelerated plans to deploy more capable technology into the field with an emphasis on system offerings that provide the frontline workers and leaders the flexibility of remaining in the field for extended periods without having system constraints that require them to return to the service centers or to congregate as frequently as was needed in the past. Even after the pandemic, these new skills and processes will continue to drive efficiency.
Category:	Technology and Automation

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Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)
Program:	Mobile Technology (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 23
DGP Section:	12.9
Scope:	• Select and implement a new and improved vegetation management platform that will provide a more reliable and scalable mobile end-to-end tree trimming operations solution to support initiation, planning, execution and audit close-out. This solution will include computer hardware, licensing, configuration and integrations to work management systems. • Implement an interface between the AMI system and the mobile dispatch and work management solution for the Electric Field Operations organization to perform meter reads and other operations remotely, allowing for safer operations and the ability to verify work completed while in the field. • Implement various application configurations, interfaces, hardware, and software to improve mobile work in the field.

(a)	(b)						
Program:	Mobile Technology (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Enable field workforce to operate safely from both Covid-19 distancing requirements, as well as enabling safe work by providing information to frontline workers at the point of activity • Deploy tools to enable efficient work at the point of activity, reducing drive-time to service centers						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x					x	

(a)	(b)			
Program:	Mobile Technology (Pg. 4 of 4)			
Current Projects:	Vegetation Management Platform AMI Integration with Mobile Other Mobile Technology			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $5.0 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~56~~	~~2,859~~	~~2,916~~
	~~Material~~	~~11~~	~~572~~	~~583~~
	~~Other~~	~~8~~	~~381~~	~~389~~
	~~**Total**~~	~~**75**~~	~~**3,813**~~	~~**3,888**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	64	3,355	3,419
	Material	3	38	41
	Other	8	419	428
	Total	**75**	**3,813**	**3,888**

(a)	(b)
Program:	Work Management & Scheduling Upgrades (Pg. 1 of 4)
Purpose and Necessity:	An effort is underway in DTEE to improve work management and scheduling processes to ensure field resources have the processes and tools to support the right jobs, with the right people, at the right time. This includes ensuring unscheduled work is reflected in the work management system, Maximo, and the field resources can receive and status jobs in real-time to create a feedback loop on asset condition and performance in alignment with the asset management capabilities.
Category:	Technology and Automation

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DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

Case No.: U-20836
Exhibit: A-23
Schedule: M6 Revised
Witness: S. G. Pfeuffer

(a)	(b)
Program:	Work Management & Scheduling Upgrades (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 24
DGP Section:	12.9
Scope:	• Acquire software licenses for additional platform functionality • Server installations and replacements • Software configuration and IT software development

(a)	(b)						
Program:	Work Management & Scheduling Upgrades (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Process improvements, reduction of jobs held due to resource constraints, higher schedule compliance rate and CWIP backlog reduction resulting in capital efficiency and O&M reduction • Additionally, the "Stabilizing DO's Maximo Instance" project in 2023 will improve overall experience with Maximo as follows: 1) improve experience for users to make modifications in Maximo, 2) transfer ownership to business units to lessen the time it takes to make system modifications, 3) reduce administrative burden in utilizing IT resources to make the system modifications, and 4) provide end-users ability to access Maximo on their mobile devices						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:					x	x	x

(a)	(b)
Program:	Work Management & Scheduling Upgrades (Pg. 4 of 4)
Current Projects:	Stabilize DO Maximo Instance Other Work Management & Scheduling ~~Maximo Return to Support~~
Budget Basis:	• IT Estimate
Cost:	Estimated project spend in 2021-2023: $12.4 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~188~~	~~6,813~~	~~7,000~~
	~~Material~~	~~38~~	~~1,363~~	~~1,400~~
	~~Other~~	~~25~~	~~908~~	~~933~~
	~~**Total**~~	~~**250**~~	~~**9,083**~~	~~**9,333**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	215	7,993	8,208
	Material	8	91	98
	Other	28	999	1,027
	Total	**250**	**9,083**	**9,333**

