ARGO & GEDDES DAMS, ANN ARBOR HYDROPOWER STUDY FINAL REPORT

Presented to:

Architecture/Engineering Services
Review of Hydropower Study at Geddes & Argo Dams
Study Final Report

VA Ann Arbor Healthcare System
Ann Arbor, Michigan

Presented by:

VECSIE, Joint Venture

Black & Veatch, Subconsultant

12240 Indian Creek Court, Suite 140A
Beltsville, Maryland 20705
Phone: (301) 210-9090 ▪ Fax: (301) 210-0993

VECSIE

Date: September 27, 2010

Project Number: W912QR-06-D-0034-DC03

(VECSIE Project Number: 2556-8)

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1.0 Introduction

The City of Ann Arbor, Michigan, owns four dams on the Huron River: Barton, Argo, Geddes, and Superior. Following a 1981 study of the hydroelectric generation potential at all four City dams, the citizens of Ann Arbor approved a $3.2 million bond to restore hydropower at Barton and Superior Dams. Higher construction cost estimates and lower electric energy production potential kept Argo and Geddes from being recommended for restoration at that time.

In 2008, the City of Ann Arbor commissioned Stantec Consulting Michigan Inc. to provide data for use in re-evaluating the feasibility of developing hydroelectric power facilities at the Argo and Geddes dams. The 2008 Report (Ref. 1) provided the following information:

- An estimate of each sites' power potential
- An estimate of redevelopment costs for each dam, including initial capital and operational costs
- An investigation of Federal Energy Regulatory Commission (FERC) licensing requirements

The focus of this report is to provide the results of a review of the 2008 Report for accuracy and completeness, including the following:

- Costs for installing the hydroelectric generating elements
- Anticipated annual maintenance costs of the generating elements
- Regulatory compliance costs
- Miscellaneous costs that the 2008 Report may have missed
- Anticipated generating capacity/capability of each hydroelectric facility
- Anticipated cost avoidance for the VA Ann Arbor Healthcare System (HCS) given current electric rate structure including out years with anticipated future utility costs over a 25 year period
- Viability of providing a dedicated power line from the hydroelectric facility to the VA Ann Arbor HCS, with respect to costs and benefits

1.1 Basis of Review

We consider the 2008 Report as intended to provide preliminary data for use in a preliminary feasibility study. As such, our review of the report takes this into consideration in terms of the level of detail and accuracy of the data that is provided. The analyses provided in this report are also considered to be at the preliminary feasibility level. Additional, more detailed analyses should be performed for each site as a next step if the preliminary evaluation is favorable with respect to hydroelectric development. These additional analyses should incorporate the results of site investigations, such as subsurface and topographic investigations, refined tailwater rating curves and headloss estimates, preliminary designs, more detailed, bottom-up cost estimates for each site and discussions with regulatory agencies for the sites remaining under consideration.

2.0 2008 Report Review

The 2008 Report provided data for use in evaluating the feasibility of redeveloping hydroelectric power facilities at the Argo and Geddes dams. Specific data provided in the report included an estimate of each site's power potential, estimated redevelopment costs for each dam, including initial capital and operational costs, and an investigation of FERC licensing requirements.

The following subsections provide the results of Black & Veatch's (B&V) review and assessment of the 2008 Report.

2.1 Powerhouse Location

Geddes Dam consists of two concrete ogee spillways, each with a pair of Tainter gates for controlling the elevation of the lake water surface. The two spillways are separated by an approximately 60 feet wide island with concrete retaining walls. The left and right abutments are engineered earthen berm structures. The 2008 Report proposes placement of the hydro facility in the area between the two spillways.

Figure 1
Geddes Dam Looking Downstream

Argo Dam consists of an approximately 165 feet long concrete ogee spillway with a 23 feet wide sluiceway adjacent and left (looking downstream) of the spillway. The spillway includes six Tainter gates for controlling the lake water surface elevation and the

sluiceway includes two 84-inch by 60-inch low-level sluice gates. A millrace channel extending from the left abutment allows for canoe portage around the dam. The 2008 Report proposes placement of the hydro facility either on the left earthen abutment or at the downstream end of the millrace channel. Locating the powerhouse at the end of the existing millrace would yield an additional two feet of net head but would require installation of a twelve foot diameter penstock to replace the open channel millrace.

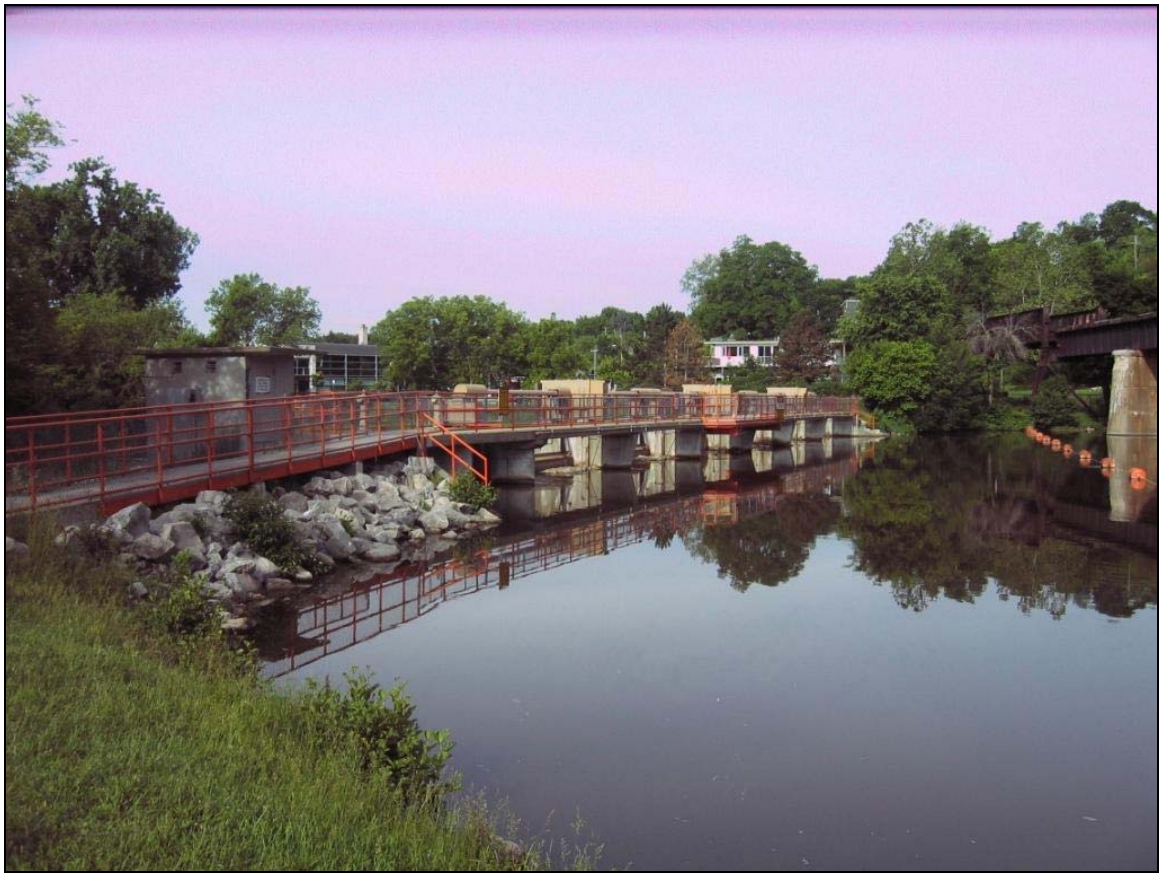


Figure 2
Argo Dam Looking Downstream

Based on our review of the proposed locations of the powerhouses, for Geddes Dam, we agree that from a hydraulic and constructability standpoint, the preferred powerhouse location would be between the two existing spillways. For Argo Dam, the east abutment is the preferred location for a powerhouse. Placing the powerhouse at the end of the millrace would eliminate the canoe portage and does not appear to be practical.

2.2 Available Head

The 2008 Report provided gross head at each site based on measurements at two flow conditions; one at a normal flow and one at an above normal flow condition. For the generation estimates, the upstream water level was assumed constant for all flows and the tailwater level was varied with flow, based on the two tailwater measurements that were available. An additional two feet of head was estimated to be available at Argo Dam if the powerhouse were to be placed at the downstream end of the existing millrace.

Development of tailwater conditions throughout the range of possible flows based on two measurements at each dam is considered reasonable for use in a preliminary feasibility evaluation. However, it is recommended that additional tailwater measurements at various flow conditions be taken to establish the tailwater rating curve for each site with more accuracy, if additional feasibility evaluations are planned. An alternative would be to estimate the tailwater rating curve using hydraulic calculations, and verify with selected tailwater measurements.

Net head was calculated assuming 0.5 foot headloss in the powerhouse forebay/intake. It appears the headloss calculations did not include powerhouse draft tube exit losses, which would be approximately 0.5 feet at the design turbine discharge condition. However, this is not expected to significantly change the results of this preliminary evaluation. If additional feasibility evaluations are planned, the variation of total headloss with turbine discharge should be accounted for; which would improve the accuracy of the net head and generation estimates.

2.3 Available Flow

The 2008 Report used river flow duration data for each dam site, as supplied by the Michigan Department of Environmental Quality (MDEQ). A flow duration analysis provides the percent of time that a given flow is equaled or exceeded based on the available period of flow records, and is commonly used as a basis for estimating annual generation potential used in feasibility studies. The MDEQ flow duration data was compared with data derived from a nearby USGS gaging station located downstream from Argo Dam, and this comparison indicated that the MDEQ data yielded slightly less river flow in the lower flow range, when compared to the USGS data. Use of the MDEQ data is reasonably conservative and is therefore appropriate for a preliminary feasibility evaluation. Should additional feasibility evaluations be performed, the difference in data values from these two sources should be resolved and the most appropriate data should be used for generation estimates.

2.4 Turbine Selection

The preliminary development concept presented in the 2008 Report includes installation of a single 1,700 mm bulb or pit double regulated propeller turbine with speed increaser and high speed generator at each site. The design turbine discharge was selected based on the 25% exceedance value of discharge as taken from the MDEQ flow duration curve. Budgetary turbine quotations were received from four turbine suppliers; Canadian Hydro Components (CHC), Hydropower Turbine Systems inc. (HTS), VA Tech Hydro, and Voith Siemens. The 2008 Report provided generation estimates assuming CHC and HTS turbines, but presented construction costs assuming the use of a CHC turbine only.

Selection of a bulb or pit turbine is reasonable for the low head applications at Geddes and Argo dams. Using the 25% exceedance value for design turbine discharge capacity is also considered appropriate for a preliminary feasibility evaluation. With this capacity, the units are capable of capturing the majority of the lower flows when net head is

highest. Key turbine operating information for each site is provided in the following table.

Table 2.1 – CHC Turbine Information			
	Geddes Dam	**Argo Dam (Option 1)**	**Argo Dam (Option 2)**
Rated Net Head (ft)	14.25	10	11.9
Flow/Unit Max (cfs)	650	550	610
Total Output (kW)	652	387	508

2.5 Estimates of Probable Cost

2.5.1 Hydropower Facilities. The 2008 Report provided a summary of the estimated direct and indirect construction costs for development of a hydro facility at Geddes Dam using CHC turbines. The report indicated that the costs would be similar for Argo Dam. A quantity based estimate was not included in the 2008 Report. It is recommended that a bottom-up quantity based estimate be performed if additional feasibility evaluations are planned.

At Argo Dam, where the hydro facility would be placed near the left abutment (Option 1), an upstream and downstream cofferdam would be required to dewater the powerhouse construction area. For Option 2 at Argo, where the hydro facility would be located at the downstream end of the millrace, only a downstream cofferdam would be required, however an allowance of $3,000,000 was included for installation of a penstock within the millrace. For the Geddes site, it is concluded that less extensive cofferdams would be required, when compared to the Argo site, due to the presence of existing retaining walls on the inboard side of each spillway chute and at the upstream end between the spillways. For this reason, the construction costs for the Geddes site were reduced by 5 percent when compared to the Argo site.

The direct and indirect costs used in the 2008 Report were adjusted to year 2010 costs using an annual escalation rate of 1.05 based on the ENR Building Cost Index. Additionally, an updated budgetary turbine-generator quotation was obtained from CHC and was included in the project cost estimates (quotation provided in Appendix A).

The 2008 Report used a contingency of 10% of direct costs. This is considered to be low for a preliminary estimate. For the 2010 estimates, a contingency of 25% was applied to both direct and indirect costs.

Table 2.2 – Preliminary Estimate of Probable Hydropower Costs				
	2008 Report (Geddes)	**2010 (Geddes)**	**2010 (Argo) (Option 1)**	**2010 (Argo) (Option 2)**
Direct Costs				
Turbine Equipment	$1,185,000	$1,400,000	$1,400,000	$1,475,000
Construction Costs	$2,143,000	$2,138,000	$2,250,000	$5,250,000
Subtotal Direct Construction Cost	**$3,328,000**	**$3,538,000**	**$3,650,000**	**$6,725,000**
Indirect Costs				
Licensing/Permits	$ 300,000	$ 315,000	$ 315,000	$ 315,000
Engineering	$ 350,000	$ 368,000	$ 368,000	$ 368,000
Legal/Financial	$ 50,000	$ 53,000	$ 53,000	$ 53,000
Contingency	$ 330,000	-	-	-
Subtotal Indirect Construction Cost	**$1,030,000**	**$ 736,000**	**$ 736,000**	**$ 736,000**
Contingency	-	$1,068,000	$1,096,000	$1,865,000
Total Preliminary Estimate of Probable Cost	**$4,358,000**	**$5,342,000**	**$5,482,000**	**$9,326,000**

2.5.2 Dedicated Transmission Line. A dedicated transmission line extending from the hydropower facilities to the VA Ann Arbor HCS is also being considered as a means to account for the reduction in total energy charges for the HCS in the economic evaluation. A dedicated transmission line would be approximately 3.3 miles in length for the Argo facility and approximately 5.5 miles in length for the Geddes facility. Estimates of probable cost for each transmission line are as follows. These estimated include both direct and indirect costs.

Table 2.3 – Preliminary Estimate of Probable Transmission Line Costs			
	Geddes Dam	**Argo Dam**	**Geddes and Argo Dams**
Total Preliminary Estimate of Probable Cost	**$587,000**	**$781,000**	**$1,325,000**

2.5.3 Annual Costs. Ongoing annual expenses associated with operations, maintenance (including repairs, rehabilitation and replacement of plant equipment), dam safety and potentially environmental mitigation will be incurred. The 2008 Report estimated the annual costs to be approximately $110,000 for each facility, based on City of Ann Arbor historical cost data for the Barton and Superior plants. Use of historical cost data is preferred for estimating annual costs, and the estimated annual cost is reasonable.

2.6 Annual Energy Evaluation

The 2008 Report provided average annual generation estimates for Geddes Dam and the two options at Argo Dam using the annual flow duration data discussed in Section 2.3

and the net head discussed in Section 2.2. A 3% reduction factor for transformer losses and station power and a 10% reduction factor for miscellaneous downtime were accounted for in the generation estimates.

Review of the generation estimates indicate that the unit efficiencies used in the 2008 Report appear to be somewhat lower than the efficiency values supplied by the turbine vendors, however this variation is not expected to affect the results of the study. The reduction factors used for transformer losses and availability are appropriate. Table 2.4 provides a summary of the estimated average annual generation provided in the 2008 Report.

Table 2.4 – Average Annual Generation

	Geddes Dam	Argo Dam (Option 1)	Argo Dam (Option 2)
Average Annual Generation (kWh)	3,358,190	2,002,344	2,504,126

2.7 Regulatory Requirements

Regulatory requirements for one or both of the hydropower projects would include FERC licensing, along with other state and local permits. The 2008 Report provided an allowance of $300,000 for the FERC licensing and permitting process. The report also notes that Argo and Geddes dams are classified as high hazard by the state and that a detailed inflow design flood (IDF) analysis would likely be required. If the IDF analysis indicates an insufficient spill capacity, substantial additional costs could be incurred to increase spillway capacity.

It is likely that the hydropower projects would be eligible for a 5 MW or Less Exemption from licensing. Qualifications include a rated capacity of less than 5 MW with the project to be located at a non-federal, pre-1977 dam (18 CFR 4.31(c)(2)). An exemption from licensing means that the exemption is not subject to the comprehensive development standard of FPA Section 10(a)(1) and is subject to the conditions attached to the exemption. However, the procedural steps for a 5 MW or less exemption are essentially the same as those that govern an application for license. Additionally, the FERC must include those terms and conditions that the fish and wildlife agencies determine are appropriate to prevent loss of, or damage to, fish and wildlife resources (18 CFR 4.34(f)(2)).

The estimated licensing and permitting costs are judged to be reasonable. However, licensing and permitting costs can vary substantially, depending on the extent of environmental studies required by the resource agencies. Additionally, depending on the license conditions, environmental mitigation costs may be incurred which could substantially increase the amount allotted for regulatory requirements.

3.0 Economic Evaluation - Hydropower

3.1 Current Energy Rates

The VA Ann Arbor HCS obtains its energy from DTE Energy. DTE Energy classifies the VA Ann Arbor HCS as an industrial D6 Primary Supply customer. The current monthly rate structure includes demand charges, energy charges and various fixed charges. The monthly on-peak billing demand is defined as the single highest 30-minute integrated kilowatt reading of the demand meter during the on-peak hours of the billing period. On-peak hours are defined as those hours between 11:00 am and 7:00 pm, Monday through Friday, excluding holidays. This on-peak billing demand cannot be less than 65% of the highest monthly on-peak metered billing demand during the billing months of June through October of the preceding eleven billing months.

The current DTE rate structure is as follows:

Power Supply Charges:

Demand Charge:	$13.61 per kW of on-peak billing demand
Energy Charge:	3.973¢ per kWh for all on-peak kWh
	3.673¢ per kWh for all off-peak kWh
Voltage Level Discount:	-0.100¢ per kWh for service at subtransmission voltage
Surcharges:	
	0.0077¢ per kWh for Enhanced Security Cost Surcharge
	-0.564¢ per kWh for Power Supply Cost Recovery Clause
	$187.50 per meter for Renewable Energy Plan Surcharge

Delivery Charges:

Service Charge:	$275 per month
Distribution Charges:	$1.38 per kW of maximum demand
	0.762¢ per kWh for all energy delivered
Surcharges:	
	0.1234¢ per kWh for Nuclear Decommissioning Surcharge
	0.4930¢ per kWh for Securitization Bond Charge
	0.2080¢ per kWh for Securitization Bond Tax Charge
	0.0500¢ per kWh for Choice Implementation Surcharge
	-0.410¢ per kWh for Pension Equalization Mechanism Credit (for August, September, October bill cycle only)
	$203.06 per meter for Energy Optimization Surcharge
Special Service Charge:	$9,792.27 per month

Based on current energy usage information provided for this study, the composite rate for energy use varies from approximately 4.3¢ per kWh to 4.7¢ per kWh, depending on

whether the usage is during off- or on-peak periods. The current monthly demand charge rate is $14.99 per kW of on-peak billing demand, which is comprised of the demand charge and distribution charge. Various fixed charges are also included in the rate structure.

3.2 Energy Cost Savings with Hydropower

3.2.1 Current Energy Charges. Electric billing statements from DTE Energy for the VA Ann Arbor HCS were provided for the 12-month period from April 13, 2009 to April 12, 2010, and are summarized in Table 3.1. Copies of the billings statements are provided in Appendix B. The billing statements indicate that the average monthly energy consumption for the VA HCS was about 1,922 MWh and the maximum monthly service demand varied from 3,824 kW to 7,251 kW. For a total average annual energy cost of $2,111,760 and a total energy consumption of 24,065,848 kWh, the resulting overall blended electric rate for this period is approximately $0.088 per kWh. Blended billing rates for each month vary from $0.074 to $0.10 per kWh for this same period.

