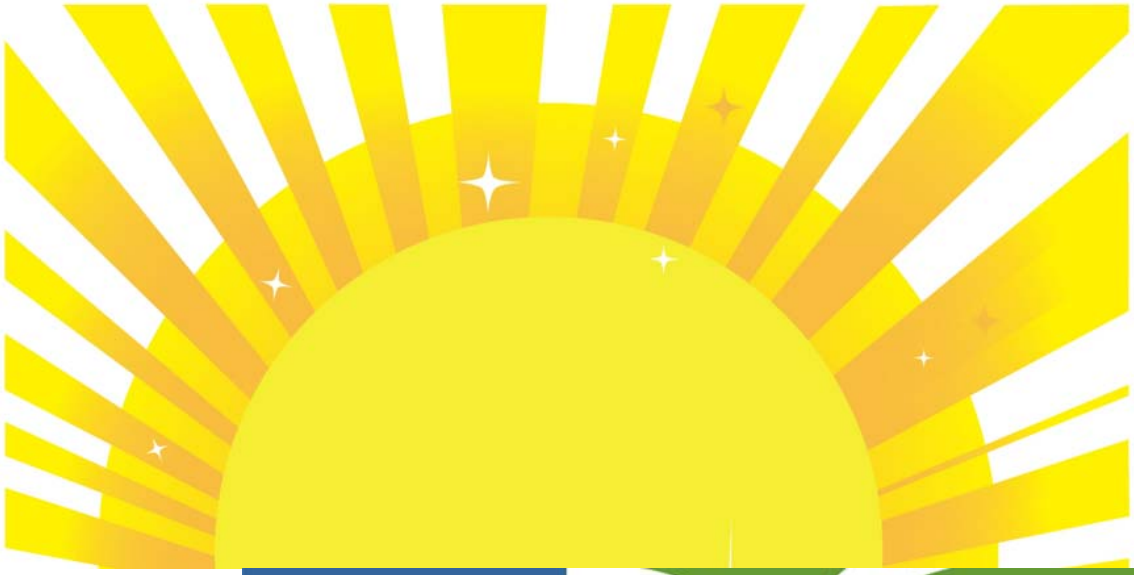
Michigan Public Service Commission

Solar Working Group – Staff Report

June 30, 2014



Electric Reliability Division Renewable Energy Section

MICHIGAN PUBLIC SERVICE COMMISSION

Executive Summary

On December 19, 2013 the Michigan Public Service Commission (Commission) issued an order in the DTE Electric Company's (DTE) Renewable Energy Plan (REP) Review, Case No. U-17302 approving the plan. The Order also directed Commission Staff (Staff) to convene a work group "to discuss and determine possibilities for improving the company's customer SolarCurrents program including means for incorporating community solar into the program." Participation in the Solar Working Group (SWG) was open to representatives from DTE and other interested stakeholders and Consumers Energy also participated. The SWG met six times at Commission Offices and meetings were well-attended with 30 – 40 participants at each meeting. A list of participants and company affiliations is included in **Appendix A**.

The SWG discussed Consumers Energy's Expanded Advanced Renewable Program (EARP) Solar and DTE's SolarCurrents programs that will result in 13 MW of customer-installed solar projects when fully subscribed in 2015. Both programs have evolved from customer applications processed on a first-come, first-served basis to the companies offering program capacity at regularly scheduled intervals and the selection of applications through a lottery system. Many SWG stakeholders recommended significant increases in program sizes. Conversely, other participants stated that increasing program sizes in their current forms will result in additional cost to the utilities and utility customers.

One of Staff's primary goals for the SWG was to identify a mechanism that utilities could use to support customer solar generation that is subsidy and incentive-free with components that are transparent and well understood by participants. DTE presented a calculation showing that its existing SolarCurrents program for residential customers includes 9 cents per kWh in the form of a net metering subsidy, 3 cents per kWh as a renewable energy credit (REC) payment, and an up-front payment of 20

cents per installed watt. Consumers identified an 8.7 cent per kWh EARP subsidy. The companies pointed out that these subsidies are mostly funded by non-participating customers.

The topic of net metering programs impacting non-participating customers has been discussed in other states recently. Many of these states have commissioned solar valuation studies to assess the impact of solar programs on non-participating customers. Without a similar study focused on Michigan's specific utility rates, avoided costs and solar generation profiles, it is not possible to know the extent of a net metering subsidy.

The SWG examined the "Value of Solar" (VOS) concept used by Austin Energy and recently adopted in Minnesota as a community solar rate that is an optional (at the utilities' discretion) replacement for net metering. A VOS tariff is calculated by summing the utility's avoided costs of generating equivalent power at the same time and place as is supplied by a solar generator plus certain additional amounts reflecting value to society that are not included in the utility's avoided costs, such as local economic development or avoided pollution. There was substantial discussion with no consensus among the SWG participants about whether a VOS should include additional values to society that are not an avoided utility cost. DTE provided a VOS calculation using historical 2013 wholesale energy and capacity prices which yielded a 3.9 cent per kWh VOS. This is significantly less than Austin Energy's current VOS of 10.7 cents per kWh which includes forecasted prices for avoided costs, or the 13.8 cent per kWh calculated for Michigan by NREL in a draft whitepaper. However, Staff concludes that any VOS calculation for a rate-regulated Michigan utility would likely be determined as part of a Commission contested case proceeding.

Staff reviewed residential customer solar project cost information provided by Consumers and other SWG participants and found that typical costs were between $2.50 and $4.00 per installed kW. Staff developed a model that looked at solar installation and financing costs to determine the residential

rate for electricity that would be necessary to break even and yield an 8% return after 20 years. Staff found that with no financing and an installation cost of $3.50 per Watt, the residential rate necessary to break even (a 0% investment return) is $0.10 per kWh and $0.22 per kWh for an 8% investment return. Factoring in financing, the residential rate necessary to break even is $0.22 per kWh and $0.37 per kWh was required to provide an 8% investment return. For reference, the net metering credit for Consumers and DTE is currently $0.12 – $0.13 cents per kWh. While residential solar prices have declined more than 50% since the renewable portfolio standard was passed in 2008, the net metering credit (at its current value) and likely the VOS are not yet sufficient to provide a return over a 20 year period or simply break even when a project is financed. Using this information and other feedback from the SWG, Staff proposed three potential 50 MW solar program frameworks:

1) Net Metering and Renewable Energy Credit (REC) Payment
2) Buy All (customer purchases all electricity used at regular tariff rates)/Credit All (utility credits customer for all solar generation at VOS rate and REC)
3) Buy Net (customer uses solar generation "behind the meter" and purchases supplemental electricity from the utility at regular tariff rates)/Credit Net (utility credits customer for solar generation not used on-site at VOS rate and REC)

Under all three programs, the program capacity is made available in blocks with the REC payment declining as each block becomes subscribed. After all program capacity is subscribed, the programs assume that the additional REC payment is fully phased out leaving VOS or net metering as the only form of customer compensation. Agreement among the participants on specific program designs was not reached. These potential programs, described in **Appendix C**, are for informational purposes only and provide a basic structure that would enable the design of future programs.

Both Consumers and DTE indicated in comments that they are interested in developing subsidy-free customer and community solar programs. Staff suggests that programs be put in place in time to allow Michigan customers to utilize the 30% federal tax credit which is scheduled to decrease to 10%

beginning January 2017. While a subsidy-free program is the end- goal, the Net Metering and REC Payment program option for small solar projects could serve as a bridge to implementing a VOS credit by building on a program already established. The program could be designed to eliminate the REC payment as the net metering credit rises. Additionally, a solar valuation to assess the extent of net metering ratepayer cross-subsidization would be useful information. The VOS calculation should be determined after thorough review such as in a contested case process.

The SWG examined different types of community solar programs and investigated utility-owned, third-party and crowd-funded models. There is significant interest in community solar in Michigan as it provides means for individuals to easily invest in distributed solar generation without a significant upfront capital outlay. Both DTE and Consumers expressed interest in company-owned models in the near term as these will allow for the most expeditious project implementation.

This report is not intended to make recommendations. Instead Staff views the purpose of the report as providing information in response to the Commission's directive to discuss and put forth ideas for improving existing solar programs and a means for incorporating community solar.

Introduction

On December 19, 2013 the Commission issued an order in the DTE Electric Company's (DTE) Renewable Energy Plan (REP) Review Case No. U-17302 approving the plan. The Order also charged Staff with the task of convening a work group "to discuss and determine possibilities for improving the Company's customer SolarCurrents program including means for incorporating community solar into the program." Participation in the Solar Working Group (SWG) was open to representatives from DTE and other interested stakeholders.[1] During this same period, Consumers Energy Company (Consumers) also requested approval of its REP Review in Case No. U-17301. In briefing, Staff suggested a similar work group to discuss and determine improvements to Consumers' Experimental Advanced Renewable Program (EARP) and a way to incorporate community solar into its program. Consumers volunteered to participate in the SWG along with DTE and a single SWG was formed.[2]

On February 4, 2014 Staff held the kick-off SWG meeting. In attendance were 42 interested parties, Consumers and DTE representatives and Staff. At the initial meeting the SWG developed three primary goals: 1) develop a value of solar (VOS) tariff; 2) explore options to modify existing solar programs; 3) develop community solar proposals for both companies. To facilitate accomplishing these goals the SWG divided into three sub-groups. The sub-groups were: 1) Value of Solar; 2) Solar Tariff, Rate Impact and Program Caps (Solar Tariff); and 3) Program Design. Each group contained 14 to 26 participants with at least three Staff members and at least one representative from both DTE and Consumers.

[1] A list of participants and company affiliations is included in **Appendix A**.
[2] Minutes, presentations and attendance lists are provided here: http://www.michigan.gov/mpsc/0,4639,7-159-16393_55246_55249-321593--,00.html

Solar Working Group Meetings

The six SWG meetings started on February 4, 2014 and ended on May 20, 2014. The purpose of the SWG meetings was for each of the sub-groups to provide updates on activities and to provide informational presentations.

The February 4, 2014 SWG meeting established the timing for subsequent meetings and the final report. Additionally, the scope and goals of the SWG were discussed, and the three sub-groups were formed (Value of Solar, Solar Tariff and Program Design). A website to give the SWG access to relevant documents and meeting agendas, minutes and presentations was created.

Meeting Summaries

The meeting summaries are intended to be brief descriptions of topics discussed and presentations made at the six SWG meetings and are not meant to indicate that Staff or the SWG endorses the information presented.

At the February 25, 2014 SWG meeting, Jesse Harlow, Staff Engineer, providing support for the Program Design sub-group, gave a background presentation on the Consumers' EARP and DTE's SolarCurrents Programs. He also updated the group regarding the information gathered from sub-group participants about the positive and negative aspects of the EARP and SolarCurrents programs and concepts for community solar programs. Julie Baldwin, Staff Manager of the Renewable Energy Section, providing support for the VOS sub-group, gave an overview of the Minnesota Value of Solar process. Dave Konkle, on behalf of the Great Lakes Renewable Energy Association and author of *A Guidebook for Community Solar Programs in Michigan Communities*[3], presented information on community solar

[3] http://www.michigan.gov/documents/mdcd/Michigan_Community_Solar_Guidebook_437888_7.pdf

programs. Karl Rábago, formerly Vice President of Distributed Energy Services at Austin Energy where the VOS methodology was created, presented background on the calculation methodology for VOS.

At the March 18, 2014 SWG meeting, Steve McLean, Staff Manager of the Rates and Tariffs Section, provided background about how cost-of-service utility rates are developed. Jesse Harlow provided a presentation on renewable energy cost recovery under 295 PA 2008. Keith Troyer, from Consumers' Transactions and Wholesale Settlements group and Todd Lohrmann, Manager of DTE's Renewable Energy Business Development group provided a joint presentation on the "utility perspective" of rates and solar programs.

At the April 8, 2014 SWG meeting, solar installers provided comments regarding their experience with solar programs in Michigan and discussed various policy ideas that could support the solar industry. Dan Alway and Art Toy of Four Elements Energy, and Jeremy Zinn of Oak Electric provided remarks. Jesse Harlow provided an update regarding the Program Design sub-group's brainstorming efforts to develop ideas to improve the existing solar programs for DTE and Consumers. Kevin Krause, Staff Auditor, providing support for the Solar Tariff sub-group, discussed efforts to design tariffs for VOS programs. Julie Baldwin provided an update on the VOS calculation methodology. Douglas Jester of 5 Lakes Energy presented a dynamic pricing tariff model that utilizes the ability of smart meters to provide hourly (or sub-hourly) solar generation and usage data to the utility and incorporates real time pricing for both the customer's solar generation and utility deliveries.

At the April 29, 2014 SWG meeting, Staff presented updates to the work conducted by the sub-groups. Julie Baldwin reported that the Value of Solar sub-group was working with the Midcontinent Independent System Operator (MISO) to better understand solar capacity credits. She also reported that Staff was working on program design details for community solar programs. Kevin Krause reported that the Solar Tariff sub-group was working on cost estimates for several program

options. Brad Klein, of the Environmental Law and Policy Center, presented options for customer solar program expansions. He described a program that has been successful in other states where prices paid or credits for solar are adjusted based on blocks of capacity. As each block of capacity becomes full, the incentives are reduced. This could be a bridge to a future with no solar incentives.

The final SWG meeting took place on May 20, 2014. Josh Cornfeld, Rachel Chalet, and Ali-Heji, University of Michigan Dow Fellows, presented their work on solar externality values. Edward Comer from the Edison Electric Institute presented concerns about the costs of customer distributed generation. Monica Martinez, Hispanics in Energy, explained that increases in the cost of electricity generally burden low income customers to a greater degree than middle to upper income customers. DTE's Todd Lohrmann presented the company's calculation of the VOS.

Staff issued its draft Staff Report on the SWG on June 10, 2014. Comments were received from 17 organizations (163 pages) by June 20, 2014. All comments received are attached to this report as **Appendix B**.

Sub-Group Actions

Staff conducted numerous sub-group meetings throughout the five month period. Most of the sub-group activity took place via telephone conference and email. Each group had specific and unique goals that took advantage of the expertise in the particular sub-group. While the goals were unique, all tasks were focused on a common effort to develop solar programs that are open and accessible to all participants including low income customers, that do not require the limitation of participants, are

sustainable (i.e. that eliminate boom and bust cycles), and do not rely on subsidies[4] from non-participating customers.