(a)	(b)
Program:	Substation Design Tool Upgrades (Pg. 1 of 4)
Purpose and Necessity:	The current process for designing any substation work or updating schematics utilizes a 2D CAD system. These drawings have no links to any additional data and all notes and comments are essentially text on the prints with no ability to dynamically search and update the drawing. There is no automatic way to generate different views or cross sections of a design, requiring significant rework for each required design and construction drawing. There is also no automatic way to generate a bill of materials or design cost estimate from the drawings. Furthermore, capabilities are needed to automatically detect clearance and set back conflicts, to take into account high resolution site plan information and to reduce the effort needed to design and construct substations and upgrades to substation equipment. Wire and conduit routing must be done manually and validated through each drawing and every reference. Schematics must be manually compared to all design drawings and other schematics to ensure that reference numbers, phasing and continuity is correct. The current process has no automated checking or data validation and each print must be reviewed manually and against each other to ensure that dimensions, wiring terminations and equipment position during every change. Quality control is done completely through a manual review process. While standard drawing elements are available in a library, any modification must be checked manually and any dimensional or elevation drawing must be carefully constructed each time it is needed. When working with outside design firms, multiple file conversions are needed to coordinate drawings and bring them into DTE formats. Industry tools have improved and capabilities now exist in the software to have 3D models of equipment that have relevant attributes and configurable parameters. These sub assemblies can be placed in spatially accurate configurations and views and drawings from any angle can be generated quickly and consistently. The sub assembly parts and bill of materials can be aggregated into project level lists and interfaced with estimating systems like Maximo to order and plan the work in conjunction with the design. Vendor designs can be quickly integrated and validated through quality tools and wire and conduit routing can be checked for conflicts and clearance concerns from the same model with minimal effort. Schematic drawings are tied directly to structural and physical layouts so that the consistency checks are continuous throughout the process saving significant review time. Changes to standards can be propagated into new designs from the sub assembly libraries and validation of clearances and set backs can be performed quickly for all components effected.
Category:	Technology and Automation

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DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)
Program:	Substation Design Tool Upgrades (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 25
DGP Section:	12.9
Scope:	• Identify scope of upgraded software platform • Procure software and hardware for project • Work on cell libraries and metadata • Work with IT to configure platform

(a)	(b)						
Program:	Substation Design Tool Upgrades (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Reduction in rework and improvement to consistency • Automatic generation of bill of materials and cost estimate framework reduces manual work and errors • Automated quality control checks and automatic cross referencing of drawings reduces review time and errors						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x		

(a)	(b)			
Program:	Substation Design Tool Upgrades (Pg. 4 of 4)			
Current Projects:	Substation Design Tool Upgrades			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $2.7 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~178~~	~~680~~	~~858~~
	~~Material~~	~~36~~	~~136~~	~~172~~
	~~Other~~	~~24~~	~~91~~	~~114~~
	~~**Total**~~	~~**237**~~	~~**906**~~	~~**1,144**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	202	798	999
	Material	9	9	19
	Other	26	100	126
	Total	**237**	**906**	**1,144**

(a)	(b)
Program:	Asset Management Upgrades (Pg. 1 of 4)
Purpose and Necessity:	The overall goal of effectively managing assets is to minimize the total cost of ownership and operations while delivering the desired service levels. This includes maintaining access to accurate digital data about the asset, algorithms to process and analyze data, and a visual context of an asset's location and condition. Asset management includes managing the full lifecycle of an asset, engineering and financial management, as well as linking spatial information in the ESRI Mapping system to an asset. Managing the electric grid is an asset-intensive operation, and as such, relies heavily on the capabilities of its Asset Management systems..
Category:	Technology and Automation

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DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)
Program:	Asset Management Upgrades (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 26
DGP Section:	12.9
Scope:	• Acquire software licenses for additional platform functionality • Server installation and replacements • Software configuration and IT software development • Development of software API's and integration between platforms • Development of machine learning models and deployment to real-time data pipeline

(a)	(b)						
Program:	Asset Management Upgrades (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Have single view into asset health on the distribution system, across equipment and system cross-sections • Bring equipment databases to supported enterprise platforms						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x	x	x	x

(a)	(b)			
Program:	Asset Management Upgrades (Pg. 4 of 4)			
Current Projects:	ESRI System Upgrades Other Asset Management			
Budget Basis:	• High Level IT Estimates			
Cost:	Estimated project spend in 2021-2023: $3.4 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~163~~	~~1,297~~	~~1,459~~
	~~Material~~	~~33~~	~~259~~	~~292~~
	~~Other~~	~~22~~	~~173~~	~~195~~
	~~**Total**~~	~~**217**~~	~~**1,729**~~	~~**1,946**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	184	1,522	1,706
	Material	9	17	26
	Other	24	190	214
	Total	**217**	**1,729**	**1,946**

(a)	(b)
Program:	Load Forecasting & Analytics (Pg. 1 of 4)
Purpose and Necessity:	Advanced situational awareness analytics are needed for planning system upgrade decision support. New developments in distributed generation resources, electric vehicle adoption, and energy waste reduction/demand response are requiring a change in process for distribution load and generation forecasting. The process, and thus data infrastructure, need to evolve into a more integrated and granular approach to distribution load and generation forecasting. To address the needs to forecast changing customer-side equipment adoption, such as DER, energy waste reduction, and microgrids, which will inform the scenario-based distribution planning, DTEE will need to collect data on customer adoption and propensity of future adoption for various customer-side equipment.
Category:	Technology and Automation