Table 3.1 – Energy Charges from April 2009 through March 2010

	Power Supply Demand (kW)	Maximum Distribution Demand (kW)	Total Energy Demand (kWh)	Off-Peak Energy Demand (kWh)	Statement Total
April 2009	3,824	5,013	1,809,920	1,299,848	$154,356
May 2009	4,455	4,973	1,924,720	1,388,750	$162,959
June 2009	4,852	4,852	2,527,280	1,863,707	$203,241
July 2009*	4,650	4,852	2,397,360	1,755,107	$182,526
August 2009	6,213	6,213	2,294,320	1,659,682	$204,322
September 2009	7,251	7,251	2,119,320	1,545,876	$211,748
October 2009	5,732	7,251	1,648,640	1,192,154	$169,737
November 2009	4,713	7,251	1,722,000	1,273,702	$158,858
December 2010	5,181	7,251	1,944,320	1,476,396	$180,503
January 2010*	4,713	7,251	2,048,048	1,499,376	$151,752
February 2010	4,713	7,251	1,683,360	1,227,563	$161,219
March 2010	4,713	7,251	1,946,560	1,444,825	$176,539
Average Month:	5,084	6,388	1,922,047	1,407,145	$176,480
Maximum Month:	7,251	7,251	2,527,280	1,863,707	$203,241
Total:	--	--	24,065,848	17,626,986	$2,111,760

* - Energy demand values from DTE Energy electrical bills are missing for 07/13/09 to 07/25/90 and for 01/26/10 to 02/0910. Values for missing periods estimated via extrapolation of adjacent billing rates.

3.2.2 Energy Cost Offset Resulting From Selling Hydropower to DTE Energy. If the energy generated from the hydro facilities were to be sold directly to the grid, the amount paid by the energy purchaser, such as DTE Energy, to the VA would be defined in a Power Purchase Agreement (PPA) between the VA and the utility, and the annual energy payment by the utility would offset a portion of the VA's current energy costs. DTE Energy has advised that PPAs are negotiated separately with each energy supplier and a standard rate has not been established. They also indicated that a long term (say 20 yrs) purchase rate is estimated to be about $0.052 per kWh based on current conditions. This would equate to the following offsets in average annual energy cost for the alternatives being considered.

Table 3.2 – Energy Cost Offset – Energy Sales to Grid

Alternative	Average Annual Generation from Hydro	Average Annual Charge Offset with Hydro
Geddes Dam:	3,358,190 kWh	$174,626
Argo Dam (Option 1)	2,002,344 kWh	$104,122
Argo Dam (Option 2)	2,504,126 kWh	$130,215
Geddes & Argo	5,360,534 kWh	$278,748

3.2.3 Reduction in Energy Costs With Dedicated Power Line. Construction of a dedicated power transmission line between the hydropower facility(ies) and the VA Ann Arbor HCS would allow for a direct reduction in the current electric costs based on the current billing rate structure and the hydropower energy generated. Both power supply and delivery charges would be reduced with this arrangement. Average monthly electric costs for existing conditions and for each alternative considered are provided in Table 3.3. The table assumes average hydropower generation output and that the maximum on-peak billing demand would be reduced by the installed capacity of the hydroelectric facility.

Table 3.3 – Average Monthly Electric Charges					
		VA Charges with Hydroelectric Power			
	Existing Charges	Geddes Dam	Argo Dam (Opt 1)	Argo Dam (Opt 2)	Geddes & Argo
On-Peak Billing Demand (kW)	5,084	4,412	4,710	4,585	4,038
Maximum Billing Demand (kW)	7,251	6,579	6,877	6,752	6,205
Total Energy Demand (MWh)	1,922	1,642.2	1,755.2	1,713.4	1,475.3
Off- Peak Energy Demand (MWh)	1,407	1,198.8	1,281.3	1,250.8	1,077.0
On-Peak Energy Demand (MWh)	514.9	443.4	473.9	462.6	398.3
Power Supply Charges:					
•Power Supply Demand ($13.61/kW)	$69,193	$60,047	$64,103	$62,402	$54,957
•Power Supply Energy (3.973¢/kWh)	$76,363	$65,245	$69,733	$68,072	$58,615
•Off-Peak Discount (-0.300¢/kWh)	-$4,221	-$3,596	-$3,844	-$3,752	-$3,231
•Voltage Level Discount (-0.10¢/kWh)	-$1,922	-$1,642	-$1,755	-$1,713	-$1,475
•ESCS (0.0077¢/kWh)	$148	$126	$135	$132	$113
•PSCR Clause (-0.564¢/kWh)	-$10,840	-$9,262	-$9,899	-$9,663	-$8,321
•Reg. Asset Recovery ($187.5/meter)	$375	$375	$375	$375	$375
Delivery Charges					
•Service Charge	$275	$275	$275	$275	$275
•Maximum Demand ($1.380/kW)	$10,006	$9,079	$9,490	$9,318	$8,563
•Energy Delivered (0.7620¢/kWh)	$14,646	$12,514	$13,375	$13,056	$11,242
•Nuclear Decomm. (0.1234¢/kWh)	$2,372	$2,026	$2,166	$2,114	$1,821
•Securitization Bond (0.4930¢/kWh)	$9,476	$8,096	$8,653	$8,447	$7,273
•Secur. Bond Tax (0.2080¢/kWh)	$3,998	$3,416	$3,651	$3,564	$3,069
•CIS (0.0500¢/kWh)	$961	$821	$878	$857	$738
•PEM Credit (-0.4100¢/kWh/4)	-$1,970	-$1,683	-$1,799	-$1,756	-$1,512
•EOS ($203.06/meter)	$406	$406	$406	$406	$406
•Special Service Charge	$9,792	$9,792	$9,792	$9,792	$9,792
Total Average Monthly Rate:	**$179,057**	**$156,035**	**$165,735**	**$161,924**	**$142,700**
Average Annual Electrical Charge:	**$2,148,689**	**$1,872,417**	**$1,988,819**	**$1,943,093**	**$1,712,402**
Average Annual Charge Reduction:	-	**$276,272**	**$159,870**	**$205,596**	**$436,287**

3.3 Present Worth Analysis

A net present worth analysis was performed for the alternatives being considered to determine a benefit cost ratio for each alternative. The economic parameters used in the analysis are as follows:

Parameter	***Value***
Evaluation Period	25 years Construction in 2011 Begin generating in 2012
Annual Escalation Rate for Capital and Annual Costs	3 percent
Annual Escalation Rate for Energy Charges	3 percent
Discount Rate	4.5 percent

The present worth analysis compares the project capital costs with the present worth of the annual costs and generation benefits. The sources of the cost information used in the analysis are as follows.

Item	***Source***
Capital Costs of Construction	Tables 2.2 and 2.3
Annual Costs	Section 2.5.3
Energy Cost Offset – Sales to Grid	Table 3.2
Energy Cost Reduction – Dedicated Transmission Line	Table 3.3

The results of the present worth analysis are shown in Table 3.4. The analysis indicates that none of the alternatives have a benefit cost ratio greater than one and that hydropower development at Geddes Dam has the highest benefit cost ratio. Installation of a dedicated transmission line to the VA HCS results in higher benefit cost ratios for all alternatives when compared to selling power directly to the grid. The present worth analysis calculations are provided in Appendix C.

Table 3.4 – Present Worth Analysis

	Benefit Cost Ratio	
	Direct Power Line	**Selling to Utility**
Geddes Dam	0.66	0.48
Argo Dam (Option 1)	0.37	0.28
Argo Dam (Option 2)	0.33	0.23
Geddes & Argo	0.51	0.38

3.4 Decision Matrix

The following cost benefit analysis decision matrix was prepared for each alternative considered. This matrix is qualitative in nature and should only be used as an indication of which alternative may be more favorable than another. For each item considered, a value of one was assigned to an alternative if it was considered more favorable when compared the other alternatives. A zero was assigned if it was not favorable or less favorable than the other alternatives.

Table 3.5 – Cost Benefit Analysis Decision Matrix

Item	Geddes Dam	Argo Dam (Option 1)	Argo Dam (Option 2)
Public acceptance of the plan	0	0	0
Costs associated with installation	1	1	0
Costs associated with maintenance	0	0	0
Potential costs not addressed in report	0	0	0
Environmental factors	0	0	0
Generating capacity of hydro facilities	1	0	0
Anticipated cost avoidance over next 25-years	1	0	0
Total:	**3**	**1**	**0**

Based on this analysis matrix, the Geddes Dam project is preferred over the other two alternatives.

3.5 Compliance with the Energy Policy Act of 2005.

The VA Ann Arbor HCS is part of the VA VISN 11 integrated service network which requires compliance with the Energy Policy Act of 2005 and the E.O. 13423 requirement for 7.5 percent renewable energy. Using the electricity billing statements that were provided from April 2009 to April 2010, the average annual energy consumption was about 24,066 MWh. To satisfy the 7.5 percent renewable energy requirement, the average annual generation from Geddes and/or Argo would have to be at least 1,805 MWh. The generation estimates used in this study indicate that the average annual generation would range from approximately 2,002 MWh (Argo-Option 1) to 3,358 MWh (Geddes). As a result, development of a hydropower facility at either dam site would be sufficient to meet the renewable energy requirements, provided the 2009 electricity usage is representative of future energy consumption.

4.0 Other Renewable Options

The subject of this task is to compare hydropower to other renewable energy sources that may be implemented at the Ann Arbor VA. The sources initially envisioned for this task included:

- Solar PV on the VA hospital building and parking structure roofs.
- Gasification of biomass fuel on site and Combined Heat & Power (CHP) gas engine to simultaneously generate electricity and heated water.
- Green power purchases for the application of power generated from remote wind power, hydroelectric production, or other renewables through the local electric utility Detroit Edison.

4.1 Present Utility Unit Costs.

In order to properly assess the savings and costs available for any energy management opportunity, such as installation of on site CHP or Solar PV generation, some knowledge of the current utility costs need to be determined.

The Client provided facility natural gas and electricity bills to review and use in this assessment. These bills show that during the 12 month period from April 2009 to March 2010, the facility had a monthly peak kW demand of 7,251 kW (maximum), 3,824 kW (minimum), and 5,084 kW (average).

The most recent demand rates include $13.61/kW for supply and $1.38 for distribution, or a total demand charge of $14.99/kW.

During this period the variable usage charges total approximately $982,426, which were billable for a total of 21,838 MWh consumed during the last 12 months. The average usage cost may be calculated as follows:

$$\$982,426/(21,838,000\ kWh) = \$0.0450/kWh$$

During the same 12 month period, the facility consumed 129 Million cubic feet of Natural Gas at a cost of $960,005. Assuming 1,000 Btu/cubic foot, the relevant cost per Million Btu may is calculated as follows:

$$129,000,000\ \text{cubic feet} \times (1,000\ \text{Btu/cubic foot}) \times (1\ \text{MMBtu}/1,000,000\ \text{Btu}) = 129,043\ \text{MMBtu/year}$$

$$(\$960,005/\text{year})/(129,043\ \text{MMBtu/year}) = \$7.44/\text{MMBtu}$$

The following table shows an approximate summary of the current annual utility consumption and costs:

Table 4.1 – Present Utility Costs	
Natural Gas	
Normal Natural Gas Purchases, MMBtu	129,043
Natural Gas Cost $/MMBtu	7.44
Annual Natural Gas Cost	$ 960,005
Electricity	
Billable Average Monthly Demand, kW	5084
Monthy Demand Rate, $/kW	$14.99
Annual Demand Charges, $	$914,510
Billable Annual Usage, kWh	21,838,040
Usage Rate, $kWh	$0.0450
Annual Electricity Usage Cost, $	$982,712
Total Annual Energy Cost	$2,857,227

4.2 Renewable Energy Options

In addition to the main objective of this study, hydropower generated from the Huron River, the facility may employ a number of on-site renewable strategies which are discussed herein.

4.2.1 Green Currents Program. The electricity provider, DTE Energy offers billing options that support renewable energy. Under the program, clients are billed an additional $0.02 per kWh which are used to support the generation of electricity from Michigan-based, renewable energy sources. It is unclear from the program description if these are existing or future sources. The customer may opt to purchase blocks of 1,000-kWh at a cost of $20 each or do a complete 100 percent match whereby an additional $0.02/kWh are added to the customer's usage charge. If the facility were to decide to purchase all of their electricity using the program, the total annual cost would be approximately: 21,838,040 kWh x $0.02/kWh, or an additional operating cost $436,760 per year charged for electricity usage. This program would not affect electricity demand charges, and the facility would not be impacted by any need for additional infrastructure or capital cost.

4.2.2 Solar PV. There is room for a significant number of solar PV arrays on the roof of the Clinical Addition Building, the West Parking Structure, and the East Parking Structure. However the East Parking Structure is located adjacent to city owned land; which includes significant canopy tree cover, which shades the East Parking Structure and make it unsuitable for solar PV arrays.

Available Footprint:	
West Parking Structure	120’ x 120’ = 14,400 square feet
Clinical Addition	120’ x 220’ = 26,400 square feet
Total:	40,800 square feet

DTE Energy, the present electricity provider to the facility, offers incentives of $2.40 per watt through its Solar Currents Customer Owned Program; which may be used to offset some of the installation cost. In addition, a monthly credit for solar generation is available at a rate of $0.11/kWh. However, the program pertains to only systems sized from 1 to 20 kW. Based on this, it appears that the most economical solar configuration would be sized for the maximum available credit of 20 kW, as a best case scenario for implementation.

Installation Cost:
20,000 watt x $7/watt = $140,000

Up Front REC Payment:
20,000 watt X $2.40/watt = $48,000 upon completion of installation.

Ongoing REC Payment:
20 kW x 730 hours/month x 0.13 capacity factor x $.11/kWh x 12 months/year = $2,505 /year

Under this program, the electricity produced by the PV array is sold to DTE for the agreed upon price of $11/kWh, and DTE would own all of the REC credits associated with the generation for a period of 20 years. Electricity billed to the facility would remain unchanged. The net result of this is a modest savings to the facility of $2,505/year, and results in a simple pay back of 37 years.

4.2.3 Biomass Based On Site CHP. The facility is presently served by a central plant that generates steam and chilled water that is distributed to the building complex. The chilled water plant is electric centrifugal based and has implemented efficiency upgrades including variable frequency drives that substantially improve the part load chiller performance. This is the optimal configuration for producing chilled water in an area where electricity rates are low, relative to gas rates and offers no area for improvement related to integration of CHP with absorption chillers. The larger opportunity for CHP projects is generally found in heating systems because the long heating season in southeast Michigan improves the availability of heat loads which my be served by a CHP asset.

The existing boiler plant has four Cleaver Brooks firetube boilers of nominal 500 BHP capacity. These boilers are rated for 200 psig, but they serve the distribution system at 68 psig. An interview with the central plant manager revealed that two boilers are kept on line year round and that the average load was 20% during the summer (mainly to supply reheat units), and 80% during the winter.

4.2.3.1 Biomass CHP Option**.** The existing steam distribution header offers the opportunity to support a backpressure steam turbine generator into the central plant. Carrier Corporation markets a 275 kW backpressure turbine that is rated to accept incoming steam at 200 psig. Since the existing boilers are rated for 200 psig, this equipment, at first glance, appears to be suitable to supply the steam turbine, but to do so with the existing natural gas fuel supply would not be renewable generation, which is the subject of this task.

B&V contacted Chiptec Wood Energy Systems, a company that manufactures small biomass gasification burner systems for use on new or existing commercial and industrial boilers. Through a phone interview with a Chiptec Technical Representative, it was discovered that because of the design of the air-box, the existing CB boiler models are not candidates for retrofit. Therefore in order to utilize a ChipTec gasifier, a new boiler is needed. In addition, biomass receiving, storage, and materials handling delivery systems are needed to supply and meter biomass to the gasification system.

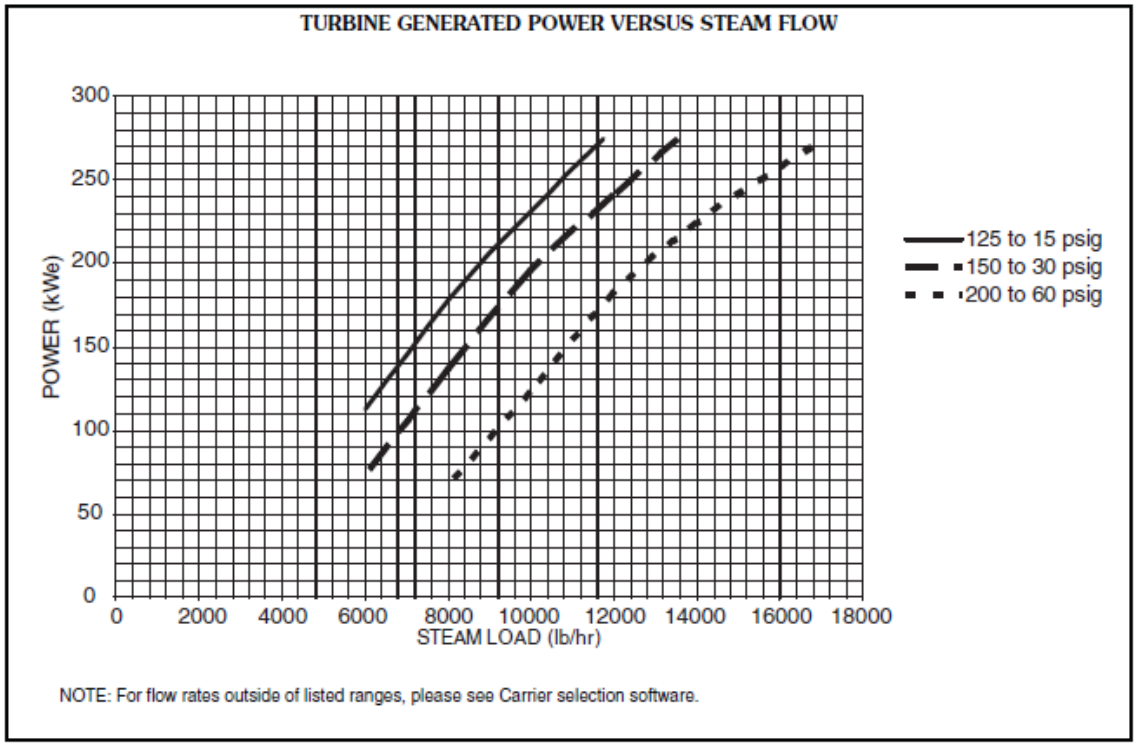
Equipment Required

- 275 kW backpressure steam turbine generator
- Biomass firetube boiler and biomass equipment

Electricity Generated

The amount of electricity generated from this, or any CHP system depends on a detailed analysis of the facility load profile because the throughput of steam to the turbine is based on steam system demands. Because of its small size relative to the overall load, a reasonable assumption for this system is that it will have relatively good capacity factor of 75 percent. This is because during the summer months, the central plant is operated at very low loads (20%) which, when shared between two boilers, will provide insufficient steam flow to run the backpressure turbine. A more detailed analysis of the load profile, which is beyond the scope of this study, is needed to verify this assumption.

The 200 psig to 60 psig curve for the Carrier Micro-Steam 18MS model turbine is the closest available approximation to actual performance. In actuality, a 68 psig header pressure will result in lower unit output for a given flow of steam, so the amount of generation predicted by the curve is slightly better than what may be achieved in this application. A steaming rate of 13,000 lb/hour has been chosen as a conceptual design point based on the largest size biomass boiler that is available in a package format in order to reduce the cost for capital equipment available from Chiptec.



At that steaming rate the following electrical generation may be achieved.

200 kW X 8760 hours/year X 0.75 = 1,314,000 kWh

The electrical generation reduces the amount of peak demand and electrical usage, resulting in electrical cost savings.

Biomass Consumption

In order to estimate fuel consumption to produce the 13,000 lb/hour of steam, one needs to know the enthalpy of the steam out of the boiler, the enthalpy of the feed water, and the boiler efficiency. Generally, biomass boilers are less efficient than other types of boilers because higher air fuel ratios are needed due to the high moisture fuel. 70 percent is typically used for biomass boiler efficiency as a conservative assumption.

Saturated Steam Enthalpy at 200 psig = 1,199 Btu/lb
Saturated Feedwater Enthalpy at 212 Deg F = 180 Btu/lb

Total Heat Energy Out of Boiler = (1,199 Btu/lb – 180 Btu/lb) x 13,000 Btu/hour = 13.25 MMBtuh.

Boiler Efficiency = Heat Outputs / Heat Inputs = 70% assumed for biomass

Therfore, the heat input from fuel may be estimated as follows:

Heat Input = 13.25 MMBtuh / 70% = 18.9 MMBtuh
(18.9 MMBtu/hour) x (.75 x 8760 hours/year) = 124,332 MMBtu/year

Biomass fuels have a wide range of energy densities, but for the purpose of this study, wood chips with 50 percent moisture and 4,300 Btu/lb are a likely available source of fuel in southeast Michigan. This results in an annual wood consumption of 14,457 tons per year. Typical delivered costs for wood chips are approximately $35 per ton. This results in annual cost for wood of approximately $505,995

Natural Gas Fuel Credit

The exhaust steam from the steam turbine generator will be used to supply the steam distribution header, and this steam will displace heating steam that is normally supplied with natural gas fired boilers. So the energy content of this exhaust steam may be expressed as a fuel credit that will reduce natural gas consumption.