Value of Solar

Establishing a price for electricity generated from solar based on the VOS is a recent concept that is in place at Austin Energy and is in the process of implementation in Minnesota. A VOS rate is calculated by determining the value of the distributed solar generation and crediting utility customers that rate through either a tariff or standard-offer contract. The VOS has also been used as a comparison to the value of net metering credits to determine if net metering cross-subsidization is occurring.[5,6] A VOS rate is based on avoided utility costs.[7,8]

One goal of the VOS is to determine a price for customer or third-party community solar-generated electricity that does not result in ratepayer cross-subsidization in the near term and if the VOS rate includes a REC, elimination of the REC payment all together when they are no longer needed for compliance with Michigan's renewable portfolio standard. As part of a presentation to the Solar Working Group, both DTE and Consumers provided an analysis showing their view of the total subsidy in

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[4] 5 lakes energy commented that other examples of cross-subsidies include 24 hour industrial operations compared to those that only run single shifts, and low-income households with no air conditioning to those that have air conditioning.

[5] See http://www.nrri.org/documents/317330/f1c96d7d-83ac-4fe3-bf0f-ef8ed343efe8
State and Utility Solar Energy Programs: Recommended Approaches for Growing Markets, NRRI, Tom Stanton, Daniel Phelan, July 2013.

[6] Current ratemaking principles result in rate structures where a significant portion of a utility's fixed costs are recovered via a per kWh charge. One of the major drivers for this is to encourage conservation. When a customer installs a distributed solar project that results in less kWh purchases from the utility, that customer makes less of a contribution to the fixed costs. In the next utility rate case, fixed costs are spread over fewer kWh resulting in non-participating customers making increased payments toward fixed costs. Michigan's net metering program limits potential ratepayer cross-subsidization by capping participation in the net metering program. For example, Michigan's net metering program for small projects is limited to 0.5% of the previous year's peak load.

[7] See Austin Energy Solar Tariff http://my.austinenergy.com/wps/wcm/connect/c6c8ad20-ee8f-4d89-be36-2d6f7433edbd/ResidentialSolar.pdf?MOD=AJPERES

[8] See Minnesota Value of Solar: Methodology
https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7bEE336D18-74C3-4534-AC9F-0BA56F788EC4%7d&documentTitle=20141-96033-02

dollars per kWh built into the customer SolarCurrents and EARP programs[9] respectively. The quantities that the companies referred to as subsidies in **Figure 1** are the SolarCurrents REC payment and DTE's fixed costs (fixed generation and distribution system costs) that are recovered from customers in the form of a variable (per kWh) rate. Consumers defines the EARP subsidy as the program's incremental cost of compliance as shown in **Figure 2** but not all parties agreed with the companies' characterization of subsidies. Many parties characterize RECs as a tangible item necessary for utilities to meet the renewable portfolio standard. The utilities say that when purchased above market value or when no longer needed for compliance, the REC purchase becomes a subsidy.

Figure 1: Solar Currents Funding Mechanism

DTE Energy

Consumers Energy
Count on Us

SolarCurrents and Net Metering funding mechanism for residential customers

	SolarCurrents (Phase 1)	SolarCurrents (Phase 2)	Funding Mechanism
Up-front solar subsidy	$2.40/W	$0.20/W	Renewable Surcharge
On-going solar subsidy	$0.11/kWh	$0.03/kWh	Renewable Surcharge
Net metering subsidy (unrecovered fixed cost)	$0.09/kWh	$0.09/kWh	*Unrecovered fixed costs are funded by non-solar customers
Total SolarCurrents and Net metering subsidy	**$0.20/kWh**	**0.12/kWh**	

[9] DTE's customer SolarCurrents and Consumers Energy's EARP programs are described in the Program Design section of this report.

Figure 2: EARP Solar Funding

DTE Energy

Consumers Energy
Count on Us

EARP-Solar Funding (cont.)

- Total Funding: $26,825,341
- Total PSCR Expense: $12,681,277
- Total ICC Expense: $14,144,064
- Total Generation: 91,028,099 kWh

- Subsidy (ICC/Generation): $0.155 per kWh
  - Original EARP-Solar: $0.321 per kWh
  - **EARP-Solar Expansion: $0.087 per kWh**

- The lower offer-price of the EARP-Solar Expansion has aided in reducing the subsidy attributed to solar in our Renewable Energy Plan

As mentioned in the Solar Working Group Meeting Section and as part of the efforts to support the VOS sub-group, Karl Rábago presented an overview of the VOS approach and explained the general benefits of this type of approach as follows:[10]

- Reduces or eliminates class subsidies
- Explicitly charges for consumption; keeps utility whole on cost of service
- Provides an incentive for efficiency
- Annual adjustment prevents over- or under- payment as utility costs change
- Better aligns with sound rate making principles
- Reduces simple payback; reduces pressure on incentive

The VOS "is intended to reflect the value of distributed solar energy to the utility—a "break-even" value for a specific kind of distributed generation resource, and a value at which the utility is economically neutral to whether it supplies such a unit of energy or obtains it from the customer." [11]

[10] http://michigan.gov/documents/mpsc/Rbago_448782_7.pdf
[11] http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=TX35R&re=0&ee=0

Austin Energy VOS Program

In 2012, Austin Energy, a municipal utility serving more than 420,000 customers, became an early adopter of the VOS concept. The components of the calculation are forecasted for the life of the project (25 years) and then levelized. The initial solar tariff was 12.8 cents per kWh and only available to residential customers with projects no larger than 20 kW.[12] It does not apply to commercial or industrial customers nor to community solar installations. The VOS rate is recalculated annually and all customers, including existing customers, receive the new VOS rate. **Figure 3** shows the elements that comprise the calculation and the recently updated 10.7 cents per kWh 2014 VOS rate for Austin Energy. In a month where customers generate more solar PV than they use, non-refundable credits are carried forward for use in future months. To encourage customers to plan for a zero net energy household and to remove the potential for a solar customer VOS payment to be considered taxable income, credits are reset to zero annually. The customer buys all net energy usage from the utility at the retail rate and is credited for all solar generation at the VOS rate. The reduction in rate from 12.8 cents per kWh to 10.7 cents per kWh was due to several factors including a decrease in forward natural gas prices and a revision of the assumed project life from 30 to 25 years.[13, 14] Austin Energy also provides an up-front rebate equal to $1.25 per watt (limited to a $15,000 per year cap), and has provided rebates for some seven years. Over time, Austin's rebates have been reduced as the solar market has matured and grown, including the period since the VOS rate was established and implemented. Just three months into the year, the utility reported that 70% of the rebate funding was claimed.

[12] http://energy.gov/savings/austin-energy-value-solar-residential-rate-texas
[13] http://www.cleanpower.com/wp-content/uploads/2014-VOS-at-Austin-Energy-Results-2013-10-21.pdf page 43.
[14] www.austinenergy.com then About, News, December 6, 2013, "New Value of Solar Rate Takes Effect January."

Figure 3: Austin Energy Value of Solar Calculation for 2014

Value Component	Basis	Distributed PV Value $/kWh
Guaranteed Fuel Value	Cost of fuel to meet electric loads and T&D losses inferred from nodal price data & guaranteed future NG prices	$0.055
Plant O & M Value	Costs associated with operations and maintenance	$0.005
Generation Capacity Value	Capital cost of generation to meet peak load inferred from nodal price data	$0.017
Avoided Transmission & Distribution Capacity Cost	Cost of money savings resulting from deferring transmission & distribution capacity additions	$0.010
Avoided Environmental Compliance Cost	Cost to comply with environmental regulations and policy objectives.	$0.020
	Total	**$0.107**

Minnesota VOS Proposal

In 2013, Minnesota passed legislation that provides investor owned utilities the option to develop a VOS tariff as an alternative to net metering. The VOS rate will also be used as the rate for community solar projects. The legislation required that the elements shown in **Figure 4** be used in the VOS calculation and also required that solar customers be billed for gross electricity consumption under applicable tariffs and receive a VOS credit for their gross solar electricity production. Clean Power Research prepared a report, *Minnesota Value of Solar: Methodology,* which was submitted to the Minnesota Department of Commerce, Division of Energy Resources (MN DOER) on January 31, 2014 providing the methodology to be used. The methodology, as detailed in the report, was approved by

the Minnesota Public Service Commission on March 12, 2014. The MN DOER describes the VOS as "the value of distributed solar to the utility, its customers, and society."[15]

The Minnesota VOS rate is a present value of a 25 year payment stream similar to a long term contract rate. Under the framework of the Minnesota VOS rate, the customer may choose a fixed rate or an escalated rate with a lower starting point. The net present value of the two options would be identical. Similar to the Austin Energy VOS tariff, any unused credit expires after 12 months. The VOS is updated annually for each new group of VOS tariff customers. The MN DOER does not consider VOS to be a "buy all/sell all" arrangement because the customer is credited through a bill mechanism that does not result in any sale of solar energy by the customer. At the time this report was being prepared, no utility had made a VOS tariff filing with the Minnesota Public Utilities Commission.

Figure 4: Minnesota Value of Solar Example Calculation[16]

25 Year Levelized Value	Gross Starting Value ($/kWh)	×	Load Match Factor (%)	× (1 +	Loss Savings Factor (%)	) =	Distributed PV Value ($/kWh)
Avoided Fuel Cost	$0.061				8%		$0.066
Avoided Plant O&M - Fixed	$0.003		40%		9%		$0.001
Avoided Plant O&M - Variable	$0.001				8%		$0.001
Avoided Gen Capacity Cost	$0.048		40%		9%		$0.021
Avoided Reserve Capacity Cost	$0.007		40%		9%		$0.003
Avoided Trans. Capacity Cost	$0.018		40%		9%		$0.008
Avoided Dist. Capacity Cost	$0.008		30%		5%		$0.003
Avoided Environmental Cost	$0.029				8%		$0.031
Avoided Voltage Control Cost							
Solar Integration Cost							
							$0.135

[15] https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={007DDF1B-C60D-4D37-8066-275A67968CCD}&documentTitle=20143-97059-01

[16] https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7bEE336D18-74C3-4534-AC9F-0BA56F788EC4%7d&documentTitle=20141-96033-02

5 Lakes Energy Dynamic Pricing Proposal

During the Solar Working Group meeting on April 8, 2014, 5 Lakes Energy presented its solar tariff concepts that included the following elements:[17]

- Bill Credit (up to the total bill amount)
- Dynamic Rate to Value Power
- Buy-net, Sell-net One-way Delivery Charge[18]
- Renewable Energy Credits
- Externality Payments

5 Lakes Energy pointed out that the use of a bill credit up to the bill amount is likely to minimize tax exposure for the solar generator and will minimize transaction costs for both the utility and its customer.

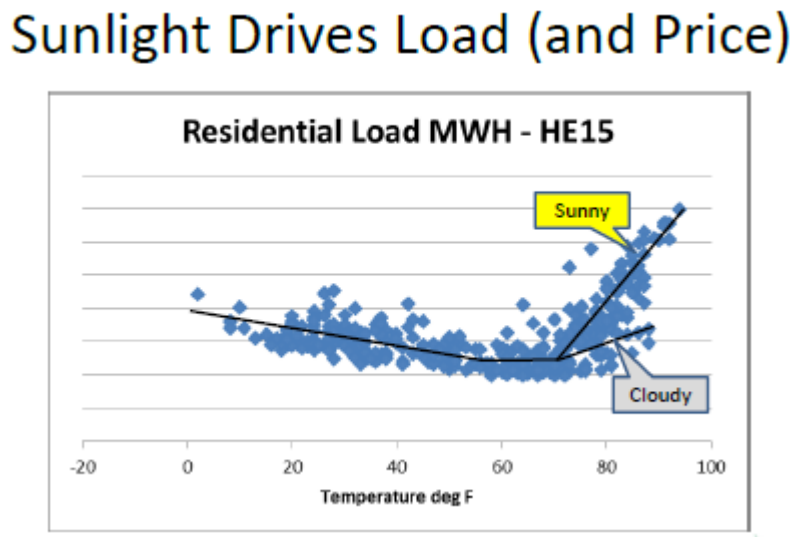
Allowing solar customers to buy or receive credit for solar-generated kWh at a dynamic power supply rate that is determined by standard rate-making principles and is available to customers who do not engage in self-service generation avoids the need for special consideration of VOS by embedding the analysis in standard rate-making. This guarantees that the dynamic rates are set to reflect the long-term avoided costs to supply power at the same time and place as the solar generation being compensated through this approach. Because a properly constructed dynamic rate will allocate generation capacity costs to peak load hours that roughly coincide with the times of solar generation, this approach also captures most of the VOS in contrast to other forms of generation. This approach to setting a VOS is also simpler than adding up the cost elements as has been done by Austin Energy and in Minnesota, because those elements are already determined in the proper design of a dynamic rate. 5 Lakes Energy also

[17] http://www.michigan.gov/documents/mpsc/5lakessolar.pdf_452989_7.pdf

[18] Buy-net/Sell-net: A customer is "credited" at the full retail rate when using their solar generation behind the meter. Solar generation sent back to the grid receives a credit of the retail rate less the delivery charge. When the customer uses electricity delivered by the utility, they buy the net additional electricity at the standard retail rate.

provided a chart shown in **Figure 5** to illustrate that a utility's load is impacted by the sun for the hour ending 15 (3 pm) for each day of the year.

Figure 5: Temperature vs. Load



Based on the assumptions that utility load and market price is most likely correlated with sunlight at any given temperature, using hourly dynamic pricing to credit solar customers will better reflect the VOS than calculations based on averages by season and time-of-day. 5 Lakes also noted that using actual dynamic rates as a basis for compensating solar generation provides the correct incentives for solar system orientation and tracking technology based on their value to the utility, unlike a fixed rate that applies to all systems. Michigan is some time away from being able to ramp up a large scale dynamic pricing scheme as smart meters are necessary to track the necessary data, but pilot programs are possible in many regions due to the companies smart meter roll-outs to date.

Figure 6 shows the average customer credit that would result from applying 5 Lakes Energy's approach to DTE's current Company-owned solar systems. Actual credits would depend on individual system performance, weather, and utility year-to-year marginal cost variation.