(a)	(b)
Program:	Load Forecasting & Analytics (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 27
DGP Section:	12.9
Scope:	• Selecting of Loading Analytics tool for implementation to provide load curve generation. Configuration of tool and integration with sources of data (AMI, GIS, PI, weather, DER adoption). Integration of load curve data with planning tool (CYME) with automatic analysis. Aggregation algorithms to evaluate loading of equipment at all levels of the grid. • Configuration of CYME's data gateway to align with network model updates, specifically substations and secondary models. Upgrade to CYME 8.2. Addition of the Advanced Project Management module. Integrate AMI data and dynamic Data Pull plugin to better analysis grid conditions during planning. • Development of DER and EV propensity forecasting tools within the DTE Enterprise Data platform, Databricks. These machine learning models will incorporate external factors and demographics to predict customer adoption of DER, such as energy efficiency equipment, electric vehicles, solar inverters, and micro-grids. • Creation of analysis tools and models to allow system planners to validate impacts of DER on energy usage, system efficiency, and reliability. • Software development for optimization analytics to consume forecasted scenarios and run numerous plausible scenarios for customers adoption across the system • Feature engineering to summarize data aligned with integrated Distribution Planning use cases. Developing artificial intelligence and machine learning technologies that describe, predict and prescribe suggested actions to take during the integrated distribution planning process, including spatial and temporal contextualization of conditions and scenarios to provide situational awareness in the planning process.

(a)	(b)						
Program:	Load Forecasting & Analytics (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Improve reliability, power quality and customer flexibility through enabling distribution planning process capabilities in alignment with grid modernization. • Load curve generation - 8760 hour load curves representing disaggregated usage and customer generation curves • Planning processes to include multiple scenarios, including forecasting of DER and EV propensity across the system, with automated analysis support for planning engineers • Ability to forecast and sequence multi-year projects within the distribution planning toolset • Improved accuracy of system planning results with integration of AMI data						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x		x	x	x	x

(a)	(b)			
Program:	Load Forecasting & Analytics (Pg. 4 of 4)			
Current Projects:	CYME Planning Tool Upgrades Loading Allocation Analytics Distribution Load Forecasting Situational Awareness Analytics			
Budget Basis:	• IT evaluation of platform and data interfaces			
Cost:	Estimated project spend in 2021-2023: $6.9 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~394~~	~~1,953~~	~~2,347~~
	~~Material~~	~~79~~	~~391~~	~~469~~
	~~Other~~	~~53~~	~~260~~	~~313~~
	~~**Total**~~	~~**525**~~	~~**2,604**~~	~~**3,129**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	446	2,292	2,738
	Material	21	26	47
	Other	58	286	344
	Total	**525**	**2,604**	**3,129**

(a)	(b)
Program:	Interconnection Process Enablement (Pg. 1 of 4)
Purpose and Necessity:	DERs are expected to be an increasingly common technology deployed on the electric grid. In particular, the DG/DS scenario from the Distribution Grid Plan considers directionally plausible forecasts where customer-owned generation, predominantly expected to be rooftop solar PVs and storage in the form of batteries, is expected to increase in adoption throughout DTEE's service territory. As the number of applications for DER increases, a critical component in providing accessibility to the grid will be to ensure that the process to connect to the distribution grid is streamlined and efficient. Enhancements to the interconnection process and technology to effectively capture and utilize information like the location, size and type of DER will help distribution planning efforts.
Category:	Technology and Automation

(a)	(b)
Program:	Interconnection Process Enablement (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 28
DGP Section:	12.9
Scope:	• Improve customer experience with application process - upgrade Power Clerk and interconnection application portal to provide seamless customer logon between sites (single sign on), implement electronic payment for applications, provide interface to transparently display application status to customer including integration with Maximo internal work tracking system for status updates. • Improve internal system integrations for processing interconnection applications - system integration from planning application to planning study tool, CYME, and enterprise data lake. Automation scripts will support automated circuit analysis, application trending reporting, and project optimization opportunities. Automated screening tools will include loading, transformer size compatibility, and voltage constraints on the system, as well as verifying customer is within DTEE's service territory. • Study tools to support aggregated resources - enhance study tools, CYME and the enterprise data lake, to support emergent regulatory requirements including FERC 841 and FERC 2222. Study tools will need to evaluate aggregated resources across locations on the grid while evaluating interrelated impacts.

(a)	(b)						
Program:	Interconnection Process Enablement (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Improve customer experience during the interconnection application process • Maintain reliable electric service by providing technology to study interrelated grid impacts of DER • Improve process efficiency evaluating interconnection applications as requests scale up						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:			x		x	x	

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

Case No.: U-20836
Exhibit: A-23
Schedule: M6 Revised
Witness: S. G. Pfeuffer

(a)	(b)
Program:	Interconnection Process Enablement (Pg. 4 of 4)
Current Projects:	Interconnection Process Enablement
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $7.4 M This project is expected to continue beyond 2023

~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~471~~	~~2,260~~	~~2,731~~
	~~Material~~	~~94~~	~~452~~	~~546~~
	~~Other~~	~~63~~	~~301~~	~~364~~
	~~**Total**~~	~~**628**~~	~~**3,013**~~	~~**3,641**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	553	2,651	3,204
	Material	6	30	36
	Other	69	331	400
	Total	**628**	**3,013**	**3,641**