The enthalpy of the steam leaving turbine is reduced due to the work extracted by the turbine. A rough approximation of this energy loss is the mechanical equivalent of heat or 3,413 Btu/ kWh. The turbine is estimated above to produce 1,314,000 kWh annually. So the equivalent amount of heat energy consumed in the turbine is approximately:

(1,314,000 kWh) x (3,413 Btu/ kWh) = 4,484 MMBtu/year

The total amount of energy into the turbine (from the boiler) shown above is:

13.25 MMBtuh, or on an annual basis,
(13.25 MMBtuh) x (8,760) x (70%) = 81,249 MMBtu/year

So the estimated fuel credit is (81,249 – 4484) = 76,765 MMBtu/year. This reduces the natural gas consumption of the facility, resulting in savings of approximately $571,057, which exceeds the cost of the wood fuel ($505,995).

4.2.3.2 Small Scale On-Site Option. This option includes gasification of biomass fuel on site and CHP gas engine to simultaneously generate electricity and heated water. This type of system has limited project history and requires much tighter fuel specifications and gas clean-up equipment needed for the internal combustion process. Commercial applications are available, and are being marketed in increments as small as 2 MW. A CHP system of this size is likely to be at the upper end of its usefulness at this site based on the available electric and waste heat loads and would require the installation of hot water distribution systems to replace existing steam system.

Equipment Cost

- 2 MW – Wood gas fired reciprocating engine w/gasification system – approximately $6500/kW or $13,000,000.

- Hot water distribution system – unknown, likely to add at least $2,000,000 for conversion of existing systems.
- $15,000,000 total cost

Electricity Generated

This is a 2 MW system. If operated year round it may produce 17,520,000 kWh of electricity, and reduce peak demand by 2,000 kW, resulting in savings of billed electricity.

Biomass Consumption

For this biomass case, the high amount of electrical generation warrants running the system continuously regardless of the available waste heat demand. Vendor correspondence states that the system is expected to consume 12,500 bone dry tons of wood per year. On an as-received 50% moisture basis this equates to 25,000 tons per year. Using the same assumed rate of $35/per ton for wood chips, this results in a delivered fuel cost for wood of $875,000.

Natural Gas Fuel Credit

Vendor correspondence indicates that this engine produces 3 MWth of waste heat. Assuming year round utilization, this results in the following production of waste heat:

(3,000 kW) x (8,760 hours/year) x (3,413 Btu/kWh) / (1,000,000 Btu/MMBtu) = 89,694 MMBtu/year, or approximately $667,246 in reduced costs for natural gas. Note that this presumes that most of the existing steam loads may be converted to hot water loads, which may not be feasible for this site.

4.3 Results and Recommendations for Renewable Energy Options

- Solar PV – Not recommended over hydropower.
  Solar PV has potential for the site based on the relatively large available footprint on the roof of the Clinical Addition. It is less disruptive than the biomass options because fuel deliveries are not required and it is therefore likely to have greater public acceptance. The simple payback for a 20 kW system that is subject to the Solar Currents program is approximately 37 years which is not competitive with the Geddes Dam project, and is therefore not a recommended alternative to it.

- Green Currents – Not recommended over hydropower.
  Overall it is fair to say that the Green Currents program is the least attractive option because there are costs and no savings available and because the benefits are not easily quantified to the customer. This is because there is an assurance but no guarantee, that the costs will be applied to renewable power generation. The result is considerable operating costs with non-firm benefits which are available from the other options considered.

- Biomass – Not recommended over hydropower, further study recommended. Biomass generation has a simple payback period that is potentially competitive with a Geddes Dam project, and is more competitive than an Argo Dam project. Biomass has the greatest costs, savings, and potential for site disruption during construction and operation, and will require additional expansion that is not required for the hydroelectric project. It is not clear that there is sufficient expansion area available on the site to accommodate a significant biomass project or to accommodate fuel receiving operations. If there were, then it would be an attractive option because the high savings available, especially of natural gas prices rise relative to biomass prices.

5.0 References

1. "*Hydoelect Redevelopment - Argo and Geddes Dams Feasibility Study*", City of Ann Arbor, July 2008, Stantec Consulting Michigan Inc.

2. *"Rate Book for Electrical Service"*, The Detroit Edison Company, Issued September 16, 2009, with revisions dated July 1, 2010.

3. DTE Energy Billing Statements for the VA Ann Arbor HCS, April 13, 2009 to April 12, 2010.

4. Budget Price from Canadian Hydro Components LTD, August 9, 2010.

5. Natural Gas Billing Data

6. Carrier Micro Steam Turbine Performance Data

Appendix A – Canadian Hydro Components Turbine Quote

Appendix B – DTE Energy Billing Statements

Appendix C – Net Present Worth Calculations

APPENDIX A

CANADIAN HYDRO COMPONENTS TURBINE QUOTE

CANADIAN HYDRO COMPONENTS LTD.

BUDGET PRICE

DATE: 09 August 2010 **BP #2008-146 REV**

TURBINE DATA

Project Name	**Argo-Option 1**	**Argo – Option 2**
Rated Net Head	3.048 m	3.627 m
Turbine Type	Axial Flow Pit Double Regulated (4 blade)	Axial Flow Pit Double Regulated (4 blade)
Runner Diameter	1700 mm	1700 mm
Flow/Unit max	15.576 cms	17.275 cms
Turbine Speed	225 rpm	240 rpm
Generator Speed	225 rpm	240 rpm
Turbine Shaft Output/unit	415 kW	546 kW
Generator Output/unit	387 kW	508 kW
Turbine Setting	2.64 m above TWL	1.16 m above TWL
Number of Units	1	1
Total Output	387 kW	508 kW

BUDGET PRICE INCLUDES: (either option)

1-Runner/Distributor Assembly
1-Draft Tube Liner
1-Synchronous Generator
1-Hydraulic Power Unit
1-Switchgear/Control/Protection

TOTAL ABOVE PACKAGE PRICE:	**Option 1**	**Option 2**
	$ 1,475,000 USD	**$ 1,400,000 USD**

PAYMENT SCHEDULE

Deposit	25 % with order
Progress Payment Due Mid-Contract	45 %
Due Before Shipment	20 %
At successful start-up No later than 120 days after shipment	10 %

GOOD FOR 90 DAYS
PRICES QUOTED IN US DOLLARS
FOB ALMONTE, ONTARIO
CUSTOMS AND BROKERAGE EXTRA

P.O. Box 640 – 16 Main Street Almonte, Ontario CANADA K0A 1A0
Tel: (613) 256-1983 Fax: (613) 256-4235 Email: inquiries@canadianhydro.com

CANADIAN HYDRO COMPONENTS LTD.

BUDGET PRICE

DATE: 09 August 2010 **BP #2008-147 REV**

TURBINE DATA

Project Name	**Geddes**
Rated Net Head	4.343 m
Turbine Type	Axial Flow Pit Double Regulated (4 blade)
Runner Diameter	1700 mm
Flow/Unit max	18.408 cms
Turbine Speed	240 rpm
Generator Speed	240 rpm
Turbine Shaft Output/unit	700 kW
Generator Output/unit	652 kW
Turbine Setting	0.06 m below TWL
Number of Units	1
Total Output	652 kW

BUDGET PRICE

1-Runner/Distributor Assembly
1-Draft Tube Liner
1-Synchronous Generator
1-Hydraulic Power Unit
1-Switchgear/Control/Protection

TOTAL ABOVE PACKAGE PRICE: $ 1,400,000 USD

PAYMENT SCHEDULE

Deposit	25 % with order
Progress Payment Due Mid-Contract	45 %
Due Before Shipment	20 %
At successful start-up No later than 120 days after shipment	10 %

GOOD FOR 90 DAYS
ALL PRICES QUOTED IN US DOLLARS
FOB ALMONTE, ONTARIO
CUSTOMS AND BROKERAGE EXTRA

P.O. Box 640 – 16 Main Street Almonte, Ontario CANADA K0A 1A0
Tel: (613) 256-1983 Fax: (613) 256-4235 Email: inquiries@canadianhydro.com

APPENDIX B

DTE ENERGY BILLING STATEMENTS

000002709 00020324119 8 JUNE 09

DTE Energy

Payment Coupon

Account Number	**0000-0270-9**
Due Date:	**August 7, 2009**
Total Due:	**$203,241.19**

US GOVT GS00S28677 CHIEF FISCAL SERVICES
VETERANS ADMIN HOSP AA
2215 FULLER RD
ANN ARBOR, MI 48105-2303

Paid 7-30-09

Mail Payments To:
DTE Energy
P.O. Box 630795
Cincinnati, OH 45263-0795

506C95072

Please detach and return coupon with account number on check. Agencies are not authorized to accept payment of this bill.

Account Information

US Govt GS00S28677 Chief Fiscal Services
Veterans Admin Hosp AA
2215 Fuller Rd
ANN ARBOR, MI 48105

Account Number	**0000-0270-9**
DTE-Energy Federal ID No.	38-3217752

Programs you are enrolled in:

How to contact us:

Power Outage	See Detail Charges
Billing Inquiry	1-313-235-5120
Analyst Code	T2

Please make any inquiry or complaint about this bill to DTE Energy before the Due Date.
DTE Energy is regulated by the Michigan Public Service Commission, Lansing, Michigan

Important Information

On June 2, 2009, in Case No. U-15806, the MPSC authorized the implementation of an Energy Efficiency Surcharge (EES) for electric customers in accordance with the Clean, Renewable, and Energy Efficiency Act, PA295 of 2008. The EES will be used to fund energy efficiency programs for Detroit Edison customers. The EES for primary voltage customers is a per meter per month charge which is based on your monthly energy consumption. The EES for customers without self directed plans is $28.32 per meter for 0-11,500kWh or $283.32 per meter if above 11,500kWh. For customers with self directed plans the EES is $4.63 per meter for 0-11,500kWh or $42.35 per meter if above 11,500kWh. The EES is effective for bills rendered on and after June 3, 2009.

RECEIVED
VAMC ANN ARBOR
ACCOUNTING

54,388.51

DTE Energy

JUL-22-2009 05:49 From:7348453223 VA ANN ARBOR (734) 845-3223 Page:5/15

Summary Of Charges

Account Number	0000-0270-9

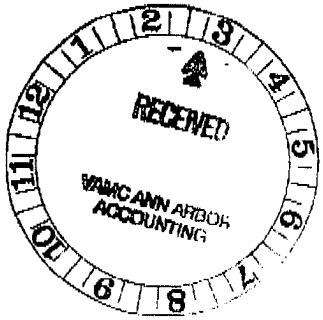
Previous Balance as of 06/15/2009	162,958.53
Payment(s) and Credit(s)	-162,958.53
Remaining Balance	$0.00

Current Charges

Service Location	Item	Service Type	Rate	Bill Period	Amount
2215 Fuller Rd	10037	Primary Supply Rate	220	06/10 - 07/12/09	203,241.19

Taxes	0.00
Miscellaneous Charges	0.00
Current Bill	$203,241.19

Amount Due on or before Due Date of 08/07/2009	**$203,241.19**
Late Payment Charge if paid after Due Date	4,064.82
Total Amount Due if paid after 08/07/2009	207,306.01



DTE Energy

JUL-22-2009 05:49 From:7348453223 UA ANN ARBOR (734) 845-3223 Page:6/15

Detail Charges

For Service at: 2215 Fuller Rd, Ann Arbor, MI 48105 **Outage Contact Number:** 1-313-235-1300

Invoice: 5568438 **Billing Period:** 06/10/2009 through 07/12/2009 **Days Billed:** 33

Metering Information

Meter Number	Start Date	Start Read	Stop Date	Stop Read	Read Difference	Units Multiplier	Usage Used	Type
8989698	06/10	2,255.2A	07/12	2,478.5A	223.3	5,600.0000	1,250,480.0	S-KVARH
8989698	06/10	4,541.4A	07/12	4,992.7A	451.3	5,600.0000	2,527,280.0	S-KWH
8989335	06/10	0.0A	07/12	0.0A	0.0	2,800.0000	0.0	S-KVARH
8989335	06/10	0.0A	07/12	0.0A	0.0	2,800.0000	0.0	S-KWH
				Total KVARH			1,250,480.0	
				Total KWH			2,527,280.0	

Invoice: 5568438 **Service Name:** VAMC AA

Item: 10037 **Cycle:** 07 **Primary Supply Rate D6 - Rate 220**

Billing Status Information

1	**On-peak Billing Demand**	**4,852**	**KW**	**ESTABLISHED**	**06/25/2009**	**12:30**
3	65% High OP Bill Dmd June-Oct prec 11 mths	3,141	KW	ESTABLISHED	07/17/2008	13:00
6	Rate Minimum Demand (Site)	50	KW	ESTABLISHED	01/22/1994	00:00
8	Highest Single Billing Demand	4,852	KW	ESTABLISHED	06/25/2009	12:30
D	**Current SV High Monthly Demand**	**4,852**	**KW**	**ESTABLISHED**	**06/25/2009**	**12:30**
E	50% of the Contract Capacity for SV	2,926	KW	ESTABLISHED	07/22/2002	11:30
F	Subtrans Voltage Maximum Demand	4,852	KW	ESTABLISHED	06/25/2009	12:30
W	Coincidental Max Onpk KW Dmd at Site	4,852	KW	ESTABLISHED	06/25/2009	12:30
	Highest Maximum OnPeak Demand Reactive Demand	2,197	KVAR	ESTABLISHED	06/25/2009	14:30
	kWh percentage change from a year ago	-1	PCT			
	Avg Kilowatthours Used Per Day A Year Ago	77,560	KWH			
	Power Factor (ratio) for all voltages	89	PCT			
	Total number of days in the Billing Period	33	DAYS			
	Excess KVAR for PF less than .8	0	KVAR			
	Contract Capacity for Location	5,853	KW	ESTABLISHED	07/22/2002	11:30
	Avg Kilowatthours Used Per Day This Period	76,584	KWH			
	(KVAR) Coincidental Max Demand at Site	2,170	KVAR			

Detail Charges

Charges for 06/10/2009 through 07/12/2009

Power Supply Charges:						
Power Supply Demand	4,852	KW	@ $	13.75	(See 1 Above)	66,715.00
Power Supply Energy:						
Power Supply Energy	2,527,280	KWH	@ $	.0401400	Per Total KWH	101,445.02
Off-Peak Discount	1,863,707	KWH	@ $	-.0030000		-5,591.12
Voltage Level Discount - SV	2,527,280	KWH	@ $	-.0010000		-2,527.28
Surcharges:						
Enhanced Security Surcharge	2,527,280	KWH	@ $	.0000770	Per Total KWH	194.60
Power Supply Cost Recovery Factor	2,527,280	KWH	@ $	-.0036000	Per Total KWH	-9,098.21
Sub Total:						151,138.01
Delivery Charges:						
Service Charge						275.00
Distribution:						
Distribution Demand - SV	4,852	KW	@ $	.9400000	(See D Above)	4,560.88
Distribution Energy - SV	2,527,280	KWH	@ $	.0062000	Per Total KWH	15,669.14
Surcharges:						
Nuclear Decommissioning	2,527,280	KWH	@ $	.0012340	Per Total KWH	3,118.66
Securitization Bond Charge	2,527,280	KWH	@ $	.0047300	Per Total KWH	11,954.03
Securitization Bond Tax Charge	2,527,280	KWH	@ $	.0019400	Per Total KWH	4,902.92
Choice Implementation Surcharge	2,527,280	KWH	@ $	.0005000	Per Total KWH	1,263.64
Energy Optimization Surcharge	2	MTR	@ $	283.32		566.64
Sub Total:						42,310.91
Special Service Charge						9,792.27
Invoice Subtotal						**203,241.19**
No Power Factor Penalty Based on 0.896 Power Factor						0.00
Michigan State Sales Tax On Taxable Portion						0.00
Invoice Total						**$203,241.19**

RECEIVED
VAMC ANN ARBOR
ACCOUNTING

DTE Energy

JUL-22-2009 05:49 From:7348453223 VA ANN ARBOR (734) 845-3223 Page:8/15

000002709 00016295853 B

MAY 09

DTE Energy

Payment Coupon

Account Number	**0000-0270-9**
Due Date:	**July 7, 2009**
Total Due:	**$162,958.53**

US GOVT GS00S28677 CHIEF FISCAL SERVICES
VETERANS ADMIN HOSP AA
2215 FULLER RD
ANN ARBOR, MI 48105-2303

Mail Payments To:

DTE Energy
P.O. Box 630795
Cincinnati, OH 45263-0795

506C95072

7-2-09

Please detach and return coupon with account number on check. Agencies are not authorized to accept payment of this bill.

Account Information

US Govt GS00S28677 Chief Fiscal Services
Veterans Admin Hosp AA
2215 Fuller Rd
ANN ARBOR, MI 48105

RECEIVED
JUN 23 2009
VOUCHER AUDIT
VAMC, STA 506
ANN ARBOR, MI

Account Number	**0000-0270-9**
DTE-Energy Federal ID No.	38-3217752

Programs you are enrolled in:

How to contact us:

Power Outage	See Detail Charges
Billing Inquiry	1-313-235-5120
Analyst Code	T2

Please make any inquiry or complaint about this bill to DTE Energy before the Due Date.
DTE Energy is regulated by the Michigan Public Service Commission, Lansing, Michigan

Important Information

On January 13, 2009, the MPSC approved the reconciliation of Detroit Edison's 2007 Choice Incentive Mechanism in case U-14838 and authorized a Regulatory Asset Recovery Surcharge (RARS) refund. A RARS credit of -0.317 cents per kWh for service greater than 15 kW has been applied to your June bill.

On June 2, 2009, in Case No. U-15806, the MPSC authorized the implementation of an Energy Efficiency Surcharge (EES) for electric customers in accordance with the Clean, Renewable, and Energy Efficiency Act, PA295 of 2008. The EES will be used to fund energy efficiency programs for Detroit Edison customers. The EES for primary voltage customers is a per meter per month charge which is based on your monthly energy consumption. The EES for customers without self directed plans is $28.32 per meter for 0-11,500kWh or $283.32 per meter if above 11,500kWh. For customers with self directed plans the EES is $4.63 per meter for 0-11,500kWh or $42.35 per meter if above 11,500kWh. The EES is effective for bills rendered on and after June 3, 2009.