Figure 6: 5 Lakes Example Solar Credit Calculation

Example Solar Credit Calculation
(Fixed South-facing Array, Net Zero Energy)

Factor	Value
DTE D-1 Rate > 17kwh/day	$0.1326/kwh
Distribution Charge	$0.05/kwh
Power Supply Charge	$0.0826/kwh
Secondary Customer Line Loss	11.5%
Power Supply Cost FOB Substation	$0.0731/kwh
Load-weighted LMP	$0.0353/kwh
Imputed Capacity Cost FOB Substation	$0.0378/kwh
Imputed DTE Capacity Cost per year	$1,745,737,359
Imputed DTE Capacity Cost FOB Substation	~$158.703/kw-yr
Imputed DTE Capacity Cost FOB Secondary Customer	~$179.325/kw-yr
Solar ELCC	52% kw/nameplate-kw
Solar Capacity Value	$93.249/kw-yr
Solar Generation per Solar Nameplate	1113 kwh/kw-yr
Solar Capacity Value per Annual Solar Output	$0.0837/kwh
Externality Payment	$0.02/kwh
Average Solar Power Supply Credit	$0.1250/kwh
Buy-net, Sell-net Delivery Charge Savings	39.45%
Average Delivery Charge Savings on Gross Consumption	$0.0197/kwh
Average Customer Credit per kwh Solar Generation	$0.1447/kwh
REC Income	$0.0112/kwh
Total Average Solar Credit	$0.1556/kwh

DTE's VOS Calculation

On May 20, 2014, at the final Solar Working Group meeting, DTE presented its VOS calculation using hourly generation data from its 386 kW (DC) DTE Energy Training and Development Center Solar Array in Westland, MI. DTE's calculation uses LMP and capacity market data from 2013. The summary of the company's calculation is shown in **Figure 7**.

Figure 7: DTE Solar Value Calculation

Based on actual production and distribution load profile, the fair market value of solar in 2013 was $0.039/kwh

DTE Energy

Components of the Minnesota VoS	
Fuel Cost and Variable O&M Costs	$0.0388/kWh
Generation Capacity and Reserve Capacity Cost	$0.00028/kWh
Fixed O&M Costs	Not Avoided
Distribution Capacity	Not Avoided
Transmission Capacity	Not Avoided
Environmental Costs	Included in Fuel and Variable O&M Cost
DTE Value of Solar in 2013	**$0.039/kwh**

DTE's numbers shown in **Figure 7** highlight the company's VOS calculation based on historical market based values. This resulted in a much lower number when compared to the Minnesota and Austin Energy VOS, which took a prospective look at the market and applied a long term levelized energy and capacity price to the calculation. DTE's method has validity because it is based on actual known market values as opposed to a forward looking projection based on projected variables. Conversely, this method subjects customers to a revenue lag in years in which market prices increase until such time as a new VOS would be calculated. The 2014 market rates for energy and capacity are higher than 2013. If DTE were to recalculate its VOS using 2014 available data, Staff expects the result would be a higher VOS. Additionally, using wholesale energy and capacity prices does not reflect the long term availability of the solar capacity. The Minnesota and Austin Energy VOS include additional pricing for externalities such as environmental costs while DTE's VOS does not.

Edison Electric Institute VOS Comments

Edward Comer presented the Edison Electric Institute's (EEI) comments on the VOS concept at a Solar Working Group meeting.[19] Mr. Comer listed six of his concerns with the VOS concept:

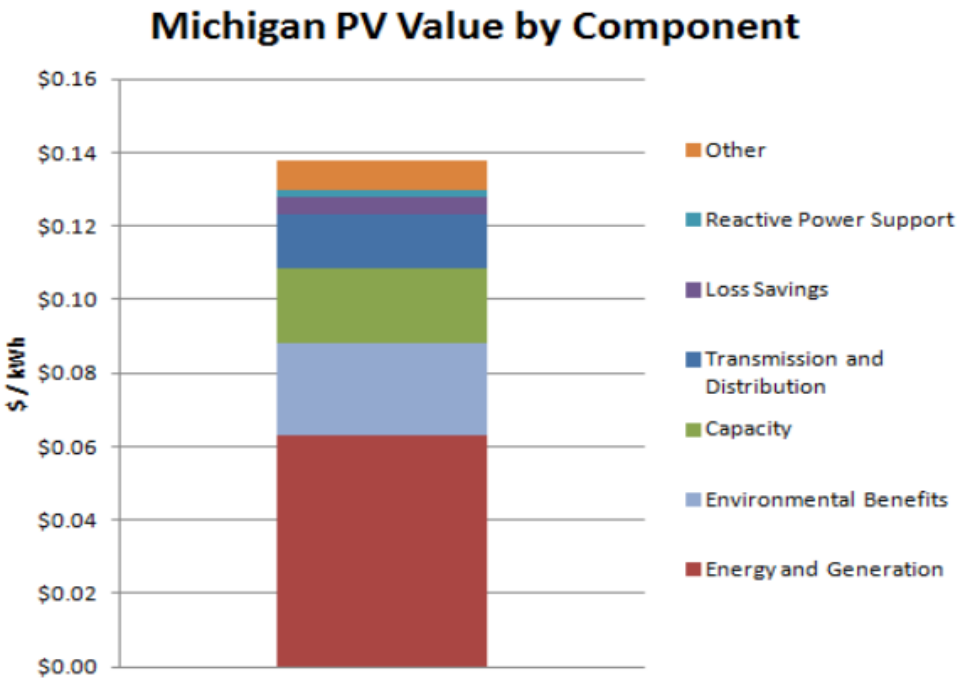
1. Predictions Highly Speculative; Likely to Be Wrong
2. Claims of Grid Savings Unlikely; True Grid Impacts and Costs of Controlling Distributed Generation Still Unknown
3. Seeks Payment for Attributes Never Paid to Utilities
4. Causes Undue Discrimination with Other Non-Carbon Emitting Generation – about 30% of Michigan's Power
5. Increases Electricity Rates for Other Customers
6. Conflicts with FERC Jurisdiction; PURPA Avoided Cost Cap

NREL Michigan VOS Report

NREL issued a draft white paper, The Value of Grid-Connected Photovoltaics in Michigan, in January 2012.[20] The resulting value, based on LMP data from 2006 through 2009, is 13.8 cents/kWh shown in **Figure 8**. The LMP market was impacted by the recession beginning in 2008; however, LMP prices in the first months of 2014 are approaching pre-recession levels.

[19] http://michigan.gov/documents/mpsc/May_20_EEI__Value_and_Cost_of_Distributed_Solar_456969_7.pdf
[20] http://www.michigan.gov/documents/mpsc/120123_PVvaluation_MI_394661_7.pdf

Figure 8: NREL Michigan Solar Value



Staff's Value of Solar Discussion

The VOS calculation utilizes utility data that may not be publicly available. Austin Energy and Minnesota used locational marginal price (LMP) or natural gas price, generation capacity, and distribution and transmission system expansion forecasts extended as much as 30 years into the future. The Institute for Local Self-Reliance stated in a recent report that "The complexity of these benefits explains why the adoption of the *methodology* alone in Minnesota required 6 months of research, stakeholder meetings, and deliberation by two government agencies."[21]

A comprehensive stakeholder engagement process, such as a Commission contested case proceeding, would provide the opportunity to establish confidence and agreement around the source data, any method for forecasting, and the correct tools for quantifying value components.

[21] See http://www.ilsr.org/wp-content/uploads/2014/04/MN-Value-of-Solar-from-ILSR.pdf page 7.

The SWG examined the Minnesota and Austin Energy VOS calculations and discussed various methods to determine each of the calculation inputs as shown in **Figure 9.** The SWG did not reach consensus on how each component should be calculated.

Several SWG participants pointed out that a VOS tariff could result in the VOS credit categorized as income and subject to income taxes. The Austin Energy and the Minnesota VOS programs issue the VOS credit to customers using an on-bill crediting mechanism and do not make payments directly to customers. Staff is not aware of any VOS participants required to pay income tax on the VOS credit. Net metering credits in Michigan are not considered taxable income.

Figure 9: Value of Solar Calculation Discussion

Value Component	Solar Working Group Discussion
Avoided Fuel Cost	MISO's LMPs associated with the hours of solar generation are a reasonable approximation of avoided fuel costs. The SWG did not reach agreement on whether it was appropriate to use the previous year's LMPs only or whether the ultimate number used in the calculation should be a levelization of a long term (25 – 30 year) LMP forecast. There was agreement that LMPs should be adjusted upward to reflect that distributed solar enters the utility system after distribution line losses. The group discussed using the line loss percentages provided in each utility's rate book related to customer choice service. (Consumers Energy Rate Sheet E-27.00, DTE Rate Sheet E-20.00) The University of Michigan Dow Fellow students recommended that the solar fuel price hedge value for Michigan should be at least $0.019/kWh.[22]
Avoided Plant Operations & Maintenance - Fixed	The SWG did not reach agreement on how to calculate this number. Options discussed included using the $5/kW Minnesota number with possible long term escalations or assuming this value is included in the MISO capacity auction market. This cost is included in the 5 Lakes Energy dynamic rate calculation because it is embedded in the utility's approved required revenue.
Avoided Plant Operations & Maintenance - Variable	Several SWG participants suggested that these variable costs are included in the MISO LMPs.
Avoided Generation & Reserve Capacity Cost	There were several SWG suggestions about determining this value: paying solar customers the same capacity payments utilities receive through the ratemaking process, using the MISO capacity market or the MISO Cost of New Entry (CONE).
Avoided Transmission & Distribution Capacity Cost	The SWG did not reach agreement on whether any of these costs might actually be avoided in a 25 – 30 year timeframe. The 5 Lakes Energy position is that transmission costs as assigned to the utility by MISO are affected by both energy and transmission demand, so that a portion of transmission costs are therefore avoided by distributed generation.
Avoided Environmental Cost	The avoided SOx and NOx allowance costs are included in the MISO LMP. The SWG considered adding a REC value to represent this cost. The alternatives that were mentioned are the market value of RECs and the average cost utilities incurred for RECs using other technologies. Some participants had concerns that this represented a subsidy or that RECs are not environmental costs. The Minnesota PUC agreed to use the Federal Social Cost of Carbon for this value. The University of Michigan Dow Fellow students recommended that the value for Michigan should be at least $0.023/kWh.[23]
Avoided Voltage Control Cost	This is an emerging area of study and implementation. Minnesota opted to save this for future evaluation. The University of Michigan Dow Fellow students calculated that the value for Michigan should be at least $0.002/kVARh.[24]
Solar Integration Cost	This is an emerging area of study and implementation. Minnesota opted to save this for future evaluation.

[22] http://michigan.gov/documents/mpsc/uofmsolardowfellow_456921_7.pdf
[23] http://michigan.gov/documents/mpsc/uofmsolardowfellow_456921_7.pdf
[24] http://michigan.gov/documents/mpsc/uofmsolardowfellow_456921_7.pdf

Net Metering

Michigan's net metering program was established in 2008 as part of Act 295. The Category 1 (projects up to 20 kW) net metering program is limited to 0.5% of each utility's previous year's peak load, while Category 2 (projects greater than 20 kW – 150 kW) net metering program is limited to 0.25% of each utility's previous year's peak load. **Figure 10** shows the status of Consumers and DTE's net metering programs showing that both companies have significant room left for programs that would utilize net metering as a basis for generation crediting.

Figure 10: Net Metering Program Status

	Total Program Size MW	Participation Level MW	Remaining Space MW
Consumers Energy Category 1 (Up to 20 kW)	45	1	44
DTE Electric Category 1 (Up to 20 kW)	53	7	46
Consumers Energy Category 2 (>20 kW to 150 kW)	22	0.8	21
DTE Electric Category 2 (>20 kW to 150 kW)	27	0.7	26

Figure 1 illustrates the utility funding mechanism for DTE's SolarCurrents program which incorporates net metering as a key element. DTE asserts that there are 9 cents of unrecovered fixed utility costs in each net metering credit provided to net metering customers. DTE's net metering credit for residential customers is about 12 cents per kWh. According to DTE, the 3 cent per kWh difference between the net metering credit and the unrecovered fixed utility costs represents fuel and costs that DTE can avoid when the customer's solar PV system is generating. DTE's opinion is that when net metering customers do not pay for the utility's fixed costs, then non-participating customers must pay to make up the difference. DTE commented that the existing net metering policy needs to be revised or amended to address these unrecovered costs. This is a step other states have taken by commissioning a

solar valuation study to determine to what extent the unrecovered fixed costs are balanced by the value of the solar generation to the utility.

In September 2013, the Rocky Mountain Institute (RMI) issued its report, *A Review of Solar PV Benefit & Cost Studies, 2nd Edition*.[25] The report reviews 16 distributed solar benefit/cost studies by utilities, national labs, and other organizations that were completed between 2005 and 2013. One of the key insights identified by RMI:

> While detailed methodological differences abound, there is general agreement on overall approach to estimating energy value and some philosophical agreement on capacity value, although there remain key differences in capacity methodology. There is significantly less agreement on overall approach to estimating grid support services and currently unmonetized values including financial and security risk, environment, and social value.

In October 2013, the Interstate Renewable Energy Council (IREC) published a "Regulator's Guidebook" to propose a standardized valuation methodology for public utility commissions to consider implementing in future studies.[26] IREC drew the following important conclusions from the RMI study:

> First and foremost, the calculated benefits [of distributed PV] often exceed residential rates … implying that [net metering] would not entail a subsidy flowing from non-solar to solar customers. Second, commercial customers almost always have unbundled rates and [net metering] has minimal impact on their demand charges because they still have demand after the sun sets. That means that [distributed solar generation] benefits compared to commercial customer energy rates would be strongly positive based on almost all of these studies.[27]

Thus, the RMI report highlights that there are substantial benefits from distributed solar generation even if there isn't universal agreement on how to quantify them at this time.

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[25] http://michigan.gov/documents/mpsc/solar_pv_benefit_and_cost_studies_448376_7.pdf

[26] Keyes, J., and Rabago, K., *A Regulator's Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation*, Interstate Renewable Energy Council (October 2013) (available at http://www.irecusa.org/2013/10/experts-propose-standard-valuation-method-to-determine-benefits-and-costs-of-distributed-solar-generation/).