(a)	(b)
Program:	Hosting Capacity Enablement (Pg. 1 of 4)
Purpose and Necessity:	Hosting capacity analysis (HCA) is the amount of DER that can be accommodated without adversely impacting operational criteria such as power quality, reliability, and safety under existing grid control and operations without requiring infrastructure upgrades. In addition, in Case No. U-20147, the MPSC has requested that DTEE adopt a phased implementation approach for HCA pilots. As the adoption rate of DERs on the system increases, HCA will be a critical tool for distribution planning to identify initial grid constraints. Furthermore, a hosting capacity map can give DER developers the ability to better select sites and possibly reduce interconnection applications for non-viable areas with grid constraints. However, as DTEE has noted in prior discussions and filings, HCA is not a substitute for the developer submitting an application to study interconnecting to the grid. An application to interconnect is still necessary to identify impacts caused by the interconnect and propose solutions to mitigate those impacts.
Category:	Technology and Automation

(a)	(b)
Program:	Hosting Capacity Enablement (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 29
DGP Section:	12.9
Scope:	• Technology investment is needed to achieve the maturing Hosting Capacity Analysis processes. To improve the speed in which customers can evaluate the ability to interconnect DERs with the grid, investment is required in both customer-facing and internal evaluation tools. The technology investment will include a system to store information on likelihood of system upgrades needed to support DER interconnection, as well as a visual interface that is externally facing for customers and developers to access. • To support DTEE’s processes to evaluate hosting capacity at a granular level, investments in tools and integrations are needed. This will begin with tools such as EPRI DRIVE and CYME integration capacity analysis to evaluate areas with high penetration of DER. Further years will see investments to link the hosting capacity into the interconnection application portal. • Various server installation • Software configuration and IT software development • IT interface development and deployment

(a)	(b)						
Program:	Hosting Capacity Enablement (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Customers able to see proactive information for their interconnection applications • Screening and application tools improved for efficiency • Helps DTE meet regulatory requirement						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:			x		x		

(a)	(b)			
Program:	Hosting Capacity Enablement (Pg. 4 of 4)			
Current Projects:	Hosting Capacity Enablement			
Budget Basis:	• High Level IT Estimates			
Cost:	Estimated project spend in 2021-2023: $0.5 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~31~~	~~156~~	~~188~~
	~~Material~~	~~6~~	~~31~~	~~38~~
	~~Other~~	~~4~~	~~21~~	~~25~~
	~~**Total**~~	~~**42**~~	~~**208**~~	~~**250**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	36	183	220
	Material	1	2	3
	Other	5	23	28
	Total	**42**	**208**	**250**

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

Case No.: U-20836
Exhibit: A-23
Schedule: M6 Revised
Witness: P. Smith

(a)	(b)
Program:	AMI: Installations (Pg. 1 of 4)
Purpose and Necessity:	This project will complete the installation of the remaining hard-to-reach AMI meters as completion of the company's AMI program, and replace the remaining electromechanical meters with AMI meters, automating meter reading.
Category:	Technology and Automation

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)
Program:	AMI: Installations (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 30
DGP Section:	Not Available
Scope:	• Updated AMI technology in back office systems • Replaced the remaining 630 meters with AMI metering • Provided call center support for customer appointments, scheduling and communication

(a)	(b)						
Program:	AMI: Installations (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Increase bill accuracy • Enable remote alarm on energy theft and tampering • Increase customer outage notification and restoration efficiency • Enable remote power quality monitoring						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:						x	x

(a)	(b)			
Program:	AMI: Installations (Pg. 4 of 4)			
Current Projects:	AMI: Installations			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.0 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

(a)	(b)
Program:	AMI: Meter Communications Upgrades (Pg. 1 of 4)
Purpose and Necessity:	Public Wireless Telecommunication providers are phasing out 3G cellular in Michigan by the end of 2021. After this date, 3G technology will no longer be supported, and existing 3G devices will not be operable with the cellular 4G platforms. The existing AMI metering deployment is dependent on 3G cellular public carrier service for approximately 1 million of the 2.6 million customer electric meters and all data for customer billing, outage analysis, electric grid analytics, etc. Without this technology transition from 3G cellular to 4G cellular, all AMI benefits related to 1.1 million residential and small commercial meters will cease and these meters will no longer be remotely accessible for billing, outage detection, voltage data or remote connect / disconnect capabilities, severely impacting customer service.
Category:	Technology and Automation

(a)	(b)
Program:	AMI: Meter Communications Upgrades (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 31
DGP Section:	12.9
Scope:	• Update technology to operate on 4G public cellular networks: - Replace 2,700 3G cell relays with 4G devices - Optimize deployments to reduce seasonal vegetation impact - Sustain network performance & remediate coverage gaps