JUN-23-2009 06:34 From:7348453223 VA ANN ARBOR (734) 845-3223 Page:10/25

Summary Of Charges

Account Number	0000-0270-9

Previous Balance as of 05/28/2009	**154,355.93**
Payment(s) and Credit(s)	**-154,355.93**
Remaining Balance	**$0.00**

Current Charges

Service Location	Item	Service Type	Rate	Bill Period	Amount
2215 Fuller Rd	10037	Primary Supply Rate	220	05/12 - 06/09/09	162,958.53

Taxes	**0.00**
Miscellaneous Charges	**0.00**
Current Bill	**$162,958.53**

Amount Due on or before Due Date of 07/07/2009	**$162,958.53**
Late Payment Charge if paid after Due Date	3,259.17
Total Amount Due if paid after 07/07/2009	166,217.70

JUN-23-2009 06:34 From:7348453223 UA ANN ARBOR (734) 845-3223 Page:11/25

Detail Charges

For Service at: 2215 Fuller Rd, Ann Arbor, MI 48105 **Outage Contact Number:** 1-313-235-1300

Invoice: 5547605 **Billing Period:** 05/12/2009 through 06/09/2009 **Days Billed:** 29

Metering Information

Meter Number	Start Date	Start Read	Stop Date	Stop Read	Read Difference	Units Multiplier	Usage Used	Type
8989698	05/12	2,087.7A	06/09	2,255.2A	167.5	5,600.0000	938,000.0	S-KVARH
8989698	05/12	4,197.7A	06/09	4,541.4A	343.7	5,600.0000	1,924,720.0	S-KWH
8989335	05/12	0.0A	06/09	0.0A	0.0	2,800.0000	0.0	S-KVARH
8989335	05/12	0.0A	06/09	0.0A	0.0	2,800.0000	0.0	S-KWH
				Total KVARH			**938,000.0**	
				Total KWH			**1,924,720.0**	

Invoice: 5547605 **Service Name:** VAMC AA

Item: 10037 **Cycle:** 07 **Primary Supply Rate D6 - Rate 220**

Billing Status Information

1	**On-peak Billing Demand**	**4,455**	**KW**	**ESTABLISHED**	**05/27/2009**	**13:00**
3	65% High OP Bill Dmd June Oct prec 11 mths	3,232	KW	ESTABLISHED	06/26/2008	17:00
6	Rate Minimum Demand (Site)	50	KW	ESTABLISHED	01/22/1994	00:00
8	Highest Single Billing Demand	4,455	KW	ESTABLISHED	05/27/2009	13:00
D	Current SV High Monthly Demand	4,455	KW	ESTABLISHED	05/27/2009	13:00
E	50% of the Contract Capacity for SV	2,926	KW	ESTABLISHED	07/22/2002	11:30
F	**Subtrans Voltage Maximum Demand**	**4,973**	**KW**	**ESTABLISHED**	**06/26/2008**	**17:00**
W	Coincidental Max Onpk KW Dmd at Site	4,455	KW	ESTABLISHED	05/27/2009	13:00
	Highest Maximum OnPeak Demand Reactive Demand	1,929	KVAR	ESTABLISHED	05/27/2009	13:00
	kWh percentage change from a year ago	-4	PCT			
	Avg Kilowatthours Used Per Day A Year Ago	68,936	KWH			
	Power Factor (ratio) for all voltages	89	PCT			
	Total number of days in the Billing Period	29	DAYS			
	Excess KVAR for PF less than .8	0	KVAR			
	Contract Capacity for Location	5,853	KW	ESTABLISHED	07/22/2002	11:30
	Avg Kilowatthours Used Per Day This Period	66,370	KWH			
	(KVAR) Coincidental Max Demand at Site	1,929	KVAR			

Detail Charges

Charges for 05/12/2009 through 06/09/2009

Power Supply Charges:						
Power Supply Demand	4,455	KW	@ $	13.75	(See 1 Above)	61,256.25
Power Supply Energy:						
Power Supply Energy	1,924,720	KWH	@ $	.0401400	Per Total KWH	77,258.26
Off-Peak Discount	1,388,750	KWH	@ $	-.0030000		-4,166.25
Voltage Level Discount - SV	1,924,720	KWH	@ $	-.0010000		-1,924.72
Surcharges:						
Enhanced Security Surcharge	1,924,720	KWH	@ $	.0000770	Per Total KWH	148.20
Regulatory Asset Recovery Surcharge	1,924,720	KWH	@ $	-.0031700	Per Total KWH	-6,101.36
Power Supply Cost Recovery Factor	1,924,720	KWH	@ $	-.0036000	Per Total KWH	-6,928.99
Sub Total:						119,541.39
Delivery Charges:						
Service Charge						275.00
Distribution:						
Distribution Demand - SV	4,973	KW	@ $	.9400000	(See F Above)	4,674.62
Distribution Energy - SV	1,924,720	KWH	@ $	.0062000	Per Total KWH	11,933.26
Surcharges:						
Nuclear Decommissioning	1,924,720	KWH	@ $	.0012340	Per Total KWH	2,375.10
Securitization Bond Charge	1,924,720	KWH	@ $	.0047300	Per Total KWH	9,103.93
Securitization Bond Tax Charge	1,924,720	KWH	@ $	.0019400	Per Total KWH	3,733.96
Choice Implementation Surcharge	1,924,720	KWH	@ $	.0005000	Per Total KWH	962.36
Energy Efficiency Surcharge	2	MTR	@ $	283.32		566.64
Sub Total.						33,624.87
Special Service Charge						9,792.27
Invoice Subtotal						**162,958.53**
No Power Factor Penalty Based on 0.898 Power Factor						0.00
Michigan State Sales Tax On Taxable Portion						0.00
Invoice Total						**$162,958.53**

JUN-23-2009 06:35 From:7348453223 UA ANN ARBOR (734) 845-3223 Page:13/25

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DTE Energy

Payment Coupon

Account Number	**0000-0270-9**
Due Date:	**June 19, 2009**
Total Due:	**$154,355.93**

US GOVT GS00S28677 CHIEF FISCAL SERVICES
VETERANS ADMIN HOSP AA
2215 FULLER RD
ANN ARBOR, MI 48105-2303

Paid 6-4-09

Mail Payments To:
DTE Energy
P.O. Box 630795
Cincinnati, OH 45263-0795

506C95072

Please detach and return coupon with account number on check. Agencies are not authorized to accept payment of this bill.

Account Information

US Govt GS00S28677 Chief Fiscal Services
Veterans Admin Hosp AA
2215 Fuller Rd
ANN ARBOR, MI 48105

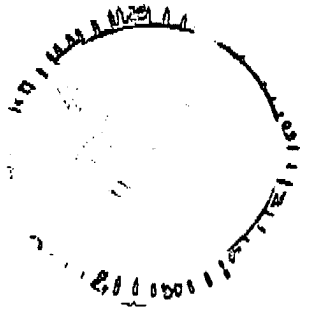
Account Number	**0000-0270-9**
DTE-Energy Federal ID No.	38-3217752

Programs you are enrolled in:

How to contact us:

Power Outage	See Detail Charges
Billing Inquiry	1-313-235-5120
Analyst Code	T2

Please make any inquiry or complaint about this bill to DTE Energy before the Due Date.
DTE Energy is regulated by the Michigan Public Service Commission, Lansing, Michigan



DTE Energy

JUN-03-2009 08:29 From:7348453223 VA ANN ARBOR (734) 845-3223 Page:2/7

Summary Of Charges

Account Number	0000-0270-9

Previous Balance as of 04/16/2009	141,694.11
Payment(s) and Credit(s)	-141,694.11
Remaining Balance	$0.00

Current Charges

Service Location	Item	Service Type	Rate	Bill Period	Amount
2215 Fuller Rd	10037	Primary Supply Rate	220	04/13 - 05/11/09	154,355.93

Taxes	0.00
Miscellaneous Charges	0.00
Current Bill	$154,355.93

Amount Due on or before Due Date of 06/19/2009	**$154,355.93**
Late Payment Charge if paid after Due Date	3,087.12
Total Amount Due if paid after 06/19/2009	157,443.05

JUN-03-2009 08:29 From:7348453223 VA ANN ARBOR (734) 845-3223 Page:3/7

Detail Charges

For Service at: 2215 Fuller Rd, Ann Arbor, MI 48105 **Outage Contact Number:** 1-313-235-1300

Invoice: 5535255 **Billing Period:** 04/13/2009 through 05/11/2009 **Days Billed:** 29

Metering Information

Meter Number	Start Date	Start Read	Stop Date	Stop Read	Read Difference	Units Multiplier	Usage Used	Type
8989698	04/13	1,933.6A	05/11	2,087.7A	154.1	5,600.0000	862,960.0	S-KVARH
8989698	04/13	3,874.5A	05/11	4,197.7A	323.2	5,600.0000	1,809,920.0	S-KWH
8989335	04/13	0.0A	05/11	0.0A	0.0	2,800.0000	0.0	S-KVARH
8989335	04/13	0.0A	05/11	0.0A	0.0	2,800.0000	0.0	S-KWH
				Total KVARH			**862,960.0**	
				Total KWH			**1,809,920.0**	

Invoice: 5535255 **Service Name:** VAMC AA

Item: 10037 **Cycle:** 07 **Primary Supply Rate D6 - Rate 220**

Billing Status Information

1	**On-peak Billing Demand**	**3,824**	**KW**	**ESTABLISHED**	**04/27/2009**	**14:00**
3	65% High OP Bill Dmd June-Oct prec 11 mths	3,258	KW	ESTABLISHED	06/09/2008	14:00
6	Rate Minimum Demand (Site)	50	KW	ESTABLISHED	01/22/1994	00:00
8	Highest Single Billing Demand	3,824	KW	ESTABLISHED	04/27/2009	14:00
D	Current SV High Monthly Demand	3,824	KW	ESTABLISHED	04/27/2009	14:00
E	50% of the Contract Capacity for SV	2,926	KW	ESTABLISHED	07/22/2002	11:30
F	**Subtrans Voltage Maximum Demand**	**5,013**	**KW**	**ESTABLISHED**	**06/09/2008**	**14:00**
W	Coincidental Max Onpk KW Dmd at Site	3,824	KW	ESTABLISHED	04/27/2009	14:00
	Highest Maximum OnPeak Demand Reactive Demand	1,680	KVAR	ESTABLISHED	04/27/2009	14:30
	kWh percentage change from a year ago	2	PCT			
	Avg Kilowatthours Used Per Day A Year Ago	61,075	KWH			
	Power Factor (ratio) for all voltages	90	PCT			
	Total number of days in the Billing Period	29	DAYS			
	Excess KVAR for PF less than .8	0	KVAR			
	Contract Capacity for Location	5,853	KW	ESTABLISHED	07/22/2002	11:30
	Avg Kilowatthours Used Per Day This Period	62,411	KWH			
	(KVAR) Coincidental Max Demand at Site	1,666	KVAR			

Charges for 04/13/2009 through 05/11/2009

Power Supply Charges:					
Power Supply Demand	3,824 KW	@ $	13.75	(See 1 Above)	52,580.00
Power Supply Energy:					
Power Supply Energy	1,809,920 KWH	@ $	.0401400	Per Total KWH	72,650.19
Off-Peak Discount	1,299,848 KWH	@ $	-.0030000		-3,899.54
Voltage Level Discount - SV	1,809,920 KWH	@ $	-.0010000		-1,809.92
Surcharges:					
Enhanced Security Surcharge	1,809,920 KWH	@ $	.0000770	Per Total KWH	139.36
Power Supply Cost Recovery Factor	1,809,920 KWH	@ $	-.0036000	Per Total KWH	-6,515.71
Sub Total:					113,144.38
Delivery Charges:					
Service Charge					275.00
Distribution:					
Distribution Demand - SV	5,013 KW	@ $	.9400000	(See F Above)	4,712.22
Distribution Energy - SV	1,809,920 KWH	@ $	.0062000	Per Total KWH	11,221.50
Surcharges:					
Nuclear Decommissioning	1,809,920 KWH	@ $	.0012340	Per Total KWH	2,233.44
Securitization Bond Charge	1,809,920 KWH	@ $	.0047300	Per Total KWH	8,560.92
Securitization Bond Tax Charge	1,809,920 KWH	@ $	.0019400	Per Total KWH	3,511.24
Choice Implementation Surcharge	1,809,920 KWH	@ $	.0005000	Per Total KWH	904.96
Sub Total:					31,419.28
Special Service Charge					9,792.27

Detail Charges

Invoice Subtotal	**154,355.93**
No Power Factor Penalty Based on 0.902 Power Factor	0.00
Michigan State Sales Tax On Taxable Portion	0.00
Invoice Total	**$154,355.93**

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DTE Energy

Payment Coupon

506C95072

US GOVT GS00S28677 CHIEF FISCAL SERVICES
VETERANS ADMIN HOSP AA
2215 FULLER RD
ANN ARBOR, MI 48105-2303

AUG 24 2009

Account Number	**0000-0270-9**
Due Date:	**September 8, 2009**
Total Due:	**$182,526.00**

Mail Payments To:

DTE Energy
P.O. Box 630795
Cincinnati, OH 45263-0795

paid 9/26/09

Please detach and return coupon with account number on check. Agencies are not authorized to accept payment of this bill

Account Information

RECEIVED AUG 24 VOLS VAMC ANN AR

US Govt GS00S28677 Chief Fiscal Services
Veterans Admin Hosp AA
2215 Fuller Rd
ANN ARBOR, MI 48105

Account Number	**0000-0270-9**
DTE Energy Federal ID No.	38-3217752

Programs you are enrolled in:

How to contact us:

Power Outage	See Detail Charges
Billing Inquiry	1-313-235-5120
Analyst Code	T2

Please make any inquiry or complaint about this bill to DTE Energy before the Due Date.
DTE Energy is regulated by the Michigan Public Service Commission, Lansing, Michigan

Important Information

Beginning with the August 2009 billing cycle, the Power Supply Cost Recovery (PSCR) factor will decrease from -0.360 cents/kWh to -1.046 cents/kWh. The PSCR factor allows Detroit Edison to recover its fuel and purchased power expense.

On July 16, 2009, the MPSC authorized the U-15768 Implementation Surcharge. This surcharge is effective for service rendered on and after July 26, 2009. Beginning in August the PSCR will be lowered. As a result of these two actions, the average primary bill will decrease by approximately 3.2 percent.

Jul 09

AUG-24-2009 08:04 From:7348453223 UA ANN ARBOR (734) 845-3223 Page:5/10

Summary Of Charges

Account Number **0000-0270-9**

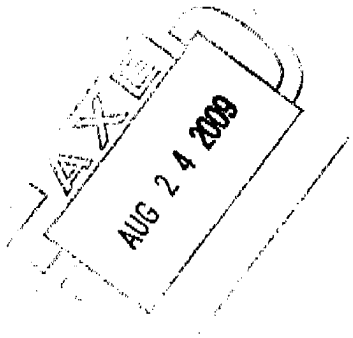
Previous Balance as of 07/16/2009	203,241.19
Payment(s) and Credit(s)	-203,241.19
Remaining Balance	$0.00

Current Charges

Service Location	Item	Service Type	Rate	Bill Period	Amount
2215 Fuller Rd	10037	Primary Supply Rate	220	07/13 - 07/25/09	71,359.47
	10037	Primary Supply Rate	220	07/26 - 08/11/09	111,166.53

Taxes	0.00
Miscellaneous Charges	0.00
Current Bill	$182,526.00

Amount Due on or before Due Date of 09/08/2009	**$182,526.00**
Late Payment Charge if paid after Due Date	3,650.52
Total Amount Due if paid after 09/08/2009	186,176.52



AUG-24-2009 08:05 From:7348453223 UA ANN ARBOR (734) 845-3223 Page:6/10

Detail Charges

For Service at: 2215 Fuller Rd, Ann Arbor, MI 48105 **Outage Contact Number:** 1-313-235-1300

Invoice: 5590475 **Billing Period:** 07/13/2009 through 08/11/2009 **Days Billed:** 30

Metering Information

Meter Number	Start Date	Start Read	Stop Date	Stop Read	Read Difference	Units Multiplier	Usage Used	Type
8989698	07/13	2,478.5A	07/25	2,567.8A	89.3	5,600.0000	500,080.0	S-KVARH
8989698	07/26	2,567.8A	08/11	2,692.0A	124.2	5,600.0000	695,520.0	S-KVARH
8989698	07/13	4,992.7A	07/25	5,171.5A	178.8	5,600.0000	1,001,280.0	S-KWH
8989698	07/26	5,171.5A	08/11	5,420.8A	249.3	5,600.0000	1,396,080.0	S-KWH
8989335	07/13	0.0A	07/25	0.0A	0.0	2,800.0000	0.0	S-KVARH
8989335	07/26	0.0A	08/11	0.0A	0.0	2,800.0000	0.0	S-KVARH
8989335	07/13	0.0A	07/25	0.0A	0.0	2,800.0000	0.0	S-KWH
8989335	07/26	0.0A	08/11	0.0A	0.0	2,800.0000	0.0	S-KWH
					Total KVARH		**1,195,600.0**	
					Total KWH		**2,397,360.0**	

Invoice: 5590475 **Service Name:** VAMC AA

Item: 10037 **Cycle:** 07 **Primary Supply Rate D6 - Rate 220**

Billing Status Information

1	**On-peak Billing Demand**	**4,650**	**KW**	**ESTABLISHED**	**08/10/2009**	**12:30**
3	65% High OP Bill Dmd June-Oct prec 11 mths	3,154	KW	ESTABLISHED	06/25/2009	12:30
6	Rate Minimum Demand (Site)	50	KW	ESTABLISHED	01/22/1994	00:00
8	Highest Single Billing Demand	4,650	KW	ESTABLISHED	08/10/2009	12:30
D	Current SV High Monthly Demand	4,650	KW	ESTABLISHED	08/10/2009	12:30
E	50% of the Contract Capacity for SV	2,926	KW	ESTABLISHED	07/22/2002	11:30
F	**Subtrans Voltage Maximum Demand**	**4,852**	**KW**	**ESTABLISHED**	**06/25/2009**	**12:30**
W	Coincidental Max Onpk KW Dmd at Site	4,650	KW	ESTABLISHED	08/10/2009	12:30
	Highest Maximum OnPeak Demand Reactive Demand	2,157	KVAR	ESTABLISHED	08/04/2009	16:00
	kWh percentage change from a year ago	-5	PCT			
	Avg Kilowatthours Used Per Day A Year Ago	83,825	KWH			
	Power Factor (ratio) for all voltages	89	PCT			
	Total number of days in the Billing Period	30	DAYS			
	Excess KVAR for PF less than .8	0	KVAR			
	Contract Capacity for Location	5,853	KW	ESTABLISHED	07/22/2002	11:30
	Avg Kilowatthours Used Per Day This Period	79,912	KWH			
	(KVAR) Coincidental Max Demand at Site	2,144	KVAR			

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Detail Charges

Charges for 07/26/2009 through 08/11/2009

Power Supply Charges:						
Power Supply Demand	4,650	KW	@ $	13.75	(See 1 Above)	36,231.46
Power Supply Energy:						
Power Supply Energy	1,396,080	KWH	@ $	.0401400	Per Total KWH	56,038.65
Off-Peak Discount	1,013,863	KWH	@ $	-.0030000		-3,041.59
Voltage Level Discount - SV	1,396,080	KWH	@ $	-.0010000		-1,396.08
Surcharges:						
Enhanced Security Surcharge	1,396,080	KWH	@ $	.0000770	Per Total KWH	107.50
Power Supply Cost Recovery Factor	1,396,080	KWH	@ $	-.0104600	Per Total KWH	-14,603.00
Sub Total:						73,336.94
Delivery Charges:						
Service Charge						155.83
Distribution:						
Distribution Demand - SV	4,852	KW	@ $	.9400000	(See F Above)	2,584.51
Distribution Energy - SV	1,396,080	KWH	@ $	.0062000	Per Total KWH	8,655.70
Surcharges:						
Nuclear Decommissioning	1,396,080	KWH	@ $	.0012340	Per Total KWH	1,722.76
Securitization Bond Charge	1,396,080	KWH	@ $	.0047300	Per Total KWH	6,603.46
Securitization Bond Tax Charge	1,396,080	KWH	@ $	.0019400	Per Total KWH	2,708.40
Choice Implementation Surcharge	1,396,080	KWH	@ $	.0005000	Per Total KWH	698.04
Energy Optimization Surcharge	2	MTR	@ $	283.32		321.10
U-15768 Implementation Surcharge	1,396,080	KWH	@ $	.0032860	Per Total KWH	4,587.52
Sub Total:						28,037.32
Special Service Charge						9,792.27
Period Subtotal						**111,166.53**
Invoice Subtotal						**182,526.00**
No Power Factor Penalty Based on 0.894 Power Factor						0.00
Michigan State Sales Tax On Taxable Portion						0.00
Invoice Total						**$182,526.00**

AUG-24-2009 08:06 From:7348453223 UA ANN ARBOR (734) 845-3223 Page:9/10

Billing Explanation Codes

Listed below are explanations of the codes used elsewhere in this bill.

Power Factor Code

Power factor and penalty are determined as follows:
(A) Divide the reactive kilovolt ampere hours by the kilowatthours.
(B) Find the ratio determined in (A) in the left column of the table below.
(C) The amount in the corresponding row of the middle column is the power factor.
(D) The amount in the corresponding row of the right column is the penalty, if any, which will be applied to the total amount of the monthly billing.

Ratio of Registration of Reactive Component Meter to Registration of Kilowatthour Meter	Power Factor	Penalty
1.021 and higher	0.699 and lower	See Below
1.020 to 0.883	0.700 to 0.749	3%
0.882 to 0.752	0.750 to 0.799	2%
0.750 to 0.622	0.800 to 0.849	1%
0.621 to 0.000	0.850 to 1.000	None

Below .700 is not permitted. A 25% penalty will be applied to any billing after two consecutive months below .700 power factor.