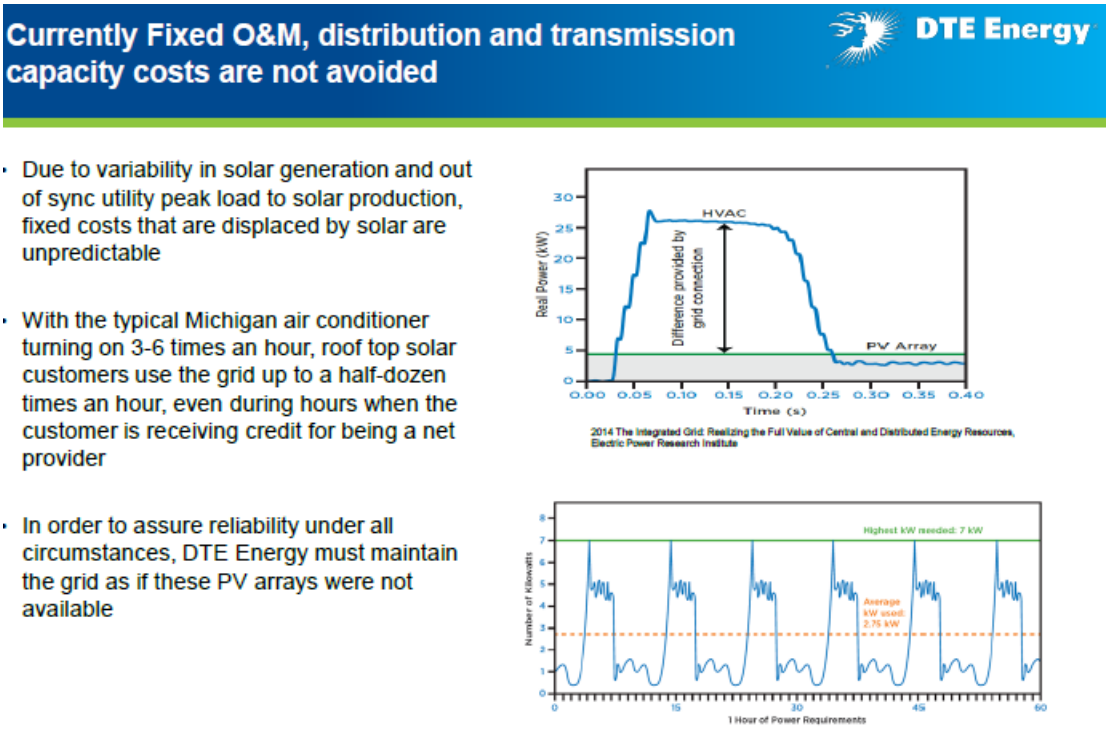
[27] *Id.* at 10.

To determine what portion, of DTE's stated 9 cents per kWh fixed costs that are not paid by net metering customers and might be offset by the benefits of solar, a utility specific solar valuation study would be needed. It is difficult to determine the net cross-subsidy resulting from net metering without considering the net benefits of solar. **Figure 7** shows that DTE calculated a 2013 value of solar of 3.9 cents per kWh[28] which differs from the 13.8 cents per kWh calculated by NREL in **Figure 8**. If policy or ratemaking decisions are to be made based on the cost/benefits of solar PV, a study should be conducted to thoroughly examine all aspects of solar generation and to develop a methodology for valuation. The Commission could order such a project to inform future net metering rate design and solar policy development.

DTE pointed out that solar net metering customers may use the grid multiple times per hour – even during an hour when the customer is a net exporter of solar generation due to the instantaneous high voltage requirements of air conditioning. **Figure 11** illustrates this concept. The rationale for presenting this concept is to explain that customers with distributed generation benefit from the grid.

[28] There was not SWG consensus on this number.

Figure 11: Solar Net Metering Customers and Air Conditioning Use

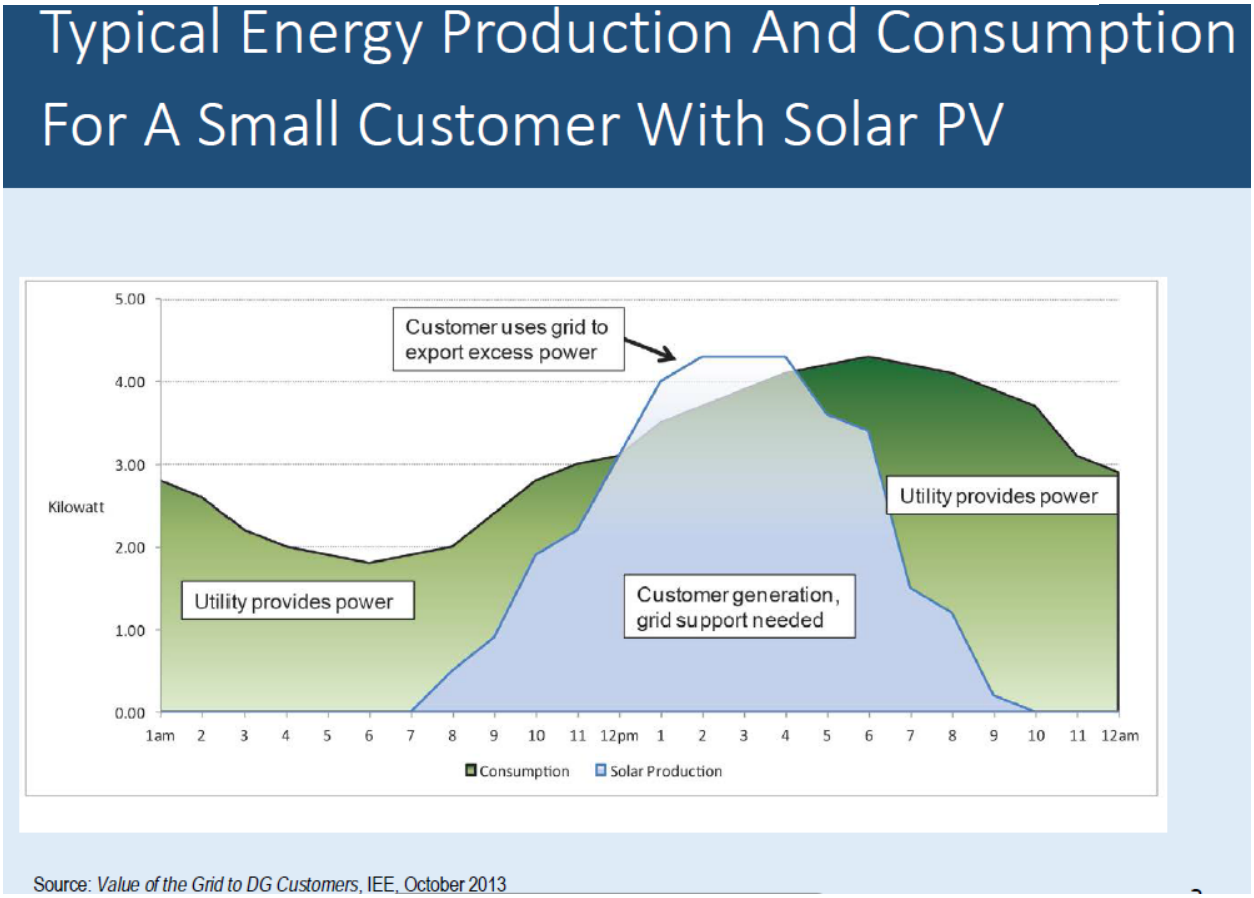


Mr. Comer presented EEI's comments on net metering [29] and provided **Figure 12** comparing hourly solar PV production and residential customer consumption for a typical small residential customer. EEI's view is that because the solar PV generation and customer usage are not fully aligned and the solar peak does not coincide with the utility's entire peak usage period[30] which drives infrastructure investment, Mr. Comer takes the position that the customer is using grid services and increasing grid costs. The utility view is because most rates recover a large share of fixed costs through variable charges that are offset by net metering credits, net metering customers are shifting costs to non-net metering customers by the act of reducing their consumption of energy.

[29] http://michigan.gov/documents/mpsc/May_20_EEI__Value_and_Cost_of_Distributed_Solar_456969_7.pdf

[30] The SWG noted that most solar arrays are positioned with a Southward azimuth to optimize solar production. Repositioning the array shifts the production to better align with peak use periods, however, this panel alignment is likely to produce less kWhs than southward facing arrays.

Figure 12: EEI Residential Energy Consumption and Solar Generation



The NRDC and EEI signed a joint statement addressed to utility regulators in February 2014 with recommendations regarding distributed generation and the utility distribution system.[31] Mr. Comer presented a selected subset of language from that joint agreement.

- Recovery of utilities' non-fuel costs should reflect the costs of maintaining and improving the electricity grid, and should not be tied to levels of retail commodity sales.
- Owners and operators of on-site distributed generation must provide reasonable cost-based compensation for the utility services they use, while also being compensated fairly for the services they provide.
- Customers deserve assurances that costs will not be shifted unreasonably to them from other customers.

[31] http://docs.nrdc.org/energy/files/ene_14021101a.pdf

Some SWG participants stated that they would prefer a program that includes net metering because utility rates are likely to increase and create increasing future value for solar customers. Additionally, the net metering program is well-established and understood.

Tariff Design and Structure

Installers agreed that there is no strong preference for tariff structure although net metering is easy for customers to understand and Consumers and DTE both have well-established programs. SWG discussions indicated that a flat contract rate or an escalating schedule are acceptable and that customers may prefer more than one option. The discussion also addressed whether there should be a guarantee that the VOS rate will not decrease, however there was not clear consensus on this point. Staff's belief is that if renewable energy credits (RECs) were included in the payment to customers that the cost of those would be funded through the renewable energy surcharge established in an Act 295 case.

Solar Program Design

The Program Design group focused on three tasks: 1) improving Consumers' EARP and analyzing the feasibility of an expansion; 2) improving the DTE's SolarCurrents Program and analyzing the feasibility of an expansion; and 3) developing Community Solar models that could be implemented in the near term. Over the last few years, the EARP and SolarCurrents programs have provided the companies an opportunity to gain a considerable amount of knowledge regarding solar photovoltaic operation and integration. Developers and customers have been able to realize the benefits of the programs, but due to the limited incremental funding, the programs are nearing capacity. Although both the EARP and SolarCurrents Program have been previously expanded and revised, solar advocates commented that they are concerned that they remain much smaller than utility programs offered in

many other states. Through the working group process, Staff has determined that there are additional improvements that can be made to allow for greater market confidence, the elimination of boom and bust cycles and more responsiveness to the falling price of solar materials, labor and balance of system. Design and administration of these programs have been the topic of considerable stakeholder analysis and testimony in renewable energy plan proceedings since the initial plans were filed in 2009. This has led to expansion and modifications of the pilot programs over the years following. To introduce the work performed in the Program Design sub-group, an explanation of the existing solar programs in Michigan is necessary.

Existing Programs

Consumers' original EARP was approved by the Commission in 2009. The maximum program size was 2 MW with 1,500 kW reserved for commercial projects and the remaining 500 kW allotted to residential projects. In June 2011, the company announced that the program had become fully subscribed after completing 102 agreements. Solar advocates intervened to request an expansion of Consumers' program. After careful review, Consumers proposed to expand the program by an additional 3 MW. The Commission approved the expanded program in May 2011 with the option for additional capacity should program funding allow. Later in 2011, the Commission approved an addition 0.25 MW for a total of 5.25 MW. As of its most recent biennial renewable energy plan review filed on May 28, 2013, the company expects to solicit a total of 6 MW of solar installations under its EARP.

Under Consumers' original EARP (phases 1 and 2), customers receive a firm price for each kWh generated by the customer's solar generation system over a 12 year period. Phase 1 agreements began in September 2009 paying $0.65 per kWh for residential systems up to 20 kW and $0.45 per kWh for commercial systems up to 150 kW. Phase 2 agreements began in May 2010 paying $0.525 per kWh for residential systems up to 20 kW and $0.375 per kWh for commercial systems up to 150 kW.

The 4 MWs of capacity under the expanded program is split between residential and non-residential customers and have been awarded in phases pertaining to the respective customer class. The price is set with a maximum offer of $0.259 per kWh, which adjusts; increasing or decreasing based on interest in prior phases. Additionally, the company offers a $0.001 per kWh bonus for systems constructed using both Michigan labor and Michigan materials.

A system's size is limited to the customer's annual electricity use, similar to the net metering program. This is a change from the original phase 1 and 2 of the EARP that allowed for systems larger than customer use within the respective category. The program will continue to add new participants for three years from the Commission approval and agreements will have 15 year terms or will expire at the end of the Renewable Energy Plan period in 2029, whichever comes first. The program allows for customers to own or lease their systems. Consumers projects that the expanded EARP program will be fully subscribed and closed to new customers later this year or during the first quarter of 2015.

DTE's 20 MW SolarCurrents pilot program includes a 5 MW customer program and a 15 MW company program. In May 2011, DTE announced that the customer program was fully subscribed. On December 20, 2011, following intervention and expert testimony by solar advocates, the Commission ordered staff to convene a collaborative to explore opportunities for the continuation of the customer SolarCurrents program. The company filed an application for a 2 MW expansion on October 8, 2012 and the Commission approved the application on November 16, 2012. Solar advocates have continued to express concern about the size and structure of DTE's program.[32] The Commission acknowledged that there is "pent-up demand" for DTE's program, which indicates the incentives may need to be adjusted.

The 5 MW phase 1 customer SolarCurrents program provided an up-front REC payment equal to $2.40 per Watt of installed solar PV which is approximately half of the total system cost. The company

[32] *See*, *e.g.*, Direct Testimony of Katie Bolcar Rever, Solar Energy Industries Association (U-17302).

will purchase the remaining RECs through a monthly payment/on-bill credit equal to $0.11 per kWh for 20 years. System size is limited by the customer's annual electricity use or by the 20 kW size cap (whichever is smaller).