(a)	(b)						
Program:	AMI: Meter Communications Upgrades (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Mitigate the impact of cellular 3G phase out by public wireless carriers on the existing AMI network, and attendant customer focused services. • Increase reliability of AMI reporting, by providing faster data collection during outages, increase the frequency of normal day-to-day data receipt and reduce network disruptions caused by vegetation. • Enable use of the AMI infrastructure as a shared infrastructure for future expansion of circuit automation.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:					x		x

(a)	(b)			
Program:	AMI: Meter Communications Upgrades (Pg. 4 of 4)			
Current Projects:	AMI Enhanced Support AMI: 3G to 4G Communication Upgrade AMI: 3G to 4G Industrial Upgrade			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $2.3 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~63~~	~~313~~	~~375~~
	~~Material~~	~~13~~	~~63~~	~~75~~
	~~Other~~	~~8~~	~~42~~	~~50~~
	~~**Total**~~	~~**83**~~	~~**417**~~	~~**500**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	68	342	410
	Material	8	42	50
	Other	7	33	40
	Total	**83**	**417**	**500**

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)
Program:	Microwave End of Life (Pg. 1 of 4)
Purpose and Necessity:	The microwave network is used as a primary and secondary WAN communications for corporate and SCADA (FCN) networks. The modernization of telecom microwave tower equipment will optimize performance and align our frequency usage with the FCC. Due to the FCC deregulation of privately owned frequencies, a number of DTE's microwave systems must be replaced to maintain a reliable network and avoid collisions with other entities using the same frequency.
Category:	Technology and Automation

(a)	(b)
Program:	Microwave End of Life (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 32
DGP Section:	12.9
Scope:	• Design and implement new microwave backhaul (WAN) communications • Install modern dishes for tower weight reduction • Install hardware for network reliability and redundancy • Replace end of life hardware

(a)	(b)						
Program:	Microwave End of Life (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Improved reliability and control, alleviating dependency on third party systems • Network modernization and resiliency						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x			x	x		

(a)	(b)			
Program:	Microwave End of Life (Pg. 4 of 4)			
Current Projects:	Microwave End of Life			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $1.0 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~63~~	~~313~~	~~375~~
	~~Material~~	~~13~~	~~63~~	~~75~~
	~~Other~~	~~8~~	~~42~~	~~50~~
	~~**Total**~~	~~**83**~~	~~**417**~~	~~**500**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	6	29	35
	Material	60	300	360
	Other	18	88	105
	Total	**83**	**417**	**500**

(a)	(b)
Program:	SCADA Remote Access and Configuration Platform (Pg. 1 of 4)
Purpose and Necessity:	The existing SCADA tool server is the only mechanism to remotely access and configure relays, RTU's, and other field equipment. Without this server all changes or validation of settings require a field visit. The SCADA tool server allows engineers and technicians to remotely perform many day to day operations to check on the status and health of devices on a detailed level far beyond the monitoring capabilities in SCADA. The existing tool server is not supported by the vendor.
Category:	Technology and Automation

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)
Program:	SCADA Remote Access and Configuration Platform (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 33
DGP Section:	12.9
Scope:	• Provisioning of upgraded and supported hardware at downtown and alternate data center in resilient configuration • Integration of SUBNET solutions Power SYSTEM Center • Integration of ION Enterprise • Configuration of PI interfaces for PQ • Configuration of PI interfaces to support increased data load • Configuration of SCADA and System Protection & Automation tools

(a)	(b)						
Program:	SCADA Remote Access and Configuration Platform (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Remote configuration management of SCADA devices resulting in less field visits • Immediate verification and health monitoring of assets • Centralization of power quality data from SCADA into single management platform allowing for quick and easy access						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x	x			x	x	x

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

Case No.: U-20836
Exhibit: A-23
Schedule: M6 Revised
Witness: S. G. Pfeuffer

(a)	(b)
Program:	SCADA Remote Access and Configuration Platform (Pg. 4 of 4)
Current Projects:	SCADA Remote Access and Configuration Platform
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $1.9 M

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~159~~	~~-~~	~~159~~
	~~Material~~	~~32~~	~~-~~	~~32~~
	~~Other~~	~~21~~	~~-~~	~~21~~
	~~**Total**~~	~~**212**~~	~~**-**~~	~~**212**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	125	-	125
	Material	76	-	76
	Other	11	-	11
	Total	**212**	**-**	**212**

(a)	(b)
Program:	Automation Configuration and Test Record Database (Pg. 1 of 4)
Purpose and Necessity:	Relay and SCADA Configuration Data was migrated from an obsolete FOCUS database when WINDOWS XP was retired. The current database tool is functioning, but is at risk of not being improved or supported due to its custom design. When migrating from FOCUS to the new tool, SCADA data was not added to the database and is currently stored on network drives. Due to process issues and lack of software support, the status of certain protection settings is not accurate and requires manual data entry and conversion. This project would procure a tool that would perform those functions and augment the asset and work management processes already developed. Relay and SCADA Configuration data is important to accurately record. NERC CIP dictates how protection settings need to be calculated for assets and these settings would be stored in the database. The integration with this software will streamline work in System Protection and Automation. Streamlined tools also have built in workflow tools that allow data to be automatically update status. This will help to ensure the accuracy of the status of the data in the database and the coordination with the work management system, Maximo.
Category:	Technology and Automation