Billing Demand Codes

1 - Highest on-peak demand(kw) value
2 - 50% of the highest monthly billing demand of the preceding eleven months
3 - 65% of the high monthly bill demand occurring June - October of the preceding 11 months
4 - 50% of the high monthly bill demand occurring June - October of the preceding 11 months
5 - 50% of the contract capacity for the site
6 - Minimum demand as prescribed by the rate
7 - 65% of the Product Protection Demand
8 - Highest Single Billing Demand
9 - 65% of high monthly bill demand occurring June - October of the preceding 11 months

Demand Codes

A - Maximum (metered) demand value at primary voltage for the location
B - 50% of the contract capacity at primary voltage
C - Highest Demand in latest 12 month period at primary voltage
D - Maximum (metered) demand value at subtransmission voltage for the location
E - 50% of contract capacity at subtransmission voltage
F - Highest Demand in latest 12 month period at subtransmission voltage
G - Maximum (metered) demand value at transmission voltage for the location
H - 50% of contract capacity at transmission voltage
I - Highest Demand in the latest 12 month period at transmission voltage
J - Maximum (metered) customer substation demand at subtransmission voltage
K - 50% of contract capacity for customer substation at subtransmission voltage
L - Highest Demand in the latest 12 month period for customer substation subtransmission voltage
M - Maximum (metered) customer substation demand at transmission voltage
N - 50% of contract capacity for customer substation at transmission voltage
P - Highest demand in the latest 12 month period for customer substation at transmission voltage
R - Valley hours
W - Coincidental Maximum On Peak kilowatt demand at site

AUG-24-2009 08:06 From:7348453223 UA ANN ARBOR (734) 845-3223 Page:10/10

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DTE Energy

Payment Coupon

Account Number	**0000-0270-9**
Due Date:	**October 27, 2009**
Total Due:	**$204,321.96**

US GOVT GS00S28677 CHIEF FISCAL SERVICES
VETERANS ADMIN HOSP AA
2215 FULLER RD
ANN ARBOR, MI 48105-2303

Refaxing

Mail Payments To

DTE Energy
P.O. Box 630795
Cincinnati, OH 45263-0795

506C 9507 J--

Please detach and return coupon with account number on check. Agencies are not authorized to accept payment of this bill.

Account Information

US Govt GS00S28677 Chief Fiscal Services
Veterans Admin Hosp AA
2215 Fuller Rd
ANN ARBOR, MI 48105

RECEIVED
OCT 15 2009
VOUCHER AUDIT
ANN ARBOR, MI

Account Number	**0000-0270-9**
DTE-Energy Federal ID No.	38-3217752

Programs you are enrolled in:

How to contact us:

Power Outage	See Detail Charges
Billing Inquiry	1-313-235-5120
Analyst Code	T2

Please make any inquiry or complaint about this bill to DTE Energy before the Due Date.
DTE Energy is regulated by the Michigan Public Service Commission, Lansing, Michigan

Important Information

On June 2, 2009, in Case No. U-15806, the MPSC authorized a Renewable Energy Plan Surcharge (REPS). This surcharge is to fund the renewable energy investments required by the Clean, Renewable, Efficient Energy Act of 2008 (PA295). For primary voltage service the REPS is a per meter per month charge which is based on your current monthly energy consumption. The REPS is $16.58 per meter for 0 - 11,500 kWh, $140.00 per meter for 11,501 - 41,500 kWh, or $187.50 per meter if above 41,500 kWh. The REPS does not apply to additional meters at a single site installed to support net metering. The REPS is effective for bills rendered on and after September 1, 2009.

FAXED
OCT 19 2009

Aug 09

DTE Energy

OCT-22-2009 08:59 From:7348453223 VA ANN ARBOR (734) 845-3223 Page:17/20

Summary Of Charges

Account Number	0000-0270-9

Previous Balance as of 08/17/2009	182,526.00
Payment(s) and Credit(s)	-182,526.00
Remaining Balance	$0.00

Current Charges

Service Location	Item	Service Type	Rate	Bill Period	Amount
2215 Fuller Rd	10037	Primary Supply Rate	220	08/12 - 09/10/09	204,321.96

Taxes	0.00
Miscellaneous Charges	0.00
Current Bill	$204,321.96

Amount Due on or before Due Date of 10/27/2009	**$204,321.96**
Late Payment Charge if paid after Due Date	4,086.44
Total Amount Due if paid after 10/27/2009	208,408.40

DTE Energy

OCT-22-2009 09:00 From:7348453223 UA ANN ARBOR (734) 845-3223 Page:18/20

Detail Charges

For Service at: 2215 Fuller Rd, Ann Arbor, MI 48105 **Outage Contact Number:** 1-313-235-1300

Invoice: 5627297 **Billing Period:** 08/12/2009 through 09/10/2009 **Days Billed:** 30

Metering Information

Meter Number	Start Date	Start Read	Stop Date	Stop Read	Read Difference	Units Multiplier	Usage Used	Type
8989698	08/12	2,692.0A	09/10	2,807.1A	115 1	5,600.0000	644,560.0	S-KVARH
8989698	08/12	5,420 8A	09/10	5,652.0A	231 2	5,600.0000	1,294,720.0	S-KWH
8989335	08/12	0.0A	09/10	184.9A	184.9	2,800.0000	517,720.0	S-KVARH
8989335	08/12	0 0A	09/10	357 0A	357.0	2,800.0000	999,600.0	S-KWH
					Total KVARH		~~1,162,280.0~~	
					Total KWH		**2,294,320.0**	

Invoice: 5627297 **Service Name:** VAMC AA
Item: 10037 **Cycle:** 07 **Primary Supply Rate D6 - Rate 220**

Billing Status Information

1	**On-peak Billing Demand**	**6,213**	**KW**	**ESTABLISHED**	**08/27/2009**	**19:00**
3	65% High OP Bill Dmd June-Oct prec 11 mths	3,154	KW	ESTABLISHED	06/25/2009	12:30
6	Rate Minimum Demand (Site)	50	KW	ESTABLISHED	01/22/1994	00:00
8	Highest Single Billing Demand	6,213	KW	ESTABLISHED	08/27/2009	19:00
D	**Current SV High Monthly Demand**	**6,213**	**KW**	**ESTABLISHED**	**08/27/2009**	**19:00**
E	50% of the Contract Capacity for SV	3,106	KW	ESTABLISHED	08/27/2009	19:00
F	Subtrans Voltage Maximum Demand	6,213	KW	ESTABLISHED	08/27/2009	19:00
W	Coincidental Max Onpk KW Dmd at Site	6,213	KW	ESTABLISHED	08/27/2009	19:00
	Highest Maximum OnPeak Demand Reactive Demand	3,182	KVAR	ESTABLISHED	08/27/2009	19:00
	kWh percentage change from a year ago	0	PCT			
	Avg Kilowatthours Used Per Day A Year Ago	76,739	KWH			
	Power Factor (ratio) for all voltages	89	PCT			
	Total number of days in the Billing Period	30	DAYS			
	Excess KVAR for PF less than .8	0	KVAR			
	Contract Capacity for Location	6,213	KW	ESTABLISHED	08/27/2009	19:00
	Avg Kilowatthours Used Per Day This Period	76,477	KWH			
	(KVAR) Coincidental Max Demand at Site	3,182	KVAR			

OCT-22-2009 09:00 From:7348453223 UA ANN ARBOR (734) 845-3223 Page:19/20

Detail Charges

Charges for 08/12/2009 through 09/10/2009

Power Supply Charges:						
Power Supply Demand	6,213	KW	@ $	13 75	(See 1 Above)	85,428.75
Power Supply Energy:						
Power Supply Energy	2,294,320	KWH	@ $	.0401400	Per Total KWH	92,094.00
Off-Peak Discount	1,659,682	KWH	@ $	-.0030000		-4,979.05
Voltage Level Discount - SV	2,294,320	KWH	@ $	-.0010000		-2,294.32
Surcharges:						
Enhanced Security Surcharge	2,294,320	KWH	@ $	.0000770	Per Total KWH	176.66
Power Supply Cost Recovery Factor	2,294,320	KWH	@ $	-.0104600	Per Total KWH	-23,998.59
Renewable Energy Plan Surcharge	2	MTR	@ $	187.50		375.00
Sub Total:						146,802.45
Delivery Charges:						275.00
Service Charge						
Distribution:						
Distribution Demand - SV	6,213	KW	@ $	.9400000	(See D Above)	5,840.22
Distribution Energy - SV	2,294,320	KWH	@ $	.0062000	Per Total KWH	14,224.78
Surcharges:						
Nuclear Decommissioning	2,294,320	KWH	@ $	.0012340	Per Total KWH	2,831.19
Securitization Bond Charge	2,294,320	KWH	@ $	.0047300	Per Total KWH	10,852.13
Securitization Bond Tax Charge	2,294,320	KWH	@ $	.0019400	Per Total KWH	4,450.98
Choice Implementation Surcharge	2,294,320	KWH	@ $	.0005000	Per Total KWH	1,147.16
Energy Optimization Surcharge	2	MTR	@ $	283.32		566.64
U-15768 Implementation Surcharge	2,294,320	KWH	@ $	.0032860	Per Total KWH	7,539.14
Sub Total:						47,727.24
Special Service Charge						9,792.27
Invoice Subtotal						**204,321.96**
No Power Factor Penalty Based on 0.892 Power Factor						0.00
Michigan State Sales Tax On Taxable Portion						0.00
Invoice Total						**$204,321.96**

OCT-22-2009 09:00 From:7348453223 UA ANN ARBOR (734) 845-3223 Page:20/20

000002709 00041607034 B

DTE Energy

Payment Coupon

Account Number	**0000-0270-9**
Due Date:	**November 6, 2009**
Total Due:	**$416,070.34**

OCT 23 2009

US GOVT GS00S28677 CHIEF FISCAL SERVICES
VETERANS ADMIN HOSP AA
2215 FULLER RD
ANN ARBOR, MI 48105-2303

Mail Payments To

DTE Energy
P.O. Box 630795
Cincinnati, OH 45263-0795

Please detach and return coupon with account number on check. Agencies are not authorized to accept payment of this bill.

Account Information

US Govt GS00S28677 Chief Fiscal Services
Veterans Admin Hosp AA
2215 Fuller Rd
ANN ARBOR, MI 48105

Account Number	**0000-0270-9**
DTE-Energy Federal ID No.	38-3217752

Programs you are enrolled in:

How to contact us:

Power Outage	See Detail Charges
Billing Inquiry	1-313-235-5120
Analyst Code	T2

Please make any inquiry or complaint about this bill to DTE Energy before the Due Date.
DTE Energy is regulated by the Michigan Public Service Commission, Lansing, Michigan

Detail Charges

Charges for 09/11/2009 through 10/12/2009

Power Supply Charges:						
Power Supply Demand	7,251	KW	@ $	13.75	(See 1 Above)	99,701.25
Power Supply Energy:						
Power Supply Energy	2,119,320	KWH	@ $	.0401400	Per Total KWH	85,069.50
Off-Peak Discount	1,545,676	KWH	@ $	-.0030000		-4,637.63
Voltage Level Discount - SV	2,119,320	KWH	@ $	-.0010000		-2,119.32
Surcharges:						
Enhanced Security Surcharge	2,119,320	KWH	@ $	.0000770	Per Total KWH	163.19
Power Supply Cost Recovery Factor	2,119,320	KWH	@ $	-.0104600	Per Total KWH	-22,168.09
Renewable Energy Plan Surcharge	2	MTR	@ $	187.50		375.00
Sub Total:						156,383.90
Delivery Charges:						
Service Charge						275.00
Distribution:						
Distribution Demand - SV	7,251	KW	@ $	.9400000	(See D Above)	6,815.94
Distribution Energy - SV	2,119,320	KWH	@ $	.0062000	Per Total KWH	13,139.78
Surcharges:						
Nuclear Decommissioning	2,119,320	KWH	@ $	.0012340	Per Total KWH	2,615.24
Securitization Bond Charge	2,119,320	KWH	@ $	.0047300	Per Total KWH	10,024.38
Securitization Bond Tax Charge	2,119,320	KWH	@ $	.0019400	Per Total KWH	4,111.48
Choice Implementation Surcharge	2,119,320	KWH	@ $	.0005000	Per Total KWH	1,059.66
Energy Optimization Surcharge	2	MTR	@ $	283.32		566.64
U-15768 Implementation Surcharge	2,119,320	KWH	@ $	.0032860	Per Total KWH	6,964.09
Sub Total:						45,572.21
Special Service Charge						9,792.27
Invoice Subtotal						**211,748.38**
No Power Factor Penalty Based on 0.886 Power Factor						0.00
Michigan State Sales Tax On Taxable Portion						0.00
Invoice Total						**$211,748.38**

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DTE Energy

Payment Coupon

Account Number	0000-0270-9
Due Date:	November 6, 2009
Total Due:	$416,070.34

OCT 23 2009
VOUCHER AND INVOICE SECTION
APPROVED

US GOVT GS00S28677 CHIEF FISCAL SERVICES
VETERANS ADMIN HOSP AA
2215 FULLER RD
ANN ARBOR, MI 48105-2303

Mail Payments To:

DTE Energy
P.O. Box 630795
Cincinnati, OH 45263-0795

Please detach and return coupon with account number on check. Agencies are not authorized to accept payment of this bill.

Account Information

US Govt GS00S28677 Chief Fiscal Services
Veterans Admin Hosp AA
2215 Fuller Rd
ANN ARBOR, MI 48105

Account Number	0000-0270-9
DTE-Energy Federal ID No.	38-3217752

Programs you are enrolled in:

How to contact us:

Power Outage	See Detail Charges
Billing Inquiry	1-313-235-5120
Analyst Code	T2

Please make any inquiry or complaint about this bill to DTE Energy before the Due Date.
DTE Energy is regulated by the Michigan Public Service Commission, Lansing, Michigan

Summary Of Charges

Account Number	0000-0270-9

506C95072

Previous Balance as of 10/05/2009	204,321.96
Payment(s) and Credit(s)	0.00
Remaining Balance	$204,321.96

Current Charges

Service Location	Item	Service Type	Rate	Bill Period	Amount
2215 Fuller Rd	10037	Primary Supply Rate	220	09/11 - 10/12/09	211,748.38

Taxes	0.00
Miscellaneous Charges	0.00
Current Bill	$211,748.38

Amount Due on or before Due Date of 11/06/2009	**$416,070.34**
Late Payment Charge if paid after Due Date	8,321.41
Total Amount Due if paid after 11/06/2009	424,391.75

Detail Charges

Charges for 09/11/2009 through 10/12/2009

Power Supply Charges:						
Power Supply Demand	7,251	KW	@ $	13.75	(See 1 Above)	99,701.25
Power Supply Energy:						
Power Supply Energy	2,119,320	KWH	@ $	.0401400	Per Total KWH	85,069.50
Off-Peak Discount	1,545,876	KWH	@ $	-.0030000		-4,637.63
Voltage Level Discount - SV	2,119,320	KWH	@ $	-.0010000		-2,119.32
Surcharges:						
Enhanced Security Surcharge	2,119,320	KWH	@ $	.0000770	Per Total KWH	163.19
Power Supply Cost Recovery Factor	2,119,320	KWH	@ $	-.0104600	Per Total KWH	-22,168.09
Renewable Energy Plan Surcharge	2	MTR	@ $	187.50		375.00
Sub Total:						156,383.90
Delivery Charges:						
Service Charge						275.00
Distribution:						
Distribution Demand - SV	7,251	KW	@ $	.9400000	(See D Above)	6,815.94
Distribution Energy - SV	2,119,320	KWH	@ $	.0062000	Per Total KWH	13,139.78
Surcharges:						
Nuclear Decommissioning	2,119,320	KWH	@ $	.0012340	Per Total KWH	2,615.24
Securitization Bond Charge	2,119,320	KWH	@ $	.0047300	Per Total KWH	10,024.38
Securitization Bond Tax Charge	2,119,320	KWH	@ $	.0019400	Per Total KWH	4,111.48
Choice Implementation Surcharge	2,119,320	KWH	@ $	.0005000	Per Total KWH	1,059.66
Energy Optimization Surcharge	2	MTR	@ $	283.32		566.64
U-15768 Implementation Surcharge	2,119,320	KWH	@ $	.0032860	Per Total KWH	6,964.09
Sub Total:						45,572.21
Special Service Charge						9,792.27
Invoice Subtotal						**211,748.38**
No Power Factor Penalty Based on 0.886 Power Factor						0.00
Michigan State Sales Tax On Taxable Portion						0.00
Invoice Total						**$211,748.38**

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DTE Energy

Payment Coupon

506C05045

Account Number	0000-0270-9
Due Date:	February 10, 2010
Total Due:	$180,502.98

PD. 2.1.10
SLI
12.10.09 THRU 1.11.10

US GOVT GS00S28677 CHIEF FISCAL SERVICES
VETERANS ADMIN HOSP AA
2215 FULLER RD
ANN ARBOR, MI 48105-2303

Mail Payments To:
DTE Energy
P O Box 630795
Cincinnati, OH 45263-0795

Please detach and return coupon with account number on check. Agencies are not authorized to accept payment of this bill.

Account Information

US Govt GS00S28677 Chief Fiscal Services
Veterans Admin Hosp AA
2215 Fuller Rd
ANN ARBOR, MI 48105

Account Number	0000-0270-9
DTE-Energy Federal ID No	38-3217752

Programs you are enrolled in:

How to contact us:

Power Outage	See Detail Charges
Billing Inquiry	1-313-235-5120
Analyst Code	T2

Please make any inquiry or complaint about this bill to DTE Energy before the Due Date
DTE Energy is regulated by the Michigan Public Service Commission, Lansing, Michigan

Important Information

Beginning with the January 2010 billing cycle, the Power Supply Cost Recovery (PSCR) factor will increase from -1.062 cents per kWh to -0.780 cents per kWh. The PSCR factor allows Detroit Edison to recover its fuel and purchased power expense.

Summary Of Charges

Account Number	0000-0270-9

Previous Balance as of 12/15/2009	158,858.10
Payment(s) and Credit(s)	-158,858.10
Remaining Balance	$0.00

Current Charges

Service Location	Item	Service Type	Rate	Bill Period	Amount
2215 Fuller Rd	10037	Primary Supply Rate	220	12/10 - 01/11/10	180,502.98

Taxes	0.00
Miscellaneous Charges	0.00
Current Bill	$180,502.98

Amount Due on or before Due Date of 02/10/2010	$180,502.98
Late Payment Charge if paid after Due Date	3,610.06
Total Amount Due if paid after 02/10/2010	184,113.04

Detail Charges

Charges for 12/10/2009 through 01/11/2010

Power Supply Charges:						
Power Supply Demand	5,181	KW	@ $	13.75	(See 1 Above)	71,238.75
Power Supply Energy:						
Power Supply Energy	1,944,320	KWH	@ $	.0401400	Per Total KWH	78,045.00
Off-Peak Discount	1,476,396	KWH	@ $	-.0030000		-4,429.19
Voltage Level Discount - SV	1,944,320	KWH	@ $	-.0010000		-1,944.32
Surcharges:						
Enhanced Security Surcharge	1,944,320	KWH	@ $	.0000770	Per Total KWH	149.71
Power Supply Cost Recovery Factor	1,944,320	KWH	@ $	-.0078000	Per Total KWH	-15,165.70
Renewable Energy Plan Surcharge	2	MTR	@ $	187.50		375.00
Sub Total.						128,269.25
Delivery Charges:						
Service Charge						275.00
Distribution						
Distribution Demand - SV	7,251	KW	@ $	9400000	(See F Above)	6,815.94
Distribution Energy - SV	1,944,320	KWH	@ $	.0062000	Per Total KWH	12,054.78
Surcharges:						
Nuclear Decommissioning	1,944,320	KWH	@ $	.0012340	Per Total KWH	2,399.29
Securitization Bond Charge	1,944,320	KWH	@ $	.0047300	Per Total KWH	9,196.63
Securitization Bond Tax Charge	1,944,320	KWH	@ $	.0019400	Per Total KWH	3,771.98
Choice Implementation Surcharge	1,944,320	KWH	@ $	0005000	Per Total KWH	972.16
Energy Optimization Surcharge	2	MTR	@ $	283.32		566.64
U-15768 Implementation Surcharge	1,944,320	KWH	@ $	.0032860	Per Total KWH	6,389.04
Sub Total:						42,441.46
Special Service Charge						9,792.27
Invoice Subtotal						**180,502.98**
No Power Factor Penalty Based on 0.895 Power Factor						0.00
Michigan State Sales Tax On Taxable Portion						0.00
Invoice Total						**$180,502.98**

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DTE Energy

Payment Coupon

Account Number	**0000-0270-9**
Due Date:	**January 6, 2010**
Total Due:	**$158,858.10**

US GOVT GS00S28677 CHIEF FISCAL SERVICES
VETERANS ADMIN HOSP AA
2215 FULLER RD
ANN ARBOR, MI 48105 2303

Mail Payments To:

DTE Energy
P O Box 630795
Cincinnati, OH 45263-0795

506C0504S

Please detach and return coupon with account number on check. Agencies are not authorized to accept payment of this bill

Account Information

US Govt GS00S28677 Chief Fiscal Services
Veterans Admin Hosp AA
2215 Fuller Rd
ANN ARBOR, MI 48105

Account Number	**0000-0270-9**

DTE-Energy Federal ID No 38-3217752

Programs you are enrolled in:

How to contact us:

Power Outage	See Detail Charges
Billing Inquiry	1-313-235-5120
Analyst Code	T2

Please make any inquiry or complaint about this bill to DTE Energy before the Due Date.
DTE Energy is regulated by the Michigan Public Service Commission, Lansing, Michigan

Important Information

Beginning with the December 2009 billing cycle, the Power Supply Cost Recovery (PSCR) factor will decrease from -1.06 cents per kWh to -1.062 cents per kWh. The PSCR factor allows Detroit Edison to recover its fuel and purchased power expense.