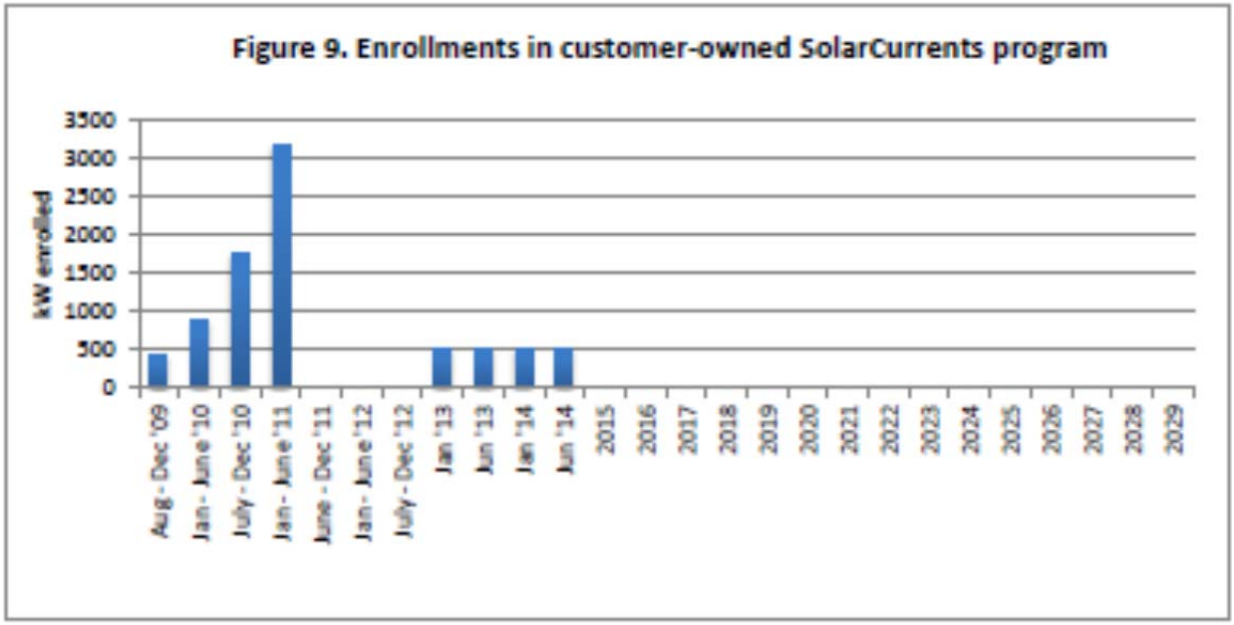
Phase 2 provided for an up-front purchase of approximately 30% of the RECs that the company anticipates will be generated over the life of the system. The remaining RECs will be purchased via monthly payments based on actual generation. This purchase is done through cents per kWh payments starting on the agreement execution date and ending on August 31, 2029, for a maximum term of 16 years. The company accepted applications for the 2 MW phase 2 program from residential customers up to 1.5 MW of the program and non-residential customers make up the remaining 0.5 MW of the program through four 500 kW tranches. The agreements were awarded using random selection events starting in 2013 with the last tranche being awarded in 2014. Any remaining kW will be awarded during a fifth offering in early 2015. The customer must own the system and cannot participate in a third party lease.

DTE's 15 MW company SolarCurrents program includes large scale solar PV projects that are either located on DTE Energy property or on customer premises. Customers selected to host a solar project receive a one-time, upfront construction payment to cover any inconvenience during installation in addition to an annual easement payment for the life of the installation. Pursuant to two separate competitive solicitations, the company contracted with Nova Consultants to construct up to 15 MW of solar. The panels will be provided by either McNaughton-McKay Electric Company or Inovatus Solar, LLC.

Solar advocates have taken the position in several recent MPSC dockets that Consumers' and DTE's existing solar programs are not meeting Act 295's goals to "diversify the resources used to reliably meet the energy needs of consumers in this state" and "encourage private investment" in renewable

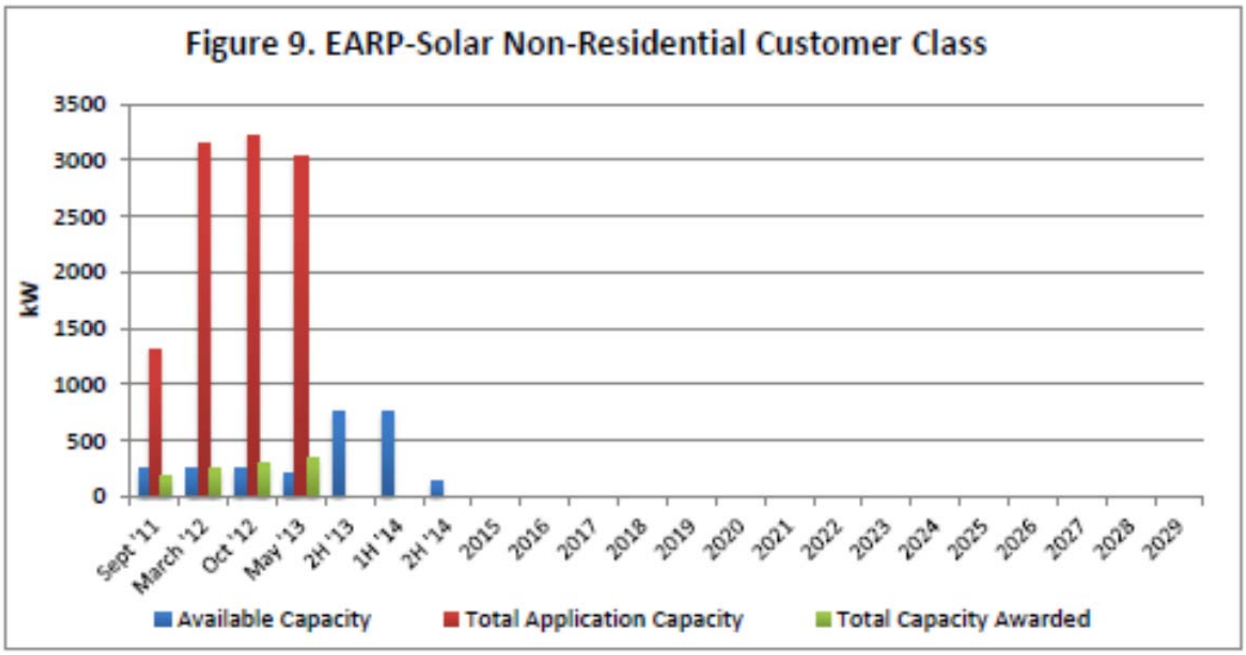
energy technologies.[33] On April 29, 2014 ELPC made a presentation to the SWG highlighting prior Commission Orders that emphasize Act 295's requirement for resource diversity and the Commission's desire for solar programs that are "long term, consistent, and foster steady growth." Specifically, ELPC pointed out that the Commission has previously ordered utilities "to design their solar programs to avoid the "boom and bust" cycles that can negatively impact the growth of emerging businesses." (U-17302) ELPC's Bradley Klein presented materials demonstrating that the available capacity in DTE and Consumers' existing programs has remained very small relative to application capacity and that the program design of each has tended to promote boom and bust cycles in the market.[34] **Figures 13 and 14** show activity in SolarCurrents and EARP.

Figure 13: Enrollments in DTE's SolarCurrents Program



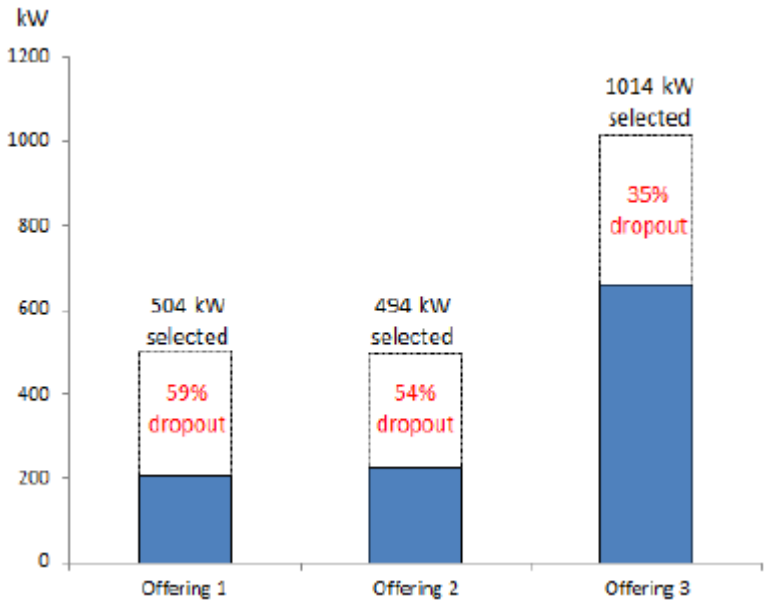
[33] The testimony and briefs of the Environmental Law & Policy Center and the Ecology Center in MPSC cases U-17301 (Consumers) and U-17302 (DTE) contain a full development of the solar advocates' arguments.
[34] The tables below are excerpted from Katie Bolcar Rever's expert testimony in cases U-17301 and U-17302 and were included in Mr. Klein's presentation to the SWG.

Figure 14: EARP Available Capacity, Applications Received and Capacity Awarded



Consumers commented that nationally, the Solar Energy Industry Association's most recent report indicates a pace of development in the first quarter of 2014 that is up 79% over the same quarter in 2013. Also, Consumers noted that the report states that more than 1/3 of residential PV installations came on-line without any state incentive in the first quarter of 2014. This information indicates that solar is becoming economic without subsidies/incentives in some areas of the country and the solar industry is growing. Staff's solar model indicates that the cost of solar is approaching the value of the net metering credit. DTE commented that there is no evidence that the existing programs are creating a "boom and bust" cycle. DTE provided **Figure 15** to illustrate the company's point that the high dropout level (nearly 50%) of projects selected in the lotteries as evidence that there is not pent-up demand.

Figure 15: Dropout Information for SolarCurrents[35]



Solar advocates commented that the high dropout rates may be due to customers attempting to secure a spot before they have completed the due diligence for their project.

ELPC presented one possible program design option that would replace the current lottery system with a "declining capacity block" program, in which blocks of capacity with a declining price schedule would be allowed to fill on a first-come, first-served basis. This "declining block" program structure is modeled on the successful programs in other states, including the California Solar Initiative. Mr. Klein noted that this program could use the REP program funds already collected by DTE and Consumers, so that a very significant program expansion on the order of 30-50 MW per utility could likely be implemented with no increase in the customer renewable energy surcharge.

[35] See DTE's comments, page 9.

Staff Program Design Discussion

During the course of the sub-group work, participants realized that the existing programs are much too close to the end of their funding limits to implement changes. Instead focus was placed on improving future programs or expansions of existing programs that could possibly build on lessons learned from Consumers' and DTE's initial pilot programs. The main complaint concerning the existing programs was the small size of the programs and the lottery method of awarding contracts in each solicitation. Consumers commented that the risk of providing subsidies for a particular technology is significant and that for both EARP and DTE's SolarCurrents programs, the risk was limited due to the program sizes.

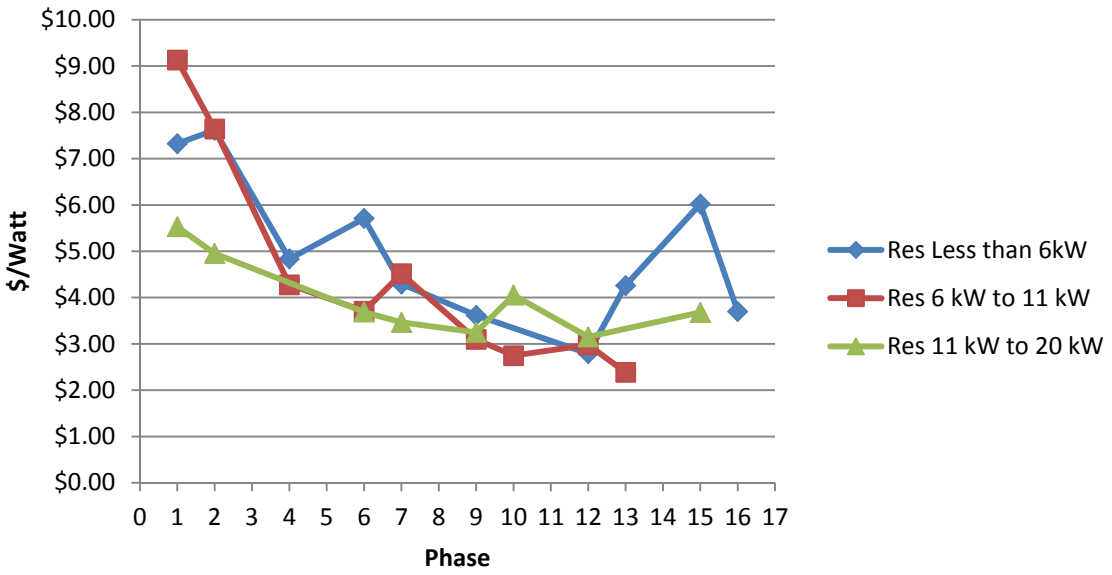
Potential participants must undertake lengthy planning and capital outlay prior to any solar system installation. This planning may involve discussion, and sometimes deposits with installers, permitting, and discussion with tax professionals and home-owners associations. It also may be necessary to hire structural engineering expertise to analyze roof placement and load calculations. This situation also puts additional strain on installers who invest time and resources into customers that are only interested in installing a system if they are selected through the lottery.

The lottery system was the solution proposed by both Consumers and DTE and approved by the Commission to deal with two issues: 1) administrative burden; and 2) spreading funding allocated to the programs out for multiple years. The initial Consumers EARP and the DTE SolarCurrents Program were first come, first served. Consumers' first EARP offering was oversubscribed in the first several days. DTE's SolarCurrents had more fluid participation in the beginning but in May of 2011, the remaining capacity which was expected to last for several years, was secured. These events caused the companies to implement lotteries to help even out program subscription.

Estimates of Current Solar Project Costs in Michigan

Consumers collects cost information from customers participating in the EARP. Residential cost data is presented in **Figure 16**.[36]

Figure 16: Consumers Energy EARP – Customer Solar Project Costs



Considering the cost data provided by Consumers and through discussions with workgroup participants, Staff opted to evaluate current solar project costs using a range of $2.50 to $4.00 per watt installed. To develop and evaluate different solar program frameworks, Staff developed a model that calculates levelized dollar per kWh prices for solar projects based upon varied assumptions. The model was reviewed by the workgroup and the assumptions were updated to reflect two financing options: no financing (project cost is reduced by the 30% tax credit) and 80% project financing (after 30% tax credit). The two financing scenarios are presented below. Scenario #1 (no financing costs) shows that the breakeven point (0% rate of return on the graph) for the range of installed costs considered is between $0.08 and $0.12 per kWh after 20 years. Scenario #2 (80% of project cost financed) indicates that the breakeven price range is approximately $0.16 to $0.25 per kWh. Considering these price ranges,

[36] Data provided by Consumers in May 19 email to MPSC Staff.