(a)	(b)
Program:	Automation Configuration and Test Record Database (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 34
DGP Section:	12.9
Scope:	• Data Preparation and Conversion - Review test records and update relay settings status' in current database - Identify missing settings and add to the existing database - Flag NERC relay configurations • Evaluate Software Options - Reach out to vendors for quotes, specifications, and capabilities, conduct RFP - Compare and select software • Purchase software, order hardware, install and configure • Develop standards and job unit materials for engineers and technicians • User implementation • Go live

(a)	(b)						
Program:	Automation Configuration and Test Record Database (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Automate relay testing and test record process • Improved accuracy of data which will ensure NERC compliance • Rapid discovery of equipment configuration via search tools • Audit and version history for data and configuration settings • Automatic and preconfigured test routines • Streamline coordination studies with data link to short circuit modeling tools						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x		

(a)	(b)			
Program:	Automation Configuration and Test Record Database (Pg. 4 of 4)			
Current Projects:	Automation Configuration and Test Record Database			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $4.2 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~281~~	~~1,089~~	~~1,370~~
	~~Material~~	~~56~~	~~218~~	~~274~~
	~~Other~~	~~38~~	~~145~~	~~183~~
	~~**Total**~~	~~**375**~~	~~**1,452**~~	~~**1,827**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	90	116	206
	Material	263	1,205	1,467
	Other	23	131	153
	Total	**375**	**1,452**	**1,827**

(a)	(b)
Program:	Grid Edge Insights & New Technology (Pg. 1 of 4)
Purpose and Necessity:	As more grid interactive customer equipment is connected to the electrical system in the form of smart inverters, energy storage, electric vehicles (including Vehicle to Grid), demand response and load control resources, non-wire alternatives and microgrids, the complexity of real time grid management increases with each new interaction of Distributed Energy Resources. DER Resources will need to work together with interoperable communications that may be local, but will still need to be interfaced to a central system like the ADMS. Not all of the capability of DER resources can be coordinated in real time by a central system such as the ADMS. There are elements of DER operations, optimization and protection that have timing requirements that cannot be addressed without local intelligence. The safe, reliable and efficient operation of these DER resources requires a distributed platform that can take control from and report information to utility backend systems such as the ADMS and future DERMs system while locally managing DER endpoints to achieve a system management goal. This mix of local and remote control, utility and customer owned resources also requires a significant emphasis on cyber security.
Category:	Technology and Automation

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)
Program:	Grid Edge Insights & New Technology (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 35
DGP Section:	12.9
Scope:	• This project addresses the real time interoperability, cyber security communications and control of distributed resources and their interaction with local and remote control systems such as the ADMS and DERMS. It is focused on the 'Grid Edge' where real time optimization of local DER resources is required across operational and ownership boundaries. • The project will design, test, standardize and implement cyber secure control and communications schemes for DER resources and microgrids using an interoperable platform based on industry standards such has Open Field Message Bus. • The platform will be modular and project scope will build on functionality developed in conjunction with the Department of Energy, National Labs and other utilities that are facing similar DER integration goals. • The platform will integrate current and future standards for customer owned DER to enable the broadest possible enablement of the DER capabilities while maintaining a cyber security first design. • The platform will be iterated upon over multiple years to optimize cost, reduce maintenance and integrate new developments in the industry, DER capabilities and standards. • The platform will be used in a standardized and repeatable manner to allow for the greatest possible efficiency in deployment to areas that require the grid edge capability.

(a)	(b)						
Program:	Grid Edge Insights & New Technology (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• The Grid Edge platform will allow for safe and reliable interaction with DER resources in complex implementations where the coordinated interaction of Smart Inverters, energy storage, load control and microgrids is required. Standardization of the platform will reduce per project costs and the variety of different systems that need to be implemented and maintained. The platform will also allow for simulation of DER interaction during project design phases to reduce on site testing and provide more reliable operation of the DER solutions.						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x		

(a)	(b)
Program:	Grid Edge Insights & New Technology (Pg. 4 of 4)
Current Projects:	Grid Edge Insights & New Technology
Budget Basis:	• Engineering Estimate
Cost:	Estimated project spend in 2021-2023: $4.1 M This project is expected to continue beyond 2023

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~213~~	~~1,125~~	~~1,338~~
	~~Material~~	~~43~~	~~225~~	~~268~~
	~~Other~~	~~28~~	~~150~~	~~178~~
	~~**Total**~~	~~**283**~~	~~**1,500**~~	~~**1,783**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	173	765	938
	Material	85	585	670
	Other	26	150	176
	Total	**283**	**1,500**	**1,783**