DTE Energy

Summary Of Charges

Account Number **0000-0270-9**

Previous Balance as of 11/13/2009	**381,485.08**
Payment(s) and Credit(s)	**-381,485.08**
Remaining Balance	**$0.00**

Current Charges

Service Location	Item	Service Type	Rate	Bill Period	Amount
2215 Fuller Rd	10037	Primary Supply Rate	220	11/10 - 12/09/09	158,858.10

Taxes	**0.00**
Miscellaneous Charges	**0.00**
Current Bill	**$158,858.10**

Amount Due on or before Due Date of 01/06/2010	**$158,858.10**
Late Payment Charge if paid after Due Date	3,177.16
Total Amount Due if paid after 01/06/2010	162,035.26

Detail Charges

Charges for 11/10/2009 through 12/09/2009

Power Supply Charges:						
Power Supply Demand	4,713	KW	@ $	13 75	(See 3 Above)	64,803.75
Power Supply Energy.						
Power Supply Energy	1,722.000	KWH	@ $	0401400	Per Total KWH	69,121.08
Off-Peak Discount	1,273,702	KWH	@ $	- 0030000		-3,821.11
Voltage Level Discount - SV	1,722,000	KWH	@ $	-.0010000		-1,722.00
Surcharges.						
Enhanced Security Surcharge	1,722,000	KWH	@ $	.0000770	Per Total KWH	132.59
Power Supply Cost Recovery Factor	1,722,000	KWH	@ $	-.0106200	Per Total KWH	-18,287.64
Renewable Energy Plan Surcharge	2	MTR	@ $	187 50		375 00
Sub Total						110,601 67
Delivery Charges:						
Service Charge						275.00
Distribution.						
Distribution Demand - SV	7,251	KW	@ $	9400000	(See F Above)	6,815 94
Distribution Energy - SV	1,722,000	KWH	@ $	.0062000	Per Total KWH	10,676.40
Surcharges						
Nuclear Decommissioning	1,722,000	KWH	@ $	.0012340	Per Total KWH	2,124.95
Securitization Bond Charge	1,722,000	KWH	@ $	.0047300	Per Total KWH	8,145.06
Securitization Bond Tax Charge	1,722,000	KWH	@ $	0019400	Per Total KWH	3,340 88
Choice Implementation Surcharge	1,722,000	KWH	@ $	0005000	Per Total KWH	861 00
Energy Optimization Surcharge	2	MTR	@ $	283.32		566.64
U-15768 Implementation Surcharge	1,722,000	KWH	@ $	0032860	Per Total KWH	5,658.49
Sub Total						38,464 16
Special Service Charge						9,792 27
Invoice Subtotal						**158,858.10**
No Power Factor Penalty Based on 0 865 Power Factor						0 00
Power Factor Penalty Charge Based On Non-Ratcheted Amount Of 127581.69						0 00
Michigan State Sales Tax On Taxable Portion						0.00
Invoice Total						**$158,858.10**

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DTE Energy

Payment Coupon

Account Number	**0000-0270-9**
Due Date:	**December 7, 2009**
Total Due:	**$381,485.08**

US GOVT GS00S28677 CHIEF FISCAL SERVICES
VETERANS ADMIN HOSP AA
2215 FULLER RD
ANN ARBOR, MI 48105-2303

Mail Payments To:

DTE Energy
P.O. Box 630795
Cincinnati, OH 45263-0795

Please detach and return coupon with account number on check. Agencies are not authorized to accept payment of this bill.

Account Information

US Govt GS00S28677 Chief Fiscal Services
Veterans Admin Hosp AA
2215 Fuller Rd
ANN ARBOR, MI 48105

Account Number	**0000-0270-9**
DTE-Energy Fedoral ID No	38-3217752

Programs you are enrolled in:

How to contact us:

Power Outage	See Detail Charges
Billing Inquiry	1-313-235-5120
Analyst Code	T2

Please make any inquiry or complaint about this bill to DTE Energy before the Due Date.
DTE Energy is regulated by the Michigan Public Service Commission, Lansing, Michigan

Important Information

Beginning with the November 2009 billing cycle, the Power Supply Cost Recovery (PSCR) factor will decrease from -1.046 cents per kWh to -1.06 cents per kWh. The PSCR factor allows Detroit Edison to recover its fuel and purchased power expense

Detail Charges

Charges for 10/13/2009 through 11/09/2009

Power Supply Charges:						
Power Supply Demand	5,732	KW	@ $	13 75	(See 1 Above)	78,815.00
Power Supply Energy:						
Power Supply Energy	1,648,640	KWH	@ $	.0401400	Per Total KWH	66,176 41
Off-Peak Discount	1,192,154	KWH	@ $	-.0030000		-3,576.46
Voltage Level Discount - SV	1,648,640	KWH	@ $	-.0010000		-1,648.64
Surcharges:						
Enhanced Security Surcharge	1,648,640	KWH	@ $	0000770	Per Total KWH	126 95
Power Supply Cost Recovery Factor	1,648,640	KWH	@ $	-.0106000	Per Total KWH	-17,475 58
Renewable Energy Plan Surcharge	2	MTR	@ $	187.50		375 00
Sub Total:						122,792.68
Delivery Charges:						
Service Charge						275.00
Distribution.						
Distribution Demand - SV	7,251	KW	@ $	9400000	(See F Above)	6,815 94
Distribution Energy - SV	1,648,640	KWH	@ $	.0062000	Per Total KWH	10,221.57
Surcharges:						
Nuclear Decommissioning	1,648,640	KWH	@ $	.0012340	Per Total KWH	2,034 42
Securitization Bond Charge	1,648,640	KWH	@ $	.0047300	Per Total KWH	7,798.07
Securitization Bond Tax Charge	1,648,640	KWH	@ $	.0019400	Per Total KWH	3,198.36
Choice Implementation Surcharge	1,648,640	KWH	@ $	.0005000	Per Total KWH	824.32
Energy Optimization Surcharge	2	MTR	@ $	283 32		566.64
U-15768 Implementation Surcharge	1,648,640	KWH	@ $	.0032860	Per Total KWH	5,417.43
Sub Total.						37,151.75
Special Service Charge						9,792.27
Invoice Subtotal						**169,736.70**
No Power Factor Penalty Based on 0.883 Power Factor						0 00
Michigan State Sales Tax On Taxable Portion						0.00
Invoice Total						**$169,736.70**

Summary Of Charges

Account Number	0000-0270-9

506C05047

Previous Balance as of 10/15/2009	416,070.34
Payment(s) and Credit(s)	-204,321.96
Remaining Balance	$211,748.38

Current Charges

Service Location	Item	Service Type	Rate	Bill Period	Amount
2215 Fuller Rd	10037	Primary Supply Rate	220	10/13 - 11/09/09	169,736.70

Taxes	0.00
Miscellaneous Charges	0.00
Current Bill	$169,736.70

Amount Due on or before Due Date of 12/07/2009	**$381,485.08**
Late Payment Charge if paid after Due Date	7,629 70
Total Amount Due if paid after 12/07/2009	389,114.78

Paid 12-1-09

DTE Energy

INVOICE

Schindler

Local Office	Schindler Elevator Corporation 28451 Schoolcraft Rd LIVONIA MI 48150-2238	**Invoice Number** **Invoice Date** **Billing ID** **Purchase Order No**	8102608302 04/30/2010 5000032209 506-C01015
		Sales Contact **Field Contact** **Telephone** **Fax**	Thomas Dziadosz Mark Pawlowski M 734-971-8242 734-971-1545
Bill to	DEPARTMENT OF VETERANS AFFAIRS FINANCIAL SERVICES CENTER PO BOX 149971 AUSTIN TX 78714-8971	**Federal Tax ID** **DUNS Number**	34 127 0056 09 480 9993
Service Contract	4200011676 **Service Period** Monthly Billing 04/01/2010 - 04/30/2010	**Service Type**	Preventive Maint.

Service Location
VA MED CENTER (ML)
2215 FULLER RD
ANN ARBOR MI 48105-2335

Contract Price	6,061.00
Subtotal	6,061.00
Tax	0.00
Invoice Amount	***$6,061.00***

Applied unless an exemption certificate is on file

Terms: ***NET PAYABLE UPON RECEIPT***

DELIVERY ORDER 506-C91241
CONTRACT NUMBER GS-06F-0079M

REMITTANCE

Please return this portion with your payment

Payer	DEPARTMENT OF VETERANS AFFAIRS FINANCIAL SERVICES CENTER PO BOX 149971 AUSTIN TX 78714-8971	**Invoice Number** **Invoice Date** **Billing ID** **Service Contract**	8102608302 04/30/2010 5000032209 4200011676
Remit to	Schindler Elevator Corporation P.O.Box 93050 Chicago, IL 60673-3050	*Use this address for payments only. Direct calls and correspondence to our Local Office above. Please check applicable payment enclosed*	***INVOICE AMOUNT*** **$6,061.00** ----

** Invoices not paid within 30 days are subject to a service charge of 1.5% per month, or the maximum permitted by law.*

Seller represents that with respect to the production of the articles and/or the performance of the services covered by this invoice, it has fully complied with the Fair Labor Standards Act of 1938, as amended.

MOD011 perf

Summary Of Charges

506C95072

Account Number	0000-0270-9

ck date Oct. 28, 2009

Previous Balance as of 10/05/2009	204,321.96
Payment(s) and Credit(s)	0.00
Remaining Balance	$204,321.96

Current Charges

Service Location	Item	Service Type	Rate	Bill Period	Amount
2215 Fuller Rd	10037	Primary Supply Rate	220	09/11 - 10/12/09	211,748.38

Taxes	0.00
Miscellaneous Charges	0.00
Current Bill	$211,748.38

Amount Due on or before Due Date of 11/06/2009	**$416,070.34**
Late Payment Charge if paid after Due Date	8,321.41
Total Amount Due if paid after 11/06/2009	424,391.75

20 DAYS IN FY09
12 DAYS IN FY10

$ 211,748.38
32 DAYS
$ 6,617.14 PER DAY

$ 132,342.80 FY09
$ 79,405.68 FY10

need increase:
$ 142549.02

C 05045

paid 11-18-09

DTE Energy

000002709 00017653905 B

DTE Energy

Payment Coupon

506C05045

Account Number	**0000-0270-9**
Due Date:	**May 11, 2010**
Total Due:	**$176,539.05**

ypd 5-5-10

APR 29 2010

US GOVT GS00S28677 CHIEF FISCAL SERVICES
VETERANS ADMIN HOSP AA
2215 FULLER RD
ANN ARBOR, MI 48105-2303

Mail Payments To:

DTE Energy
P.O. Box 630795
Cincinnati, OH 45263-0795

Please detach and return coupon with account number on check. Agencies are not authorized to accept payment of this bill.

Account Information

US Govt GS00S28677 Chief Fiscal Services
Veterans Admin Hosp AA
2215 Fuller Rd
ANN ARBOR, MI 48105

Account Number	**0000-0270-9**

DTE-Energy Federal ID No 38-3217752

Programs you are enrolled in:

How to contact us:

Power Outage	See Detail Charges
Billing Inquiry	1-313-235-5120
Analyst Code	T2

Please make any inquiry or complaint about this bill to DTE Energy before the Due Date.
DTE Energy is regulated by the Michigan Public Service Commission, Lansing, Michigan

Important Information

Beginning with the April 2010 billing cycle, the Power Supply Cost Recovery (PSCR) factor will increase from (0 780) cents/kWh to (0.600) cents/kWh. The PSCR factor allows Detroit Edison to recover its fuel and purchased power expense.

DTE Energy

Summary Of Charges

Account Number 0000-0270-9

Previous Balance as of 03/17/2010	**161,218.97**
Payment(s) and Credit(s)	**-161,218.97**
Remaining Balance	**$0.00**

Current Charges

Service Location	Item	Service Type	Rate	Bill Period	Amount
2215 Fuller Rd	10037	Primary Supply Rate	220	03/11 - 04/12/10	176,539.05

Taxes	**0.00**
Miscellaneous Charges	**0.00**
Current Bill	**$176,539.05**

Amount Due on or before Due Date of 05/11/2010	**$176,539.05**
Late Payment Charge if paid after Due Date	3,530 78
Total Amount Due if paid after 05/11/2010	180,069.83

DTE Energy

Detail Charges

Charges for 03/11/2010 through 04/12/2010

Power Supply Charges:						
Power Supply Demand	4,713	KW	@ $	13.61	(See 3 Above)	64,143.93
Power Supply Energy.						
Power Supply Energy	1,946,560	KWH	@ $	0397300	Per Total KWH	77,336 83
Off-Peak Discount	1,444,825	KWH	@ $	- 0030000		-4,334 48
Voltage Level Discount - SV	1,946,560	KWH	@ $	- 0010000		-1,946.56
Surcharges:						
Enhanced Security Surcharge	1,946,560	KWH	@ $	.0000770	Per Total KWH	149.89
Power Supply Cost Recovery Factor	1,946,560	KWH	@ $	- 0060000	Per Total KWH	-11,679.36
Renewable Energy Plan Surcharge	2	MTR	@ $	187.50		375.00
Sub Total:						124,045.25
Delivery Charges:						
Service Charge						275 00
Distribution.						
Distribution Demand - SV	7,251	KW	@ $	1.38	(See F Above)	10,006.38
Distribution Energy - SV	1,946,560	KWH	@ $	0076200	Per Total KWH	14,832.79
Surcharges:						
Nuclear Decommissioning	1,946,560	KWH	@ $	0012340	Per Total KWH	2,402 06
Securitization Bond Charge	1,946,560	KWH	@ $	.0049300	Per Total KWH	9,596 54
Securitization Bond Tax Charge	1,946,560	KWH	@ $	.0020800	Per Total KWH	4,048 84
Choice Implementation Surcharge	1,946,560	KWH	@ $	.0005000	Per Total KWH	973.28
Energy Optimization Surcharge	2	MTR	@ $	283 32		566.64
Sub Total:						42,701.53
Special Service Charge						9,792 27
Invoice Subtotal						**176,539.05**
No Power Factor Penalty Based on 0 889 Power Factor						0.00
Power Factor Penalty Charge Based On Non-Ratcheted Amount Of 150137 23						0 00
Michigan State Sales Tax On Taxable Portion						0 00
Invoice Total						**$176,539.05**

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DTE Energy

Payment Coupon

Account Number	0000-0270-9
Due Date:	April 8, 2010
Total Due:	$161,218.97

US GOVT GS00S28677 CHIEF FISCAL SERVICES
VETERANS ADMIN HOSP AA
2215 FULLER RD
ANN ARBOR, MI 48105-2303

Mail Payments To:
DTE Energy
P.O. Box 630795
Cincinnati, OH 45263-0795

paid 4-8-10

506C05045

Please detach and return coupon with account number on check. Agencies are not authorized to accept payment of this bill.

Account Information

US Govt GS00S28677 Chief Fiscal Services
Veterans Admin Hosp AA
2215 Fuller Rd
ANN ARBOR, MI 48105

Account Number	0000-0270-9
DTE-Energy Federal ID No.	38-3217752

Programs you are enrolled in:

How to contact us:

Power Outage	See Detail Charges
Billing Inquiry	1-313-235-5120
Analyst Code	T2

Please make any inquiry or complaint about this bill to DTE Energy before the Due Date
DTE Energy is regulated by the Michigan Public Service Commission, Lansing, Michigan

Important Information

Effective with the March 2010 billing cycle, the Securitization Bond Charge was increased from $0.00473 to $0.00493 per kWh and the Securitization Bond Tax Charge was increased from $0.00194 to $0 00208 por kWh.

DTE Energy

Summary Of Charges

Account Number 0000-0270-9

Previous Balance as of 02/16/2010	**151,751.84**
Payment(s) and Credit(s)	**-151,751.84**
Remaining Balance	**$0.00**

Current Charges

Service Location	Item	Service Type	Rate	Bill Period	Amount
2215 Fuller Rd	10037	Primary Supply Rate	220	02/10 - 03/10/10	161,218.97

Taxes	**0.00**
Miscellaneous Charges	**0.00**
Current Bill	**$161,218.97**

Amount Due on or before Due Date of 04/08/2010	**$161,218.97**
Late Payment Charge if paid after Due Date	3,224.38
Total Amount Due if paid after 04/08/2010	164,443.35

Detail Charges

Charges for 02/10/2010 through 03/10/2010

Power Supply Charges:						
Power Supply Demand	4,713	KW	@ $	13.61	(See 3 Above)	64,143.93
Power Supply Energy:						
Power Supply Energy	1,683,360	KWH	@ $	0397300	Per Total KWH	66,879.89
Off-Peak Discount	1,227,563	KWH	@ $	- 0030000		-3,682.69
Voltage Level Discount - SV	1,683,360	KWH	@ $	-.0010000		-1,683.36
Surcharges:						
Enhanced Security Surcharge	1,683,360	KWH	@ $	.0000770	Per Total KWH	129.62
Power Supply Cost Recovery Factor	1,683,360	KWH	@ $	-.0078000	Per Total KWH	-13,130.21
Renewable Energy Plan Surcharge	2	MTR	@ $	187.50		375.00
Sub Total						113,032.18
Delivery Charges:						
Service Charge						275.00
Distribution:						
Distribution Demand - SV	7,251	KW	@ $	1.38	(See F Above)	10,006.38
Distribution Energy - SV	1,683,360	KWH	@ $	.0076200	Per Total KWH	12,827.20
Surcharges:						
Nuclear Decommissioning	1,683,360	KWH	@ $	.0012340	Per Total KWH	2,077.27
Securitization Bond Charge	1,683,360	KWH	@ $	0049300	Per Total KWH	8,298.96
Securitization Bond Tax Charge	1,683,360	KWH	@ $	.0020800	Per Total KWH	3,501.39
Choice Implementation Surcharge	1,683,360	KWH	@ $	.0005000	Per Total KWH	841.68
Energy Optimization Surcharge	2	MTR	@ $	283.32		566.64
Sub Total						38,394.52
Special Service Charge						9,792.27
Invoice Subtotal						**161,218.97**
No Power Factor Penalty Based on 0 893 Power Factor						0.00
Power Factor Penalty Charge Based On Non-Ratcheted Amount Of 129686.18						0.00
Michigan State Sales Tax On Taxable Portion						0.00
Invoice Total						**$161,218.97**

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DTE Energy

Payment Coupon

Account Number	0000-0270-9
Due Date:	March 10, 2010
Total Due:	$151,751.84

PD. JLI 2.26.10

US GOVT GS00S28677 CHIEF FISCAL SERVICES
VETERANS ADMIN HOSP AA
2215 FULLER RD
ANN ARBOR, MI 48105 2303

Mail Payments To:

DTE Energy
P O. Box 630795
Cincinnati, OH 45263-0795

506 C0504S

Please detach and return coupon with account number on check. Agencies are not authorized to accept payment of this bill.