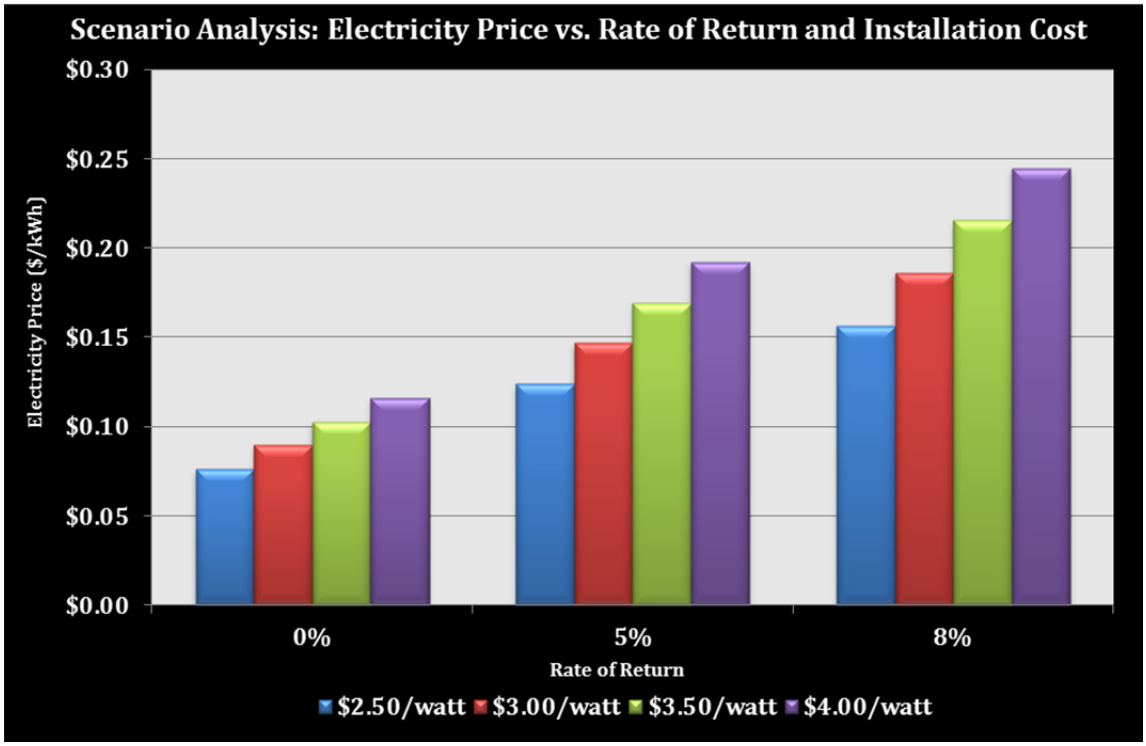
designing customer programs to, at least initially, provide a total credit of $0.15 per kWh appears reasonable for the purposes of this discussion. Final program details, including any incentive/subsidy levels, would need to be fully vetted by stakeholders at the time of program review and implementation at the Commission.

Solar module costs are not expected to decline significantly in the near future, but the soft costs of solar systems should be reduced significantly as Michigan gains experience and scale with solar generation. NREL reports that soft costs are now approximately 64% of total residential solar project costs.[37] There could also be a breakthrough in solar panel efficiency that could reduce the levelized costs for solar projects.

[37] http://www.nrel.gov/news/press/2013/5306.html

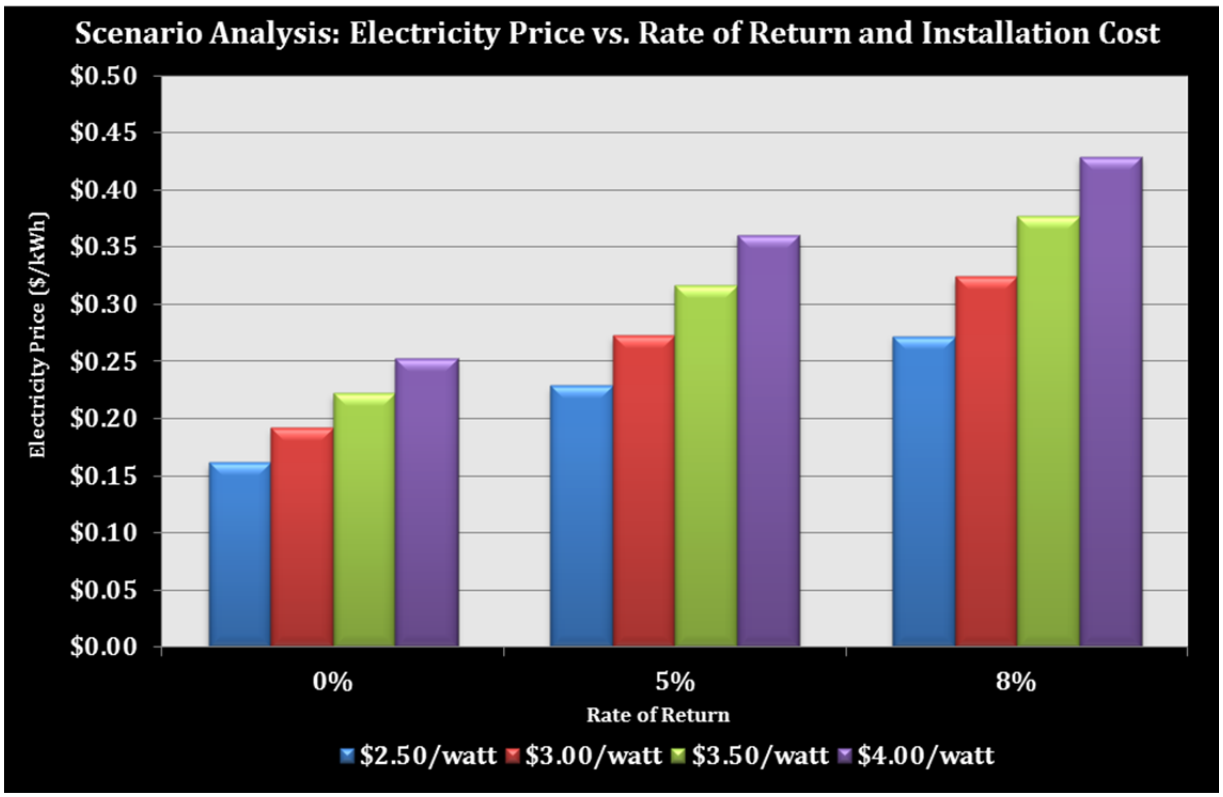
Scenario #1 (No Loans, 20 Year Analysis Period)

Installation Size	kW	5
Capacity Factor	%	14
Operation/Maintenance	$/kWh	$0.01
Total Project Cost	$	$17,500
Investment Tax Credit	%	30%
Total Project Cost (Net of Tax Credit)	$	$12,250
Salvage Value as Percentage of Initial Capital Cost:	%	10%
Amount of Project Financed	%	0%
Assets Depreciated	(Yes/No)	No



Scenario #2 (80% Financed and 20% Cash, 20 Year Analysis Period)

Installation Size	kW	5
Capacity Factor	%	14
Operation/Maintenance	$/kWh	$0.01
Total Project Cost	$	$17,500
Investment Tax Credit	%	30%
Total Project Cost (Net of Tax Credit)	$	$12,250
Salvage Value as Percentage of Initial Capital Cost:	%	10%
Amount of Project Financed	%	80%
Loan Rate	APR	7%
Loan Term	Years	10
Assets Depreciated	(Yes/No)	No



The ultimate goals of customer solar programs are to encourage distributed generation, increase the use of clean energy, provide customers with control over their energy supply and continue to increase knowledge about renewable energy.

In its 2014 survey of utility customers, Deloitte found:[38]

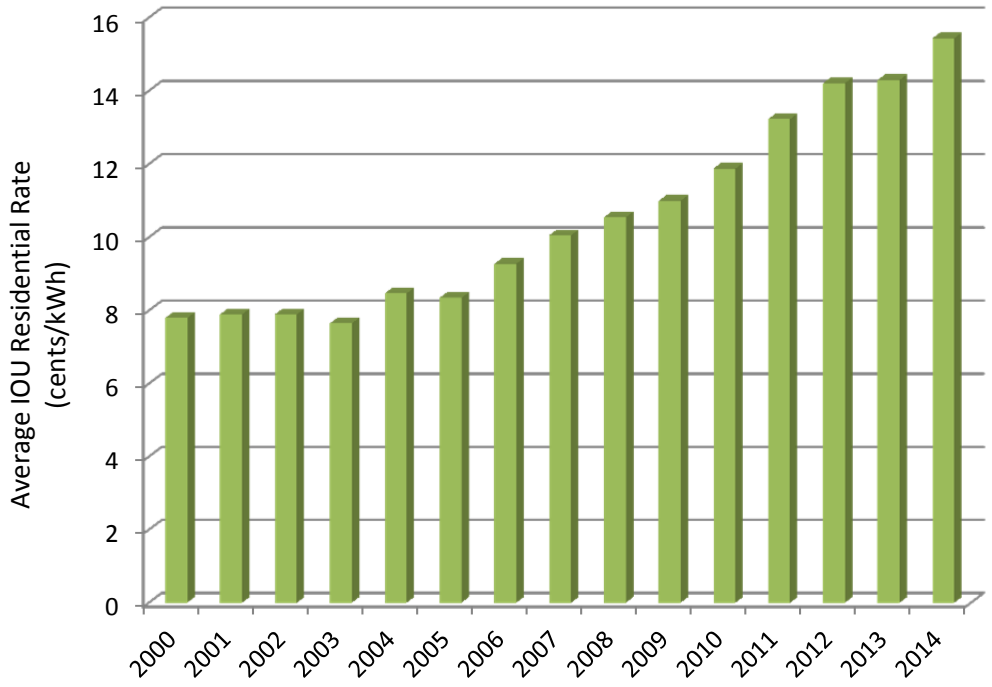
- Desire to increase the use of renewables, particularly solar, continues to trend upward among consumers: 58% ranked "increasing the use of solar power" among the top three energy-related issues most important to them, up from 44% in 2012.
- More than one-fourth (27%) named installing solar panels as among the top five actions they could take in the future, while only about 3% say they are doing this now.
- Top drivers of interest in solar panels are saving on electricity bills (80%) and solar power is clean and does not contribute to climate change (60%); while perceptions of being too expensive (43%) and fears of the panels not working as promised (29%) emerged as the main barriers to consumer interest in solar.

A number of Michigan residents have expressed interest in installing solar projects or participating in a community solar project. The Sierra Club participated in the SWG and submitted 1,800 signatures to Staff encouraging improvement and expansion of existing programs and community solar program implementation. The economics are not quite to the point where it is likely that a completely unsubsidized VOS rate or net metering are sufficient. However, if wholesale LMP market prices and utility retail rates continue to increase and solar project costs continue to decrease, the VOS and net metering may become acceptable on their own – without added incentives.

Figure 17 shows average investor owned utility rates for a residential customer using 500 kWh per month from 2000 to 2014.[39] The numbers shown in **Figure 17** include revenue that is not in the net metering credit such as monthly customer charge and certain surcharges.

[38] http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/Energy_us_er/us_er_reSources2014_summary_May2014.pdf
[39] http://www.dleg.state.mi.us/mpsc/electric/download/rates1.pdf

Figure 17: Average Michigan Investor Owned Utility Residential Rates



Based on input from the SWG, Staff has provided the framework for 3 customer solar program options that could be considered for continuing solar efforts. Descriptions and analysis of each option is provided below. These options incorporate incentives or subsidies; however, they are, in almost all cases, less than the current solar programs, and are phased out at the conclusion of the programs. Solar installers would prefer solar options for their customers that do not rely on the lottery system and reduce their transaction costs when working with customers to sell a solar project. Allowing the third party leasing option as well as community solar to be included in all future solar programs may be a way to make solar projects available to customers with lower income levels. Michigan's net metering

program does not prohibit third party leasing. Sunrun explained in a presentation to the SWG that in California, third party solar installations represented 70% of the residential solar market share in 2012.[40]

Potential Solar Program Designs

Staff reviewed residential customer solar project cost information provided by Consumers and other SWG participants and developed a model that looked at solar installation and financing costs to determine the residential rate for electricity that would be necessary to break even or yield an 8% return after 20 years. Staff found that with no financing and an installation cost of $3.50 per Watt, the residential rate necessary to break even (a 0% investment return) was $0.10 per kWh and $0.22 per kWh to provide an 8% investment return. Factoring in financing, the residential rate necessary to break even was $0.22 per kWh and $0.37 per kWh to provide an 8% investment return. For reference, the net metering credit for Consumers and DTE is currently $0.12 – $0.13 per kWh. While residential solar prices have declined more than 50% since the renewable portfolio standard was passed in 2008, the net metering credit (at its current value) and likely the VOS are not yet sufficient to provide a return over a 20 year period or simply break even when a project is financed. Using this information and other feedback from the SWG, Staff proposed three potential 50 MW solar program frameworks:

1. Net Metering and REC Payment
2. Buy All (customer purchases all electricity used at regular tariff rates)/Credit All (utility credits customer for all solar generation at VOS rate and RECs)
3. Buy Net (customer uses solar generation "behind the meter" and purchases supplemental electricity from the utility at regular tariff rates)/Credit Net (utility credits customer for solar generation not used on-site at VOS rate and RECs)

The programs are described in more detail in **Appendix C**. Under all three programs the program capacity is made available in blocks with the REC payment declining as each block becomes subscribed. After all program capacity is subscribed, the program designs assume that net metering or the VOS

[40] http://www.michigan.gov/documents/mpsc/14-0429_Michigan_PSC_solar_working_group1_454793_7.pdf

credit is the only credit provided and the additional REC payment is fully phased out. These potential programs are meant to be examples and the SWG participants, including the utilities, may have concepts and ideas for different solar programs. Agreement among the participants on specific program designs was not reached.