(a)	(b)
Program:	Sensor, Network and Algorithm Development (Solar Deployment) (Pg. 1 of 4)
Purpose and Necessity:	This project is in support of the MPSC's "MI Power Grid" initiative and to prepare for the greater penetration of customer owned solar and FERC Order 2222.
Category:	Technology and Automation

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)
Program:	Sensor, Network and Algorithm Development (Solar Deployment) (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 36
DGP Section:	12.9
Scope:	• Develop low-cost sensors • Deploy distributed computing elements • Grow a centralized machine learning platform • Install a low-cost supplemental network

(a)	(b)						
Program:	Sensor, Network and Algorithm Development (Solar Deployment) (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	The project will develop functionality in three target areas to benefit DTE customers including: • Net load forecasting • Power quality and reliability • Transformer health						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:		x	x		x	x	x

(a)	(b)			
Program:	Sensor, Network and Algorithm Development (Solar Deployment) (Pg. 4 of 4)			
Current Projects:	Sensor, Network and Algorithm Development (Solar Deployment)			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $1.6 M This project is expected to continue beyond 2023			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~55~~	~~736~~	~~791~~
	~~Material~~	~~11~~	~~147~~	~~158~~
	~~Other~~	~~7~~	~~98~~	~~105~~
	~~**Total**~~	~~**73**~~	~~**982**~~	~~**1,055**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	42	383	425
	Material	25	520	546
	Other	5	79	84
	Total	**73**	**982**	**1,055**

(a)	(b)
Program:	Other Modernize Grid Management (Pg. 1 of 4)
Purpose and Necessity:	Grid management includes the full suite of distribution management applications, including advanced metering infrastructure, distribution automation, outage response, and advanced control toolsets. Mature grid management enables distribution operators to model and manage the distribution network, monitor the power system, manage planned and unplanned outages, and analyze and optimize the quality and reliability of the network. This program includes components to enable real-time situational awareness and analytics as well as IT systems to manage the increasing amount of smart devices on the grid.
Category:	Technology and Automation

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)
Program:	Other Modernize Grid Management (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 37
DGP Section:	12.9
Scope:	• Acquire software licenses for additional platform functionality • Server installation and replacements • Software configuration and IT software development • Development of software API's and integration between platforms • Development of machine learning models and deployment to real-time data pipeline

(a)	(b)						
Program:	Other Modernize Grid Management (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Improved real-time situational awareness from grid devices • Ability to manage IED configurations in central location • Real-time detection and prediction of power quality issues impacting customers						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:					x	x	x

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

Case No.: U-20836
Exhibit: A-23
Schedule: M6 Revised
Witness: S. G. Pfeuffer

(a)	(b)
Program:	Other Modernize Grid Management (Pg. 4 of 4)
Current Projects:	Other Modernize Grid Management
Budget Basis:	• High Level IT Estimates
Cost:	Estimated project spend in 2021-2023: $5.4 M This project is expected to continue beyond 2023

~~Test Year ($000's):~~		~~2 mos. 11/01/22 12/31/22~~	~~10 mos. 01/01/23 10/31/23~~	~~Test Year 12 mos. ending 10/31/23~~
	~~Total Labor (DTE Electric & Contractors)~~	~~583~~	~~469~~	~~1,052~~
	~~Material~~	~~117~~	~~94~~	~~210~~
	~~Other~~	~~78~~	~~63~~	~~140~~
	~~**Total**~~	~~**777**~~	~~**625**~~	~~**1,402**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	661	531	1,192
	Material	31	25	56
	Other	85	69	154
	Total	**777**	**625**	**1,402**

(a)	(b)
Program:	Substation Cybersecurity (Pg. 1 of 4)
Purpose and Necessity:	This work is necessary to avoid and reduce system vulnerability to cyber attacks on the distribution system.
Category:	Technology and Automation

(a)	(b)
Program:	Substation Cybersecurity (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 38
DGP Section:	16.3
Scope:	This is a pilot program to implement Substation Cyber security solutions at Stone Pool Substation. The scope includes the following solutions to correct security gaps: • Patching • HMI Anti-Virus • Special purpose devices • Alerting • Vulnerability scanning • HMI hardening • Asset and configuration management

(a)	(b)						
Program:	Substation Cybersecurity (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Increase security posture and reduce cybersecurity risk						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x						

(a)	(b)			
Program:	Substation Cybersecurity (Pg. 4 of 4)			
Current Projects:	Substation Cybersecurity			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $2.3 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~288~~	~~-~~	~~288~~
	~~Material~~	~~58~~	~~-~~	~~58~~
	~~Other~~	~~38~~	~~-~~	~~38~~
	~~**Total**~~	~~**383**~~	~~**-**~~	~~**383**~~
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	269	-	269
	Material	72	-	72
	Other	42	-	42
	Total	**383**	**-**	**383**