Account Information

US Govt GS00S28677 Chief Fiscal Services
Veterans Admin Hosp AA
2215 Fuller Rd
ANN ARBOR, MI 48105

Account Number	0000-0270-9
DTE-Energy Federal ID No.	38-3217752

Programs you are enrolled in:

How to contact us:

Power Outage	See Detail Charges
Billing Inquiry	1-313-235-5120
Analyst Code	T2

Please make any inquiry or complaint about this bill to DTE Energy before the Due Date
DTE Energy is regulated by the Michigan Public Service Commission, Lansing, Michigan

Important Information

The Michigan Public Service Commission (MPSC) approved a credit of -0 655 cents per kWh to your February Detroit Edison bill. The credit was part of the Pension Equalization Mechanism (PEM) in Case No. U-15002-R.

DTE Energy

Summary Of Charges

Account Number 0000-0270-9

Previous Balance as of 01/19/2010	**180,502.98**
Payment(s) and Credit(s)	**-180,502.98**
Remaining Balance	**$0.00**

Current Charges

Service Location	Item	Service Type	Rate	Bill Period	Amount
2215 Fuller Rd	10037	Primary Supply Rate	220	01/12 - 01/25/10	68,481.90
	10037	Primary Supply Rate	220	01/26 - 02/09/10	83,269.94

Taxes	**0.00**
Miscellaneous Charges	**0.00**
Current Bill	**$151,751.84**

Amount Due on or before Due Date of 03/10/2010	**$151,751.84**
Late Payment Charge if paid after Due Date	3,035.04
Total Amount Due if paid after 03/10/2010	154,786.88

Detail Charges

Charges for 01/12/2010 through 01/25/2010

Power Supply Charges:						
Power Supply Demand	4,713	KW	@ $	13.75	(See 3 Above)	31,284.66
Power Supply Energy:						
Power Supply Energy	821,520	KWH	@ $	.0401400	Per Total KWH	32,975.81
Off-Peak Discount	602,095	KWH	@ $	-.0030000		-1,806.29
Voltage Level Discount - SV	821,520	KWH	@ $	-.0010000		-821.52
Surcharges:						
Enhanced Security Surcharge	821,520	KWH	@ $	.0000770	Per Total KWH	63.26
Power Supply Cost Recovery Factor	821,520	KWH	@ $	-.0078000	Per Total KWH	-6,407.86
Renewable Energy Plan Surcharge	2	MTR	@ $	187.50		181.04
Sub Total:						55,469.10
Delivery Charges:						
Service Charge						132.76
Distribution:						
Distribution Demand - SV	7,251	KW	@ $	.9400000	(See F Above)	3,290.46
Distribution Energy - SV	821,520	KWH	@ $	0062000	Per Total KWH	5,093.42
Surcharges:						
Nuclear Decommissioning	821,520	KWH	@ $	.0012340	Per Total KWH	1,013.76
Securitization Bond Charge	821,520	KWH	@ $	.0047300	Per Total KWH	3,885.79
Securitization Bond Tax Charge	821,520	KWH	@ $	.0019400	Per Total KWH	1,593.75
Choice Implementation Surcharge	821,520	KWH	@ $	.0005000	Per Total KWH	410.76
PEM Credit	821,520	KWH	@ $	-.0065500	Per Total KWH	-5,380.96
Energy Optimization Surcharge	2	MTR	@ $	283.32		273.55
U-15768 Implementation Surcharge	821,520	KWH	@ $	.0032860	Per Total KWH	2,699.51
Sub Total:						13,012.80
Period Subtotal						**68,481.90**

Billing Status Information

1	On-peak Billing Demand	3,138	KW	ESTABLISHED	01/12/2010	11:30
3	**65% High OP Bill Dmd June-Oct prec 11 mths**	**4,713**	**KW**	**ESTABLISHED**	**09/25/2009**	**12:30**
6	Rate Minimum Demand (Site)	50	KW	ESTABLISHED	01/22/1994	00:00
8	Highest Single Billing Demand	3,138	KW	ESTABLISHED	01/12/2010	11:30
D	Current SV High Monthly Demand	3,138	KW	ESTABLISHED	01/12/2010	11:30
E	50% of the Contract Capacity for SV	3,626	KW	ESTABLISHED	09/25/2009	12:30
F	**Subtrans Voltage Maximum Demand**	**7,251**	**KW**	**ESTABLISHED**	**09/25/2009**	**12:30**
W	Coincidental Max Onpk KW Dmd at Site	3,138	KW	ESTABLISHED	01/12/2010	11:30
	Highest Maximum OnPeak Demand Reactive Demand	1,431	KVAR	ESTABLISHED	01/14/2010	12:00
	kWh percentage change from a year ago	0	PCT			
	Avg Kilowatthours Used Per Day A Year Ago	59,225	KWH			
	Power Factor (ratio) for all voltages	89	PCT			
	Total number of days in the Billing Period	29	DAYS			
	Excess KVAR for PF less than .8	0	KVAR			
	Contract Capacity for Location	7,251	KW	ESTABLISHED	09/25/2009	12:30
	Avg Kilowatthours Used Per Day This Period	59,379	KWH			
	(KVAR) Coincidental Max Demand at Site	1,404	KVAR			

DTE Energy

Billing Explanation Codes

Listed below are explanations of the codes used elsewhere in this bill.

Power Factor Code

Power factor and penalty are determined as follows.
(A) Divide the reactive kilovolt ampere hours by the kilowatthours.
(B) Find the ratio determined in (A) in the left column of the table below.
(C) The amount in the corresponding row of the middle column is the power factor.
(D) The amount in the corresponding row of the right column is the penalty, if any, which will be applied to the total amount of the monthly billing.

Ratio of Registration of Reactive Component Meter to Registration of Kilowatthour Meter	Power Factor	Penalty
1.021 and higher	0.699 and lower	See Below
1.020 to 0.883	0.700 to 0.749	3%
0.882 to 0.752	0.750 to 0.799	2%
0.750 to 0.622	0.800 to 0.849	1%
0.621 to 0.000	0.850 to 1.000	None

Below .700 is not permitted. A 25% penalty will be applied to any billing after two consecutive months below .700 power factor.

Billing Demand Codes

1 - Highest on-peak demand(kw) value
2 - 50% of the highest monthly billing demand of the preceding eleven months
3 - 65% of the high monthly bill demand occurring June - October of the preceding 11 months
4 - 50% of the high monthly bill demand occurring June - October of the preceding 11 months
5 - 50% of the contract capacity for the site
6 - Minimum demand as prescribed by the rate
7 - 65% of the Product Protection Demand
8 - Highest Single Billing Demand
9 - 65% of high monthly bill demand occurring June - October of the preceding 11 months

Demand Codes

A - Maximum (metered) demand value at primary voltage for the location
B - 50% of the contract capacity at primary voltage
C - Highest Demand in latest 12 month period at primary voltage
D - Maximum (metered) demand value at subtransmission voltage for the location
E - 50% of contract capacity at subtransmission voltage
F - Highest Demand in latest 12 month period at subtransmission voltage
G - Maximum (metered) demand value at transmission voltage for the location
H - 50% of contract capacity at transmission voltage
I - Highest Demand in the latest 12 month period at transmission voltage
J - Maximum (metered) customer substation demand at subtransmission voltage
K - 50% of contract capacity for customer substation at subtransmission voltage
L - Highest Demand in the latest 12 month period for customer substation subtransmission voltage
M - Maximum (metered) customer substation demand at transmission voltage
N - 50% of contract capacity for customer substation at transmission voltage
P - Highest demand in the latest 12 month period for customer substation at transmission voltage
R - Valley hours
W - Coincidental Maximum On Peak kilowatt demand at site

APPENDIX C

NET PRESENT WORTH CALCULATIONS

ARGO AND GEDDES DAMS
NET PRESENT VALUE ANALYSIS - **GEDDES DAM - Sell Directly to DTE Energy**

Evaluation Period:	2012-2036		
Value of Energy (2010)($/MWh):	$52.00	=	$0.0520 kW-hrs
Average Annual Generation (MWh):	**3,358**		
Annual Revenue (2010):	$174,626		
Annual Escallation Rate (%):	3.00		
Discount Rate (%):	4.50		
Present Worth Rate (%):	4.50		
Hydro Construction Costs (2010)($1,000):	**$5,342**		
Construction Escallation Rate (%):	3.00		

	Year	Present Worth Factor	Annual Revenue ($1,000)	Annual O&M ($1,000)	Other ($1,000)	Annual Net Revenue ($1,000)	Present Worth Factor	Net Present Value ($1,000)	Hydro Construct Cost ($1,000)	Net Present Value ($1,000)	Net Present Value ($1,000)	Energy Benefit Present Value ($1,000)	Total O&M & Constr Cost Present Value ($1,000)
	2010	1.00		**$ 110.0**	$ -								
	2011	1.03							$ 5,502	1.05	$ 5,750		$ 5,750
1	2012	1.06	$ 185	$ 117		$ 69	1.00	$ 69				$ 185	$ 117
2	2013	1.09	$ 191	$ 120		$ 71	0.96	$ 68				$ 183	$ 115
3	2014	1.13	$ 197	$ 124		$ 73	0.92	$ 67				$ 180	$ 113
4	2015	1.16	$ 202	$ 128		$ 75	0.88	$ 66				$ 177	$ 112
5	2016	1.19	$ 209	$ 131		$ 77	0.84	$ 65				$ 175	$ 110
6	2017	1.23	$ 215	$ 135		$ 79	0.80	$ 64				$ 172	$ 109
7	2018	1.27	$ 221	$ 139		$ 82	0.77	$ 63				$ 170	$ 107
8	2019	1.30	$ 228	$ 144		$ 84	0.73	$ 62				$ 167	$ 105
9	2020	1.34	$ 235	$ 148		$ 87	0.70	$ 61				$ 165	$ 104
10	2021	1.38	$ 242	$ 152		$ 89	0.67	$ 60				$ 163	$ 102
11	2022	1.43	$ 249	$ 157		$ 92	0.64	$ 59				$ 160	$ 101
12	2023	1.47	$ 256	$ 162		$ 95	0.62	$ 58				$ 158	$ 100
13	2024	1.51	$ 264	$ 166		$ 98	0.59	$ 58				$ 156	$ 98
14	2025	1.56	$ 272	$ 171		$ 101	0.56	$ 57				$ 154	$ 97
15	2026	1.60	$ 280	$ 177		$ 104	0.54	$ 56				$ 151	$ 95
16	2027	1.65	$ 289	$ 182		$ 107	0.52	$ 55				$ 149	$ 94
17	2028	1.70	$ 297	$ 187		$ 110	0.49	$ 54				$ 147	$ 93
18	2029	1.75	$ 306	$ 193		$ 113	0.47	$ 54				$ 145	$ 91
19	2030	1.81	$ 315	$ 199		$ 117	0.45	$ 53				$ 143	$ 90
20	2031	1.86	$ 325	$ 205		$ 120	0.43	$ 52				$ 141	$ 89
21	2032	1.92	$ 335	$ 211		$ 124	0.41	$ 51				$ 139	$ 87
22	2033	1.97	$ 345	$ 217		$ 128	0.40	$ 51				$ 137	$ 86
23	2034	2.03	$ 355	$ 224		$ 131	0.38	$ 50				$ 135	$ 85
24	2035	2.09	$ 366	$ 230		$ 135	0.36	$ 49				$ 133	$ 84
25	2036	2.16	$ 377	$ 237	$ -	$ 139	0.35	$ 48				$ 131	$ 82
								$ 1,449			$ 5,750	**$ 3,915**	**$ 8,216**

AVG: Benefit Cost = NPV Revenue / NPV Construction Costs = 0.25 Benefit/Cost Ratio = **0.48**

ARGO AND GEDDES DAMS
NET PRESENT VALUE ANALYSIS - **GEDDES DAM - Direct Power Line**

Evaluation Period:	2012-2036
Average Annual Revenue from Hydro Offset (2010):	**$276,272**
Annual Escallation Rate (%):	3.00
Discount Rate (%):	4.50
Present Worth Rate (%):	4.50
Hydro Construction Costs (2010)($1,000):	**$5,342**
Construction Escallation Rate (%):	3.00
Dedicated Power Line Costs (2010)($1,000):	**$587**

	Year	Present Worth Factor	Annual Revenue ($1,000)	Hydro Annual O&M ($1,000)	Power Line Annual O&M ($1,000)	Annual Net Revenue ($1,000)	Present Worth Factor	Net Present Value ($1,000)	Hydro & Dedicated Power Construct Cost ($1,000)	Net Present Value ($1,000)	Net Present Value ($1,000)	Energy Benefit Present Value ($1,000)	Total O&M & Constr Cost Present Value ($1,000)
	2010	1.00		**$ 110.0**	**$ 25.0**								
	2011	1.03							$ 6,107	1.05	$ 6,382		$ 6,382
1	2012	1.06	$ 293	$ 117	$ 27	$ 150	1.00	$ 150				$ 293	$ 143
2	2013	1.09	$ 302	$ 120	$ 27	$ 154	0.96	$ 148				$ 289	$ 141
3	2014	1.13	$ 311	$ 124	$ 28	$ 159	0.92	$ 146				$ 285	$ 139
4	2015	1.16	$ 320	$ 128	$ 29	$ 164	0.88	$ 144				$ 281	$ 137
5	2016	1.19	$ 330	$ 131	$ 30	$ 169	0.84	$ 141				$ 277	$ 135
6	2017	1.23	$ 340	$ 135	$ 31	$ 174	0.80	$ 139				$ 273	$ 133
7	2018	1.27	$ 350	$ 139	$ 32	$ 179	0.77	$ 137				$ 269	$ 131
8	2019	1.30	$ 360	$ 144	$ 33	$ 184	0.73	$ 135				$ 265	$ 129
9	2020	1.34	$ 371	$ 148	$ 34	$ 190	0.70	$ 134				$ 261	$ 128
10	2021	1.38	$ 382	$ 152	$ 35	$ 196	0.67	$ 132				$ 257	$ 126
11	2022	1.43	$ 394	$ 157	$ 36	$ 201	0.64	$ 130				$ 254	$ 124
12	2023	1.47	$ 406	$ 162	$ 37	$ 207	0.62	$ 128				$ 250	$ 122
13	2024	1.51	$ 418	$ 166	$ 38	$ 214	0.59	$ 126				$ 246	$ 120
14	2025	1.56	$ 430	$ 171	$ 39	$ 220	0.56	$ 124				$ 243	$ 119
15	2026	1.60	$ 443	$ 177	$ 40	$ 227	0.54	$ 122				$ 239	$ 117
16	2027	1.65	$ 457	$ 182	$ 41	$ 234	0.52	$ 121				$ 236	$ 115
17	2028	1.70	$ 470	$ 187	$ 43	$ 241	0.49	$ 119				$ 233	$ 114
18	2029	1.75	$ 484	$ 193	$ 44	$ 248	0.47	$ 117				$ 229	$ 112
19	2030	1.81	$ 499	$ 199	$ 45	$ 255	0.45	$ 116				$ 226	$ 110
20	2031	1.86	$ 514	$ 205	$ 47	$ 263	0.43	$ 114				$ 223	$ 109
21	2032	1.92	$ 529	$ 211	$ 48	$ 271	0.41	$ 112				$ 219	$ 107
22	2033	1.97	$ 545	$ 217	$ 49	$ 279	0.40	$ 111				$ 216	$ 106
23	2034	2.03	$ 562	$ 224	$ 51	$ 287	0.38	$ 109				$ 213	$ 104
24	2035	2.09	$ 578	$ 230	$ 52	$ 296	0.36	$ 107				$ 210	$ 103
25	2036	2.16	$ 596	$ 237	$ 54	$ 305	0.35	$ 106				$ 207	$ 101
								$ 3,167			$ 6,382	**$ 6,194**	**$ 9,408**

AVG: Benefit Cost = NPV Revenue / NPV Construction Costs = 0.50 Benefit/Cost Ratio = **0.66**

ARGO AND GEDDES DAMS
NET PRESENT VALUE ANALYSIS - **ARGO DAM (Option 1) - Sell Directly to DTE Energy**

Evaluation Period:	2012-2036		
Value of Energy (2010)($/MWh):	$52.00	=	$0.0520 kW-hrs
Average Annual Generation (MWh):	**2,002**		
Annual Revenue (2010):	$104,122		
Annual Escallation Rate (%):	3.00		
Discount Rate (%):	4.50		
Present Worth Rate (%):	4.50		
Hydro Construction Costs (2010)($1,000):	**$5,482**		
Construction Escallation Rate (%):	3.00		

	Year	Present Worth Factor	Annual Revenue ($1,000)	Annual O&M ($1,000)	Other ($1,000)	Annual Net Revenue ($1,000)	Present Worth Factor	Net Present Value ($1,000)	Hydro Construct Cost ($1,000)	Net Present Value ($1,000)	Net Present Value ($1,000)	Energy Benefit Present Value ($1,000)	Total O&M & Constr Cost Present Value ($1,000)
	2010	1.00		**$ 110.0**	$ -								
	2011	1.03							$ 5,646	1.05	$ 5,901		$ 5,901
1	2012	1.06	$ 110	$ 117		$ (6)	1.00	$ (6)				$ 110	$ 117
2	2013	1.09	$ 114	$ 120		$ (6)	0.96	$ (6)				$ 109	$ 115
3	2014	1.13	$ 117	$ 124		$ (7)	0.92	$ (6)				$ 107	$ 113
4	2015	1.16	$ 121	$ 128		$ (7)	0.88	$ (6)				$ 106	$ 112
5	2016	1.19	$ 124	$ 131		$ (7)	0.84	$ (6)				$ 104	$ 110
6	2017	1.23	$ 128	$ 135		$ (7)	0.80	$ (6)				$ 103	$ 109
7	2018	1.27	$ 132	$ 139		$ (7)	0.77	$ (6)				$ 101	$ 107
8	2019	1.30	$ 136	$ 144		$ (8)	0.73	$ (6)				$ 100	$ 105
9	2020	1.34	$ 140	$ 148		$ (8)	0.70	$ (6)				$ 98	$ 104
10	2021	1.38	$ 144	$ 152		$ (8)	0.67	$ (5)				$ 97	$ 102
11	2022	1.43	$ 148	$ 157		$ (8)	0.64	$ (5)				$ 96	$ 101
12	2023	1.47	$ 153	$ 162		$ (9)	0.62	$ (5)				$ 94	$ 100
13	2024	1.51	$ 157	$ 166		$ (9)	0.59	$ (5)				$ 93	$ 98
14	2025	1.56	$ 162	$ 171		$ (9)	0.56	$ (5)				$ 92	$ 97
15	2026	1.60	$ 167	$ 177		$ (9)	0.54	$ (5)				$ 90	$ 95
16	2027	1.65	$ 172	$ 182		$ (10)	0.52	$ (5)				$ 89	$ 94
17	2028	1.70	$ 177	$ 187		$ (10)	0.49	$ (5)				$ 88	$ 93
18	2029	1.75	$ 183	$ 193		$ (10)	0.47	$ (5)				$ 86	$ 91
19	2030	1.81	$ 188	$ 199		$ (11)	0.45	$ (5)				$ 85	$ 90
20	2031	1.86	$ 194	$ 205		$ (11)	0.43	$ (5)				$ 84	$ 89
21	2032	1.92	$ 200	$ 211		$ (11)	0.41	$ (5)				$ 83	$ 87
22	2033	1.97	$ 205	$ 217		$ (12)	0.40	$ (5)				$ 82	$ 86
23	2034	2.03	$ 212	$ 224		$ (12)	0.38	$ (5)				$ 80	$ 85
24	2035	2.09	$ 218	$ 230		$ (12)	0.36	$ (4)				$ 79	$ 84
25	2036	2.16	$ 225	$ 237	$ -	$ (13)	0.35	$ (4)				$ 78	$ 82
								$ (132)			$ 5,901	**$ 2,334**	**$ 8,367**

AVG: Benefit Cost = NPV Revenue / NPV Construction Costs = -0.02 Benefit/Cost Ratio = **0.28**

ARGO AND GEDDES DAMS
NET PRESENT VALUE ANALYSIS - **ARGO DAM (Option 1) - Direct Power Line**

Evaluation Period:	2012-2036
Average Annual Revenue from Hydro Offset (2010):	**$159,870**
Annual Escallation Rate (%):	3.00
Discount Rate (%):	4.50
Present Worth Rate (%):	4.50
Hydro Construction Costs (2010)($1,000):	**$5,482**
Construction Escallation Rate (%):	3.00
Dedicated Power Line Costs (2010)($1,000):	**$781**