Both Consumers and DTE indicated in comments that they are interested in developing subsidy-free customer and community solar programs. Staff suggests that programs be put in place in time to allow Michigan customers to utilize the 30% federal tax credit. While a subsidy-free program is the end-goal, the Net Metering and REC Credit program for small solar projects could serve as a bridge to implementing a VOS credit by building on a program already established. The program could be designed to eliminate the REC credit as the net metering credit rises. Additionally, a solar valuation to assess the extent of cross-subsidization would be useful information. The VOS calculation should be determined after thorough review such as in a contested case process.

Community Solar

Traditionally, only homeowners in ideal locations, with properly oriented buildings could take advantage of solar energy. This prompted the concept of community solar programs, also called "shared solar" or "solar gardens." Through a properly designed community solar program, a much broader segment of the population can participate in a solar project. Renters, lower income individuals, people prohibited from installing solar due to associations or codes, people who do not want to maintain an installation, and people who have shading issues due to foliage, nearby buildings or improperly oriented roof space can be part of a community solar program and receive bill credits for the proportional generation of their share of the installation without the project being located on their premises.

Community solar programs use a variety of different models. Cherryland Electric Cooperative and Traverse City Light & Power, jointly, are the first electric providers in Michigan to offer a community solar program through the Solar Up North (SUN) Alliance Program. Cherryland Electric Cooperative members and Traverse City Light & Power customers can purchase solar shares for a one time investment of $470.00 each. The participants receive a $75.00 Energy Optimization rebate per panel. The electric providers use the wholesale electric market prices to determine the amount of monthly bill credit to provide to the participants. It is estimated that the credit will be an average of $2.00 per month. This amount will be based on the total monthly array output and will vary based on solar production for the month. The SUN Alliance Program has attracted customer participation and is continuing to grow.

Home Works Tri-County Electric Cooperative has followed Cherryland's lead and recently installed the second Community Solar Garden in Michigan.[41] The project is 20.9 kW and consists of all American made components. The project has left room for expansion up to 124.5 kW. Members can sign a 20 year lease for $425 after a $200 Energy Optimization Rebate and a $75 Touchstone Energy Rebate. The member will receive a bill credit equal to the prior year's wholesale rate (currently $0.082 per kWh).

On September 3, 2013, the Ann Arbor City Council released a resolution that City Staff will work with DTE Electric to develop a community solar project by March 2014. The City is currently waiting for release of this report to continue its efforts. Additionally, East Lansing recently completed an online survey assessing interest in investing in and hosting a community solar project.[42] The survey results showed that almost 90% of respondents would be interested in exploring the idea of a voluntarily

[41] http://www.homeworks.org/content/were-growing-community-solar-garden
[42] http://www.cityofeastlansing.com/CommunitySolar/

funded community solar project and over 90% would be interested in investing in the project.[43] It is evident that there is considerable interest in the Michigan community solar programs.

Throughout the process, both DTE and Consumers expressed interest in building and owning a community solar project. Staff analyzed various community solar models that could be readily implemented by Consumers and DTE. Three options were investigated: 1) Company-owned panel lease model, 2)Private party third party model, and 3) Crowd funded third party model.

Staff analyzed various options of utility ownership and customer participation. Options similar to DTE's existing GreenCurrents[44] and Consumers' Green Generation[45] programs in which the customers pays a premium for green energy (in this case solar) were analyzed. Staff determined that customers would most likely want a program that is different from the traditional green pricing premium program because it could provide a more tangible asset, and could potentially provide for an economic return in addition to the environmental stewardship associated with the GreenCurrents and Green Generation Programs. This discussion led to consideration of a panel sale or panel lease option. Regulatory accounting and the utilities' long term depreciation and rate of return schedules complicate these options. Staff analyzed a panel lease model that would allow the costs of the installation to be spread over the life of the asset on an escalating scale that follows a reverse depreciation curve.

Utility Lease Model

The panel lease model is not without its own challenges for utilities. In order for this to appeal to the utility by allowing a return on its capital investment, the panel lease must be considered an operating lease and not a capital lease. Consideration under an operating lease means that the contract

[43] See Michigan Energy Options comments in **Appendix B**
[44] http://www.dteenergy.com/greenCurrents/
[45] https://www.consumersenergy.com/content.aspx?ID=1458

with customers must follow four guidelines as prescribed in the Uniform System of Accounts, Subject to the Federal Power Act, Part 101, General Instructions, Sec. 19.[46]

Under the utility lease model, customers would sign a lease with the utility with no upfront payments. The customer pays for the energy supply component of the pro-rata lease on a volumetric basis that escalates every year. In addition to the energy supply solar premium payment, the customer would pay for the distribution component associated with the generation from the panel that is leased. In doing so the customer is replacing power supply charges on their firm service tariff with the solar payment. The expectation is that the solar payment, based on a fixed escalating schedule, would reach parity with retail energy prices before the end of the lease agreement.

In this model, the company is made whole for all of its administration costs, operating and maintenance, taxes, and return on and return of capital investment. The customer would be able to hedge against future energy price risk by receiving the solar payment schedule upfront and hopefully realize a net bill savings at the end the lease agreement.

Third-Party and Customer-Owned Community Solar Development

Many SWG participants were very interested in a third party model of ownership. Similar to the structure developed in Section 33 of PA 295, 50% company-owned and 50% developer/customer owned community solar limits would allow for a price competitive atmosphere where program innovation and best practices would be more likely to thrive. This policy would have to be carefully constructed to allow flexibility in situations where no third-parties feel that the economic atmosphere is conducive for participation, which could stunt utility progress should they be held to this model. The third party/customer owned community solar program could be implemented in a number of ways with two

[46] http://www.ecfr.gov/cgi-bin/text-idx?rgn=div5&node=18:1.0.1.3.34

concepts coming to the forefront for initial ease and expedited program development: third party lease of panels and crowd funded customer project.

A third party model similar to that developed in Minnesota by Xcel Energy[47] would allow for developers to build a community solar project and sign-up customers. The developer would be responsible for all customer interaction and all development and maintenance of the facility. In exchange, the developer would receive a REC payment from the utility or a small up front or on-going fee from the customers. The utility would purchase the RECs and the energy from the developer and credit the customer's bill with VOS. Consumers commented that this model could circumvent its competitive bidding process if the company was required to pay a VOS rate for the solar generation and DTE pointed out such a model could violate established statute and circumvent consumer protections provided through Commission oversight of entities that provide electric service to end use customers.

A relatively new enabling option for community solar arose with the December 2013 passage of PA 264[48] allowing for crowd-funding in Michigan. Businesses can now sell equity shares without registering with the Securities and Exchange Commission (SEC). This eliminates a costly and complicated barrier allowing for groups of non-accredited investors to purchase shares of a Community Solar project up to $10,000 each with a total project cost of less than $1 million.[49] This option opens to individuals models and projects similar to the third party model mentioned above which may provide better economics to customer owners. Even with the legislation allowing for such an option, the crowd-funded model provides legal complexities that may hinder participation to all but the most savvy participants.

[47] https://www.xcelenergy.com/Save_Money_&_Energy/Residential/Renewable_Energy_Programs/Solar_Gardens_-_MN

[48] http://www.legislature.mi.gov/documents/2013-2014/publicact/pdf/2013-PA-0264.pdf

[49] This cap is raised to $2 million if audited financial statements are provided to the SEC.

Both of these third-party style models raise issues with utilities. The concepts take sales away from utilities by allowing an independent power producer to substitute energy traditionally supplied by the companies with solar energy similar to Public Utilities Regulatory Power Act (PURPA)[50] contracts. Utilities are still required to provide the energy and capacity should the distributed solar installation fail for some reason, which comes at a cost that must be borne by and spread over all customers.

In comments, both Consumers and DTE say that they would support and quickly pilot a voluntary community solar model. DTE plans to use one of its company-owned arrays at full and fair cost, with no subsidies.

Community Solar and Value of Solar

A VOS tariff offers a way to help enable community solar, as it is clear that the current net metering law is not applicable to solar that is generated off-site. Some adjustments to current VOS models may be appropriate for the benefits and costs associated with community solar installations. If the VOS tariff also requires purchase of RECs from the customers then the cost recovery of those REC purchases must be handled in an Act 295 case.

Consumers Energy commented that a VOS rate may put wholesale project developers in the position of avoiding competitive bidding requirements if they adopt a VOS rate. Consumers suggested that a competitive bid situation be viewed as an opportunity to improve supply cost for customers and could be required for developers that propose to build facilities larger than the host customer typically consumes.

[50] http://energy.gov/oe/services/electricity-policy-coordination-and-implementation/other-regulatory-efforts/public

Conclusion

The SWG met the Commission's directive to discuss and put forth possibilities for improving customer programs and a means for incorporating community solar. Three customer solar program and community solar options were discussed and investigated, any of which could be implemented upon utility request and Commission approval. Community solar programs could be established on a pilot program basis. There are many program variations and the SWG was not able to review and analyze all of them. Staff encourages the SWG participants to continue to monitor solar program activities.

Utilities, customers, environmental groups and policy makers will ultimately need to consider the policy benefits of encouraging customers to install distributed customer solar projects. The SWG heard from presenters that solar currently costs approximately three times more than other types of renewable energy such as wind, where some large, utility scale projects have achieved levelized costs under $50 per MWh (5 cents per kWh). Presenters also pointed out that there are many benefits of solar such as cleaner air, distributed energy benefits to the grid, generation during periods of high electric use, economic development and increased diversity in Michigan's renewable portfolio. The Commission has determined that Act 295 requires resource diversity and has expressed a preference for solar programs that are "long term, consistent and that foster steady growth."

A properly designed VOS tariff would assure that the utility and non-participating customers are indifferent from a cost perspective. Care should be given to balancing the benefits with impacts on all customers, especially low-income customers. When these incentives or subsidies are collected through a power supply recovery rate, regulated customers must pay it while customers of retail choice suppliers, municipally regulated and self-regulated utilities may not have the same requirement to subsidize energy priced above the market.

Both Consumers and DTE indicated in comments that they are interested in developing subsidy-free customer and community solar programs. Staff suggests that programs be put in place in time to allow Michigan customers to utilize the 30% federal tax credit. While a subsidy-free program is the end-goal, the Net Metering and REC Payment program for small solar projects could serve as a bridge to implementing a VOS credit by building on a program already established. The program could be designed to eliminate the REC payment as the net metering credit rises. Additionally, a solar valuation to assess the extent of cross-subsidization would be useful information. The VOS calculation should be determined after thorough review such as in a contested case process.

Staff would like to thank each of the SWG and sub-group participants for their efforts to make the SWG successful. The many informative presentations and thoughtful discussions helped to highlight key elements of possible future solar programs. While there were participants with differing viewpoints, all members approached the work of the SWG in good faith. Additionally, Staff thanks Consumers and DTE for providing data at several points during the SWG process.

Appendix A

Solar Working Group Participants and Company Affiliations[1]

	Company Affiliation	Participant Name
1	5 Lakes Energy	Liesl Clark
2	5 Lakes Energy	Douglas Jester
3	5 Lakes Energy	Skip Pruss
4	Ann Arbor Energy Commission	Wayne Appleyard
5	Chart House Energy	Rob Rafson
6	Carter Law	James Carter
7	City of Ann Arbor Energy Office	Nathan Geisler
8	Clean Energy Coalition	Christina Li
9	Clean Energy Coalition	Jenny Oorbeck
10	Clean Energy Coalition	Mark Rabinsky
11	Clean Energy Coalition	Sean Reed
12	Consumers	Laura Collins
13	Consumers	Lisa Delacy
14	Consumers	Lori Fobes
15	Consumers	Terry Mierzwa
16	Consumers	David Ronk
17	Consumers	Michael Ross
18	Consumers	Keith Troyer
19	Consumers Energy	Nancy Popa
20	Consumers Energy	Karen Wienke
21	Dovetail Solar	Dave Leahy
22	DTE	Jennifer Kahn
23	DTE	Todd Lohrmann
24	DTE	Ugonma Onnknubin
25	DTE	Jim Padgett
26	DTE	Regina Warner
27	DTE	Michael Williams
28	DTE	David Harwood
29	DTE	Julie Londo
30	DTE	Ray Zoia
31	Ecology Center	Jason Bing
32	Ecology Center	Charles Griffith
33	Ecology Center	David Wright
34	Edison Electric Institute	Edward Comer
35	Environmental Law and Policy Center	Bradley Klein

[1] Participant information is drawn from meeting sign-in sheets and Staff notes.

	Company Affiliation	Participant Name
36	Farm Works Housing	Al Calderon
37	Four Elements Energy	Dan Alway
38	Four Elements Energy	Art Toy
39	GLREA	Dave Konkle
40	GLREA	John Sarver
41	Grand Valley State MAREC	Kim Walton
42	Hispanics In Energy	Monica Martinez
43	Homeland Builders	John Freeman
44	Homeland Builders	Dave Friedrichs
45	McNaughton-McKay	Mark Ferda
46	MEDC	Tania Howard
47	Michigan Energy Options	John Kinch
48	Michigan Environmental Council	James Clift
49	Michigan Environmental Council	Sarah Mullkoff
50	Michigan Land Use Institute	Brian Beuchamp
51	Michigan Land Use Institute	Jim Dulzo
52	MPSC Staff	David Binkley
53	MPSC Staff	Dan Blair
54	MPSC Staff	Daniel Gottschalk
55	MPSC Staff	Trista Gregorski
56	MPSC Staff	Kevin Krause
57	MPSC Staff	Steve Mclean
58	MPSC Staff	Katie Trachsel
59	MPSC Staff	Sally Wallace
60	MPSC Staff	Susanna Woolcock
61	MPSC Staff	Julie Baldwin
62	MPSC Staff	Jesse Harlow
63	MPSC Staff	David Isakson
64	MPSC Staff	Gary Kitts
65	MPSC Staff	Michael O'Brien
66	MPSC Staff	Paul Proudfoot
67	National Regulatory Research Institiute	Tom Stanton
68	Northwestern Michigan College	Bill Queen
69	Oak Electric	Jeremy Zinn
70	Rabago Energy, LLC	Karl Rabago
71	Sierra Club	Teresa McHugh
72	Sierra Club	Brad Van Guilder
73	Sierra Club	Anne Woiwode
74	Solar Winds Power Systems	Mike Linsea
75	Sunrun	Sarah Bertram
76		Eric Keller

Appendix B

Solar Working Group Comments Received by June 20, 2014

B-1	5 Lakes
B-9	Wayne Appleyard
B-11	Wayne Appleyard- Additional comments
B-14	Chart House Energy
B-16	Consumers Energy
B-25	DTE
B-39	Easy Clean Energy
B-41	Ecology Center
B-43	Edison Electric Institute
B-46	Environmental Law Policy Center
B-58	ELPC Attachment A
B-61	ELPC Attachment B
B-122	GLREA
B-125	Grand Valley State University
B-128	Hispanics in Energy
B-130	Homeland Solar
B-134	Michigan Energy Options
B-148	Michigan Environmental Council
B-150	Sierra Club
B-152	Solar Winds Power Solutions
B-154	The Alliance for Solar Choice

Comments on Draft MPSC Staff Report concerning
2014 Solar Working Group

Douglas Jester
5 Lakes Energy

I'd like to compliment the renewable energy staff of the Michigan Public Service Commission for a well-run solar work group process and for a constructive effort to summarize the multiple presentations and discussions in usable form.