(a)	(b)
Program:	Operational Technology and Error Free Communication (Pg. 1 of 4)
Purpose and Necessity:	Customers are frustrated because based on the data we have, we cannot quickly and definitively answer this question - do we know if a customer has power. Therefore, we cannot feed that information into our workflows and this creates errors in communication with our customers about the current state of their restoration. Additionally, we have prioritized operational efficiency over restoration data accuracy - we must balance operational efficiency with customer experience. - No single view of customer outage status based on all sources of information available to DTE (Customer, AMI, Equipment, Jobs, Restoration Estimate) - Currently, closing job in OMS directly translates into the incorrect assumption that customers are restored which is driving our channels to have errors (website, mobile app, outage map) - We are using AMI numbers publicly during a storm which is inconsistent with OMS numbers on the outage map - media, poweroutage.us, and EEI are unclear of the correct number which is reducing our credibility
Category:	Technology and Automation

(a)	(b)
Program:	Operational Technology and Error Free Communication (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 39
DGP Section:	Not Available
Scope:	The following key scope items will be delivered as part of the Error Free Communications project: • For the first time, we will combine meter data (AMI), work order data, customer data and equipment hierarchy that makes up our entire grid to create single source of truth for outage data • Using the single source of truth, we will be able to further validate outage data with Smart Meter Data and more accurately close jobs • We will move and develop quickly to make meaningful impacts. We will expose insights to existing applications, with the ability to reliably scale 24/7, 365

(a)	(b)						
Program:	Operational Technology and Error Free Communication (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Single data source for each customer outage status (Yes/No/Don't Know) to be available all-weather (not just storm) • Customer status and outage map API service layer created, deployed, and can be used by operations and customer systems • Outage Status app, SEL-UOL updated with information to be viewable to all DO employees (office and field)						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:	x				x		

(a)	(b)			
Program:	Operational Technology and Error Free Communication (Pg. 4 of 4)			
Current Projects:	Operational Technology and Error Free Communication			
Budget Basis:	• Project Management Estimate			
Cost:	Estimated project spend in 2021-2023: $12.9 M			
~~**Test Year ($000's):**~~		~~**2 mos. 11/01/22 12/31/22**~~	~~**10 mos. 01/01/23 10/31/23**~~	~~**Test Year 12 mos. ending 10/31/23**~~
	~~Total Labor (DTE Electric & Contractors)~~	~~250~~	~~-~~	~~250~~
	~~Material~~	~~50~~	~~-~~	~~50~~
	~~Other~~	~~33~~	~~-~~	~~33~~
	~~**Total**~~	~~**333**~~	~~**-**~~	~~**333**~~

Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric &	293	-	293
	Material	-	-	-
	Other	40	-	40
	Total	**333**	**-**	**333**

(a)	(b)
Program:	Analog Lines Elimination (Pg. 1 of 4)
Purpose and Necessity:	Analog lines are obsolete telecommunication technology that results in O&M expense. This project is to eliminate the usage of analog lines in our system.
Category:	Technology and Automation

(a)	(b)
Program:	Analog Lines Elimination (Pg. 2 of 4)
Line Number:	Exhibit A-12, Schedule B5.4, Page 11, Line 40
DGP Section:	Not Available
Scope:	• Removal of analog lines

Michigan Public Service Commission
DTE Electric Company
Distribution Plant Capital Project Detail - Technology and Automation

(a)	(b)						
Program:	Analog Lines Elimination (Pg. 3 of 4)						
Customer benefit / Effect on cost of operation and reliability:	• Remove aging and obsolete equipment and reduce O&M						
Impact Dimension:	Safety	Load Relief	Regulatory Compliance	Major Event Risk	Reliability	O&M Avoidance	Reactive Capital Avoidance
Targeted:						x	

(a)	(b)			
Program:	Analog Lines Elimination (Pg. 4 of 4)			
Current Projects:	Analog Lines Elimination			
Budget Basis:	• Engineering Estimate			
Cost:	Estimated project spend in 2021-2023: $0.0 M			
Test Year ($000's):		**2 mos. 11/01/22 12/31/22**	**10 mos. 01/01/23 10/31/23**	**Test Year 12 mos. ending 10/31/23**
	Total Labor (DTE Electric & Contractors)	-	-	-
	Material	-	-	-
	Other	-	-	-
	Total	**-**	**-**	**-**

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the Application of	)	
DTE ELECTRIC COMPANY for	)	
authority to increase its rates, amend its	)	
rate schedules and rules governing the	)	Case No. U-20836
distribution and supply of electric energy,	)	
and for miscellaneous accounting authority	)	

PROOF OF SERVICE

STATE OF MICHIGAN)
) ss.
COUNTY OF WAYNE)

CAITLIN D. MYERS states that on April 5, 2022, she served a copy of DTE Electric Company's Revised Exhibit A-23 Schedules M4 – M6 in the above captioned matter, via electronic mail upon the persons listed on the attached service list.

Caitlin D. Myers
Digitally signed by Caitlin D. Myers
Date: 2022.04.05 15:52:58 -04'00'

CAITLIN D. MYERS

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