	Year	Present Worth Factor	Annual Revenue ($1,000)	Hydro Annual O&M ($1,000)	Power Line Annual O&M ($1,000)	Annual Net Revenue ($1,000)	Present Worth Factor	Net Present Value ($1,000)	Hydro & Dedicated Power Construct Cost ($1,000)	Net Present Value ($1,000)	Net Present Value ($1,000)	Energy Benefit Present Value ($1,000)	Total O&M & Constr Cost Present Value ($1,000)
	2010	1.00		**$ 110.0**	**$ 25.0**								
	2011	1.03							$ 6,451	1.05	$ 6,741		$ 6,741
1	2012	1.06	$ 170	$ 117	$ 27	$ 26	1.00	$ 26				$ 170	$ 143
2	2013	1.09	$ 175	$ 120	$ 27	$ 27	0.96	$ 26				$ 167	$ 141
3	2014	1.13	$ 180	$ 124	$ 28	$ 28	0.92	$ 26				$ 165	$ 139
4	2015	1.16	$ 185	$ 128	$ 29	$ 29	0.88	$ 25				$ 162	$ 137
5	2016	1.19	$ 191	$ 131	$ 30	$ 30	0.84	$ 25				$ 160	$ 135
6	2017	1.23	$ 197	$ 135	$ 31	$ 31	0.80	$ 25				$ 158	$ 133
7	2018	1.27	$ 203	$ 139	$ 32	$ 32	0.77	$ 24				$ 156	$ 131
8	2019	1.30	$ 209	$ 144	$ 33	$ 32	0.73	$ 24				$ 153	$ 129
9	2020	1.34	$ 215	$ 148	$ 34	$ 33	0.70	$ 24				$ 151	$ 128
10	2021	1.38	$ 221	$ 152	$ 35	$ 34	0.67	$ 23				$ 149	$ 126
11	2022	1.43	$ 228	$ 157	$ 36	$ 35	0.64	$ 23				$ 147	$ 124
12	2023	1.47	$ 235	$ 162	$ 37	$ 37	0.62	$ 23				$ 145	$ 122
13	2024	1.51	$ 242	$ 166	$ 38	$ 38	0.59	$ 22				$ 143	$ 120
14	2025	1.56	$ 249	$ 171	$ 39	$ 39	0.56	$ 22				$ 141	$ 119
15	2026	1.60	$ 257	$ 177	$ 40	$ 40	0.54	$ 22				$ 139	$ 117
16	2027	1.65	$ 264	$ 182	$ 41	$ 41	0.52	$ 21				$ 137	$ 115
17	2028	1.70	$ 272	$ 187	$ 43	$ 42	0.49	$ 21				$ 135	$ 114
18	2029	1.75	$ 280	$ 193	$ 44	$ 44	0.47	$ 21				$ 133	$ 112
19	2030	1.81	$ 289	$ 199	$ 45	$ 45	0.45	$ 20				$ 131	$ 110
20	2031	1.86	$ 297	$ 205	$ 47	$ 46	0.43	$ 20				$ 129	$ 109
21	2032	1.92	$ 306	$ 211	$ 48	$ 48	0.41	$ 20				$ 127	$ 107
22	2033	1.97	$ 316	$ 217	$ 49	$ 49	0.40	$ 19				$ 125	$ 106
23	2034	2.03	$ 325	$ 224	$ 51	$ 51	0.38	$ 19				$ 123	$ 104
24	2035	2.09	$ 335	$ 230	$ 52	$ 52	0.36	$ 19				$ 122	$ 103
25	2036	2.16	$ 345	$ 237	$ 54	$ 54	0.35	$ 19				$ 120	$ 101
								$ 558			$ 6,741	**$ 3,584**	**$ 9,768**

AVG: Benefit Cost = NPV Revenue / NPV Construction Costs = 0.08 Benefit/Cost Ratio = **0.37**

ARGO AND GEDDES DAMS
NET PRESENT VALUE ANALYSIS - **ARGO DAM (Option 2) - Sell Directly to DTE Energy**

Evaluation Period:	2012-2036		
Value of Energy (2010)($/MWh):	$52.00	=	$0.0520 kW-hrs
Average Annual Generation (MWh):	**2,504**		
Annual Revenue (2010):	$130,215		
Annual Escallation Rate (%):	3.00		
Discount Rate (%):	4.50		
Present Worth Rate (%):	4.50		
Hydro Construction Costs (2010)($1,000):	**$9,326**		
Construction Escallation Rate (%):	3.00		

	Year	Present Worth Factor	Annual Revenue ($1,000)	Annual O&M ($1,000)	Other ($1,000)	Annual Net Revenue ($1,000)	Present Worth Factor	Net Present Value ($1,000)	Hydro Construct Cost ($1,000)	Net Present Value ($1,000)	Net Present Value ($1,000)	Energy Benefit Present Value ($1,000)	Total O&M & Constr Cost Present Value ($1,000)
	2010	1.00		**$ 110.0**	$ -								
	2011	1.03							$ 9,606	1.05	$ 10,038		$ 10,038
1	2012	1.06	$ 138	$ 117		$ 21	1.00	$ 21				$ 138	$ 117
2	2013	1.09	$ 142	$ 120		$ 22	0.96	$ 21				$ 136	$ 115
3	2014	1.13	$ 147	$ 124		$ 23	0.92	$ 21				$ 134	$ 113
4	2015	1.16	$ 151	$ 128		$ 23	0.88	$ 21				$ 132	$ 112
5	2016	1.19	$ 155	$ 131		$ 24	0.84	$ 20				$ 130	$ 110
6	2017	1.23	$ 160	$ 135		$ 25	0.80	$ 20				$ 129	$ 109
7	2018	1.27	$ 165	$ 139		$ 26	0.77	$ 20				$ 127	$ 107
8	2019	1.30	$ 170	$ 144		$ 26	0.73	$ 19				$ 125	$ 105
9	2020	1.34	$ 175	$ 148		$ 27	0.70	$ 19				$ 123	$ 104
10	2021	1.38	$ 180	$ 152		$ 28	0.67	$ 19				$ 121	$ 102
11	2022	1.43	$ 186	$ 157		$ 29	0.64	$ 19				$ 120	$ 101
12	2023	1.47	$ 191	$ 162		$ 30	0.62	$ 18				$ 118	$ 100
13	2024	1.51	$ 197	$ 166		$ 31	0.59	$ 18				$ 116	$ 98
14	2025	1.56	$ 203	$ 171		$ 31	0.56	$ 18				$ 114	$ 97
15	2026	1.60	$ 209	$ 177		$ 32	0.54	$ 18				$ 113	$ 95
16	2027	1.65	$ 215	$ 182		$ 33	0.52	$ 17				$ 111	$ 94
17	2028	1.70	$ 222	$ 187		$ 34	0.49	$ 17				$ 110	$ 93
18	2029	1.75	$ 228	$ 193		$ 35	0.47	$ 17				$ 108	$ 91
19	2030	1.81	$ 235	$ 199		$ 37	0.45	$ 17				$ 106	$ 90
20	2031	1.86	$ 242	$ 205		$ 38	0.43	$ 16				$ 105	$ 89
21	2032	1.92	$ 250	$ 211		$ 39	0.41	$ 16				$ 103	$ 87
22	2033	1.97	$ 257	$ 217		$ 40	0.40	$ 16				$ 102	$ 86
23	2034	2.03	$ 265	$ 224		$ 41	0.38	$ 16				$ 101	$ 85
24	2035	2.09	$ 273	$ 230		$ 42	0.36	$ 15				$ 99	$ 84
25	2036	2.16	$ 281	$ 237	$ -	$ 44	0.35	$ 15				$ 98	$ 82
								$ 453			$ 10,038	**$ 2,919**	**$ 12,504**

AVG: Benefit Cost = NPV Revenue / NPV Construction Costs = 0.05 Benefit/Cost Ratio = **0.23**

ARGO AND GEDDES DAMS
NET PRESENT VALUE ANALYSIS - **ARGO DAM (Option 2) - Direct Power Line**

Evaluation Period:	2012-2036
Average Annual Revenue from Hydro Offset (2010):	**$205,596**
Annual Escallation Rate (%):	3.00
Discount Rate (%):	4.50
Present Worth Rate (%):	4.50
Hydro Construction Costs (2010)($1,000):	**$9,326**
Construction Escallation Rate (%):	3.00
Dedicated Power Line Costs (2010)($1,000):	**$781**

	Year	Present Worth Factor	Annual Revenue ($1,000)	Hydro Annual O&M ($1,000)	Power Line Annual O&M ($1,000)	Annual Net Revenue ($1,000)	Present Worth Factor	Net Present Value ($1,000)	Hydro & Dedicated Power Construct Cost ($1,000)	Net Present Value ($1,000)	Net Present Value ($1,000)	Energy Benefit Present Value ($1,000)	Total O&M & Constr Cost Present Value ($1,000)
	2010	1.00		**$ 110.0**	**$ 25.0**								
	2011	1.03							$ 10,410	1.05	$ 10,879		$ 10,879
1	2012	1.06	$ 218	$ 117	$ 27	$ 75	1.00	$ 75				$ 218	$ 143
2	2013	1.09	$ 225	$ 120	$ 27	$ 77	0.96	$ 74				$ 215	$ 141
3	2014	1.13	$ 231	$ 124	$ 28	$ 79	0.92	$ 73				$ 212	$ 139
4	2015	1.16	$ 238	$ 128	$ 29	$ 82	0.88	$ 72				$ 209	$ 137
5	2016	1.19	$ 245	$ 131	$ 30	$ 84	0.84	$ 71				$ 206	$ 135
6	2017	1.23	$ 253	$ 135	$ 31	$ 87	0.80	$ 70				$ 203	$ 133
7	2018	1.27	$ 260	$ 139	$ 32	$ 89	0.77	$ 69				$ 200	$ 131
8	2019	1.30	$ 268	$ 144	$ 33	$ 92	0.73	$ 68				$ 197	$ 129
9	2020	1.34	$ 276	$ 148	$ 34	$ 95	0.70	$ 67				$ 194	$ 128
10	2021	1.38	$ 285	$ 152	$ 35	$ 98	0.67	$ 66				$ 192	$ 126
11	2022	1.43	$ 293	$ 157	$ 36	$ 101	0.64	$ 65				$ 189	$ 124
12	2023	1.47	$ 302	$ 162	$ 37	$ 104	0.62	$ 64				$ 186	$ 122
13	2024	1.51	$ 311	$ 166	$ 38	$ 107	0.59	$ 63				$ 183	$ 120
14	2025	1.56	$ 320	$ 171	$ 39	$ 110	0.56	$ 62				$ 181	$ 119
15	2026	1.60	$ 330	$ 177	$ 40	$ 113	0.54	$ 61				$ 178	$ 117
16	2027	1.65	$ 340	$ 182	$ 41	$ 117	0.52	$ 60				$ 176	$ 115
17	2028	1.70	$ 350	$ 187	$ 43	$ 120	0.49	$ 59				$ 173	$ 114
18	2029	1.75	$ 361	$ 193	$ 44	$ 124	0.47	$ 59				$ 171	$ 112
19	2030	1.81	$ 371	$ 199	$ 45	$ 128	0.45	$ 58				$ 168	$ 110
20	2031	1.86	$ 382	$ 205	$ 47	$ 131	0.43	$ 57				$ 166	$ 109
21	2032	1.92	$ 394	$ 211	$ 48	$ 135	0.41	$ 56				$ 163	$ 107
22	2033	1.97	$ 406	$ 217	$ 49	$ 139	0.40	$ 55				$ 161	$ 106
23	2034	2.03	$ 418	$ 224	$ 51	$ 144	0.38	$ 54				$ 159	$ 104
24	2035	2.09	$ 430	$ 230	$ 52	$ 148	0.36	$ 54				$ 156	$ 103
25	2036	2.16	$ 443	$ 237	$ 54	$ 152	0.35	$ 53				$ 154	$ 101
								$ 1,583			$ 10,879	**$ 4,609**	**$ 13,905**

AVG: Benefit Cost = NPV Revenue / NPV Construction Costs = 0.15 Benefit/Cost Ratio = **0.33**

ARGO AND GEDDES DAMS
NET PRESENT VALUE ANALYSIS - **GEDDES & ARGO (Option 1) DAMS - Sell Directly to DTE Energy**

Evaluation Period:	2012-2036		
Value of Energy (2010)($/MWh):	$52.00	=	$0.0520 kW-hrs
Average Annual Generation (MWh):	**5,361**		
Annual Revenue (2010):	$278,748		
Annual Escallation Rate (%):	3.00		
Discount Rate (%):	4.50		
Present Worth Rate (%):	4.50		
Hydro Construction Costs (2010)($1,000):	**$10,824**		
Construction Escallation Rate (%):	3.00		

	Year	Present Worth Factor	Annual Revenue ($1,000)	Annual O&M ($1,000)	Other ($1,000)	Annual Net Revenue ($1,000)	Present Worth Factor	Net Present Value ($1,000)	Hydro Construct Cost ($1,000)	Net Present Value ($1,000)	Net Present Value ($1,000)	Energy Benefit Present Value ($1,000)	Total O&M & Constr Cost Present Value ($1,000)
	2010	1.00		**$ 220.0**	$ -								
	2011	1.03							$ 11,149	1.05	$ 11,650		$ 11,650
1	2012	1.06	$ 296	$ 233		$ 62	1.00	$ 62				$ 296	$ 233
2	2013	1.09	$ 305	$ 240		$ 64	0.96	$ 61				$ 291	$ 230
3	2014	1.13	$ 314	$ 248		$ 66	0.92	$ 61				$ 287	$ 227
4	2015	1.16	$ 323	$ 255		$ 68	0.88	$ 60				$ 283	$ 223
5	2016	1.19	$ 333	$ 263		$ 70	0.84	$ 59				$ 279	$ 220
6	2017	1.23	$ 343	$ 271		$ 72	0.80	$ 58				$ 275	$ 217
7	2018	1.27	$ 353	$ 279		$ 74	0.77	$ 57				$ 271	$ 214
8	2019	1.30	$ 364	$ 287		$ 77	0.73	$ 56				$ 267	$ 211
9	2020	1.34	$ 375	$ 296		$ 79	0.70	$ 56				$ 263	$ 208
10	2021	1.38	$ 386	$ 305		$ 81	0.67	$ 55				$ 260	$ 205
11	2022	1.43	$ 397	$ 314		$ 84	0.64	$ 54				$ 256	$ 202
12	2023	1.47	$ 409	$ 323		$ 86	0.62	$ 53				$ 252	$ 199
13	2024	1.51	$ 422	$ 333		$ 89	0.59	$ 52				$ 249	$ 196
14	2025	1.56	$ 434	$ 343		$ 92	0.56	$ 52				$ 245	$ 193
15	2026	1.60	$ 447	$ 353		$ 94	0.54	$ 51				$ 242	$ 191
16	2027	1.65	$ 461	$ 364		$ 97	0.52	$ 50				$ 238	$ 188
17	2028	1.70	$ 475	$ 375		$ 100	0.49	$ 49				$ 235	$ 185
18	2029	1.75	$ 489	$ 386		$ 103	0.47	$ 49				$ 231	$ 183
19	2030	1.81	$ 503	$ 397		$ 106	0.45	$ 48				$ 228	$ 180
20	2031	1.86	$ 519	$ 409		$ 109	0.43	$ 47				$ 225	$ 177
21	2032	1.92	$ 534	$ 422		$ 113	0.41	$ 47				$ 221	$ 175
22	2033	1.97	$ 550	$ 434		$ 116	0.40	$ 46				$ 218	$ 172
23	2034	2.03	$ 567	$ 447		$ 119	0.38	$ 45				$ 215	$ 170
24	2035	2.09	$ 584	$ 461		$ 123	0.36	$ 45				$ 212	$ 167
25	2036	2.16	$ 601	$ 474	$ -	$ 127	0.35	$ 44				$ 209	$ 165
								$ 1,317			$ 11,650	**$ 6,249**	**$ 16,583**

AVG: Benefit Cost = NPV Revenue / NPV Construction Costs = 0.11 Benefit/Cost Ratio = **0.38**

ARGO AND GEDDES DAMS
NET PRESENT VALUE ANALYSIS - **GEDDES & ARGO (Option 1) DAMS - Direct Power Line**

Evaluation Period:	2012-2036
Average Annual Revenue from Hydro Offset (2010):	**$436,142**
Annual Escallation Rate (%):	3.00
Discount Rate (%):	4.50
Present Worth Rate (%):	4.50
Hydro Construction Costs (2010)($1,000):	**$10,824**
Construction Escallation Rate (%):	3.00
Dedicated Power Line Costs (2010)($1,000):	**$1,325**

	Year	Present Worth Factor	Annual Revenue ($1,000)	Hydro Annual O&M ($1,000)	Power Line Annual O&M ($1,000)	Annual Net Revenue ($1,000)	Present Worth Factor	Net Present Value ($1,000)	Hydro & Dedicated Power Construct Cost ($1,000)	Net Present Value ($1,000)	Net Present Value ($1,000)	Energy Benefit Present Value ($1,000)	Total O&M & Constr Cost Present Value ($1,000)
	2010	1.00		**$ 220.0**	**$ 50.0**								
	2011	1.03							$ 12,513	1.05	$ 13,077		$ 13,077
1	2012	1.06	$ 463	$ 233	$ 53	$ 176	1.00	$ 176				$ 463	$ 286
2	2013	1.09	$ 477	$ 240	$ 55	$ 182	0.96	$ 174				$ 456	$ 282
3	2014	1.13	$ 491	$ 248	$ 56	$ 187	0.92	$ 171				$ 450	$ 278
4	2015	1.16	$ 506	$ 255	$ 58	$ 193	0.88	$ 169				$ 443	$ 274
5	2016	1.19	$ 521	$ 263	$ 60	$ 198	0.84	$ 166				$ 437	$ 270
6	2017	1.23	$ 536	$ 271	$ 61	$ 204	0.80	$ 164				$ 430	$ 266
7	2018	1.27	$ 552	$ 279	$ 63	$ 210	0.77	$ 162				$ 424	$ 263
8	2019	1.30	$ 569	$ 287	$ 65	$ 217	0.73	$ 159				$ 418	$ 259
9	2020	1.34	$ 586	$ 296	$ 67	$ 223	0.70	$ 157				$ 412	$ 255
10	2021	1.38	$ 604	$ 305	$ 69	$ 230	0.67	$ 155				$ 406	$ 251
11	2022	1.43	$ 622	$ 314	$ 71	$ 237	0.64	$ 153				$ 400	$ 248
12	2023	1.47	$ 640	$ 323	$ 73	$ 244	0.62	$ 150				$ 395	$ 244
13	2024	1.51	$ 660	$ 333	$ 76	$ 251	0.59	$ 148				$ 389	$ 241
14	2025	1.56	$ 679	$ 343	$ 78	$ 259	0.56	$ 146				$ 383	$ 237
15	2026	1.60	$ 700	$ 353	$ 80	$ 267	0.54	$ 144				$ 378	$ 234
16	2027	1.65	$ 721	$ 364	$ 83	$ 275	0.52	$ 142				$ 372	$ 231
17	2028	1.70	$ 743	$ 375	$ 85	$ 283	0.49	$ 140				$ 367	$ 227
18	2029	1.75	$ 765	$ 386	$ 88	$ 291	0.47	$ 138				$ 362	$ 224
19	2030	1.81	$ 788	$ 397	$ 90	$ 300	0.45	$ 136				$ 357	$ 221
20	2031	1.86	$ 811	$ 409	$ 93	$ 309	0.43	$ 134				$ 352	$ 218
21	2032	1.92	$ 836	$ 422	$ 96	$ 318	0.41	$ 132				$ 347	$ 215
22	2033	1.97	$ 861	$ 434	$ 99	$ 328	0.40	$ 130				$ 342	$ 211
23	2034	2.03	$ 887	$ 447	$ 102	$ 338	0.38	$ 128				$ 337	$ 208
24	2035	2.09	$ 913	$ 461	$ 105	$ 348	0.36	$ 126				$ 332	$ 205
25	2036	2.16	$ 941	$ 474	$ 108	$ 358	0.35	$ 125				$ 327	$ 202
								$ 3,725			$ 13,077	**$ 9,778**	**$ 19,130**

AVG: Benefit Cost = NPV Revenue / NPV Construction Costs = 0.28 Benefit/Cost Ratio = **0.51**