I do have a number of comments that will help to clarify the issues that must eventually be resolved if Michigan is to have a viable solar generation sector. These comments and other, minor matters are addressed in a joint redline which will be submitted by Bradley Klein, Environmental Law and Policy Center.

Reference page 5 "Value of Solar".

"A VOS rate is based on avoided utility costs, whereas, a feed in tariff or standard offer contract price is typically based on the project developer's costs."

I recommend using and discussing the following definitions, in order to parse out the significant concepts at issue.

1. A **tariff** is a rate charged by or paid by a utility in transactions with its customers, which is established by the utility with approval of the Public Service Commission. A tariff may be changed from time to time and those changes will affect transactions that occur subsequent to the tariff change. When applied to solar generation by a customer, this means that the amount paid to a customer for solar generation may change from time to time in a manner that is not prescribed by an agreement with the customer.
2. A **power purchase agreement (PPA)** is a contract whereby a utility contracts to accept and pay for power generation for a fixed term. Power purchase agreements typically have duration approaching the remaining life of the generation system and either provide a fixed rate schedule for the entire contract or index the rate to some external reference not controlled by the parties to the agreement. In common usage, a power purchase agreement is contracted either as a result of a reverse auction or custom negotiation.
3. A **standard-offer PPA** is a power purchase agreement in which the utility announces the available terms and enters contracts with anyone who agrees to accept the terms of the offer. A standard-offer PPA foregoes the price-setting precision of a reverse auction but radically reduces the transactions costs of power purchase, and can thereby produce lower total utility purchase costs and/or lower costs to society than a reverse auction. Across the economy, homogeneous and low-cost purchases are commonly done through standard offers, either to buy or sell, while large and heterogeneous purchases are typically done through auctions or negotiations. It is therefore reasonable for a utility to use standard-offer terms for purchasing

power from small generators and use auction or negotiation processes for purchasing power from large generators.

4. A f**eed-in tariff**, unfortunately named, is a standard-offer PPA in which the price offered for purchased power is based on an estimate of the payment rate required for the generators to recover their reasonably-incurred costs of owning and operating the generation systems. This approach assumes that the utility desires, or is required, to purchase power from particular forms of generation. Paying a rate sufficient for the generator to recover their reasonably-incurred costs of owning and operating the generation system is the way that utilities are compensated in traditional rate-making.
5. An **avoided-costs tariff** assigns value to the generated power based on what it would have cost the utility to provide equivalent power at the same time and place, absent the generation compensated through the tariff. Controversy concerning avoided costs arises predominantly over whether the avoided costs are only short-term operational costs or also include long-term capital costs. An avoided-costs tariff, like an avoided-costs standard-offer PPA, leaves it to the erstwhile generator to determine whether the compensation offered warrants incurring the costs of owning and operating the generation system. In this sense, an avoided-costs tariff or standard-offer PPA can function like a technology-neutral market for purchasing power.
6. An **avoided-costs standard offer PPA** is a standard-offer PPA in which the terms are based on projected utility costs to provide equivalent power at the same time and place as is to be supplied by the contracted generation. An avoided-costs standard offer PPA may reasonably include a payment for the value of future-cost risks avoided by the utility or its (other) customers through the contract.
7. A **value-of-solar tariff** is a tariff based on summing the utility's avoided costs of generating equivalent power at the same time and place as is supplied by a solar generator PLUS certain additional amounts reflecting additional value to society that are not included in the utility's avoided costs, such as local economic development or avoided pollution.
8. A **value-of-solar standard offer PPA** is a standard-offer contract in which the terms are based on projected utility costs to provide equivalent power at the same time and place as is projected to be supplied by the contracted solar system PLUS certain additional amounts reflecting additional value to society that are not included in the utility's avoided costs, such as local economic development or avoided pollution. Like avoided-costs standard-offer PPAs, a value-of-solar standard-offer PPA may include a payment for the value of future-cost risks avoided by the utility or its customers through the contract.

Reference page 6"Value of Solar"

*"As part of a presentation to the Solar Working Group, both DTE and Consumers Energy provided an analysis showing the total incentive, some of which is a subsidy, in dollar per kWh built into the customer SolarCurrents and EARP program respectively. The quantities referred to as subsidies in **Figure 1** are the SolarCurrents Renewable Energy Credit (REC) payment and DTE's fixed costs (fixed generation and distribution system costs) that are recovered from customers in the form of a variable (per kWh) rate. Consumers defines the EARP subsidy as the program's incremental cost of compliance as shown in **Figure 2**."*

I acknowledge that this represents the claims made by DTE and Consumers Energy. MPSC staff need to distance themselves from this inaccurate language or provide a critical analysis. An avoided cost, by definition, is NOT a subsidy. In the long-run, there are no fixed generation costs so it is inappropriate to accept at face value DTE's assertion that fixed generation costs not recovered from a customer who practices self-service generation are a subsidy. In addition, DTE's claim is inconsistent with the structure of PA 295, which defines the incremental cost of compliance by comparison to the full cost of power supply, not just the variable cost.

Further, purchase of renewable energy credits, either separately or bundled, is a legal obligation of these utilities; therefore DTE's REC purchases from SolarCurrents customers and Consumers Energy's incremental costs of compliance calculations for the EARP program are not subsidies except to the extent they exceed the costs of compliance by an alternative means.

DTE's claim that fixed costs of distribution not recovered from a customer who practices self-service generation are a subsidy is also inappropriate unless the Company also considers all other heterogeneities amongst customers that affect the amount of power delivered as constituting cross-subsidies.

Reference page 9, Karl Rábago

An important point made by Karl Rábago that isn't reflected in the staff summary is that all value of solar calculations to date have produced estimates that are close to or exceed the rates paid through net metering, making net metering "rough justice" at this time, but that as solar penetration increases to significant levels the value of solar will decline so the tariff-setting practices need to track the evolving circumstances.

Reference page 11 "5 Lakes Energy"

"The proposal also included crediting solar customers with a capacity charge allocated over high load hours."

A key point in the 5 Lakes Energy approach was to have solar customers buy or sell power at a dynamic rate that is determined by standard rate-making principles and is available to customers who do not engage in self-service generation. This guarantees that the dynamic rates are set to reflect the long-term avoided costs to supply power at the same time and place as the solar generation being compensated through this approach. This approach to setting a value-of-solar tariff is also simpler than adding up the cost elements as has been done by Austin Energy and in Minnesota, because those elements are already determined in the proper design of a dynamic rate.

Reference page 11 "5 Lakes Energy"

Figure 6.

The comparable chart from Slide 24 of the 5 Lakes Energy presentation would be more appropriate, as it also shows REC income.

Reference page 12 "5 Lakes Energy"

"Based on the assumption that utility load and market price is most likely correlated with sunlight and temperature, using hourly dynamic pricing to credit solar customers should reflect the true VOS to the utility."

My assertion would more correctly be stated as "Because utility load and market price is correlated with sunlight at any given temperature, using hourly dynamic pricing to credit solar customers will better reflect the value of solar than calculations based on averages by season and time-of-day."

I also suggest including my additional rationale that "Using actual dynamic rates as a basis for compensating solar generation also provides the correct incentives for solar system orientation and tracking technology based on their value to the utility than does a fixed rate that applies to all systems." This could be illustrated by either including the chart from Slide 26 of the 5 Lakes Energy presentation or referencing that using this method to value generation from a single-axis tracker led to an estimated average solar power supply credit of $0.1357 (or total credit of $0.1711) versus $0.1250 (or total credit of $0.1556) for the average fixed array owned by DTE.

Reference page 12 "5 Lakes Energy"

*"**Figure 6** shows 5 Lakes Energy's Average Customer Credit."*

I suggest clarifying that this an average calculation rather than a proposed solar tariff by writing it as "Figure 6 shows the average customer credit that would result from applying 5 Lakes Energy's approach to DTE's current Company-owned solar systems. Actual credits would depend on individual system performance, weather, and utility year-to-year marginal cost variation."

Reference page 16 "DTE"

Figure 7.

It would be helpful if staff clarified the principal reasons for the differences between values cited by DTE and those in other presentations. In particular, the difference between DTE capacity value and 5 Lakes Energy avoided capacity cost is that DTE used the value of capacity in the MISO capacity market while 5 Lakes Energy used the value of capacity that DTE is receiving through current rates approved by the Public Service Commission.

Reference page 19

Figure 9

"The University of Michigan Dow Fellow students recommended that the solar fuel price hedge value for Michigan should be at least $0.019/kWh."

This is correct, but a key point is missing. In a solar tariff that changes over time to reflect evolving avoided costs, the customer who is generating with solar will receive the benefits of any unexpected fuel price escalation. This would be the case with both net metering and the 5 Lakes Energy dynamic rates proposals. The fuel price hedge is realized when the utility enters a long-term contract with a fixed price schedule and the value of the hedge should be applied in that case; an indexed contract will likely have a partial hedge value but the amount will be different than with a fixed price schedule.

Avoided Plant Operations and Maintenance – Fixed

This cost is included in the 5 Lakes Energy dynamic rate calculation because it is embedded in the utility's approved required revenue and is not included in the LMPs that are subtracted in that method to obtain the cost of capacity.

Avoided Transmission & Distribution Cost

It would be useful, as with the other boxes, to identify the various positions presented.

The utility position was that there are never any avoided transmission & distribution costs.

The 5 Lakes Energy position is that transmission costs as assigned to the utility by MISO are affected by both energy transmitted and transmission demand, so that a portion of transmission costs to the utility are therefore avoided by distributed generation. The 5 Lakes Energy position is that distribution costs will commonly not be avoided by distributed solar generation but that in certain locations where a distribution bus is congested, it will either improve voltage levels or avoid/delay capacity investments. No distribution cost avoidance was assumed in the 5 Lakes Energy method, but in circumstances where it could provide additional value, utilities should offer an increment on the tariff reflecting that value.

Avoided Environmental Cost

I would say that "The avoided SOx and NOx allowance costs are included in the MISO LMP. These are avoided environmental compliance costs but do not necessarily equal the marginal costs of health and environmental effects of these pollutants. The fixed costs of pollution controls and the costs of health and environmental effects of other pollutants that are not regulated through a cap-and-trade system are not included in LMPs."

A better statement about carbon pollution would be "The Minnesota PUC agreed to use the Federal Social Cost of Carbon for this value. The University of Michigan Dow Fellow students calculated that the Federal Social Cost of Carbon corresponds to a value from solar generation in Michigan of approximately $0.023/kWh."

Avoided REC Cost

This table should logically have a box for avoided REC costs. Absent RECs for solar, RECs must be generated from some other source. The cost of RECs from the other source(s) is thus an avoided cost.

The alternatives that were mentioned in work group discussions are the market value of RECs and the average cost utilities incurred for RECs using other technologies.

Reference page 20

"This would lead to under-recovery of fixed distribution costs and would complicate charges to electric choice customers."

This sentence needs clarification. If the basis for determining delivery rates to cover distribution costs is total power consumption, regardless whether self-service or provided by the utility, then this statement would be true. If however, the basis for determining delivery rates to cover distribution costs is power delivered by the utility, then the rates will be correspondingly adjusted and there will not be under-recovery. This change could be made in the utility's next general rate case under existing Public Service Commission authority.

To the extent that self-service generation differs from the forecast used in the test year during rate setting, then this question is very much like the issue of decoupling that arises from energy optimization programs. Such decoupling would require legislative authorization.

Reference page 20

"The utilities had no issues with determining a VOS rate provided it was based on true avoided costs."

I strongly object to use of the word "true" in this discussion. Externalities are true costs. The issue is whether they are avoided **utility** costs. I agree that externalities are not current utility costs, hence will not be avoided **utility** costs, so I suggest replacing "true avoided cost" with "avoided utility cost" throughout.

My specific perspective on including avoided externalities in a VOS rate is missing from this discussion. My view is that under Chapter 460 of Michigan Compiled Laws the Commission has the power to authorize a utility to purchase a more costly form of power generation if it is less harmful to the public health, safety, and welfare and that the Commission may be obligated to such a course pursuant to the Michigan Environmental Protection Act. If a utility does so with permission or at the behest of the Commission, then the utility is clearly entitled to the reasonable and prudent costs of acquiring that less polluting generation. Thus, it would be appropriate for the Commission to approve or order a utility to pay a premium above utility avoided costs for solar generation up to the value of avoided health and environmental effects.

Further, given the pendency of the EPA rule on carbon pollution from existing electric generation sources, Michigan utilities will soon face direct costs of reducing carbon pollution, which might therefore be considered as avoided utility costs. Those costs likely will not exactly equal the Federal Social Cost of Carbon, but could be reasonably approximated by that value since EPA's obligation under Section 111d of the Clean Air Act is to establish the Best System of Emission Reduction and the stringency of that system should logically create marginal costs of emissions reductions approximately equal to the social cost of the pollution avoided.

Reference page 20

"The utilities further stated they wanted no further incentives beyond the true VOS because of ratepayer cross-subsidy concerns…."

This statement and the subsequent discussion should not be in the same paragraph as the preceding material relating to externalities. These are logically separate subjects. Incentives for the purpose of promoting the use of solar in Michigan don't really belong in the value of solar calculation or a tariff; they should be an add-on for the purpose of meeting the objectives of the programs if and as necessary. I suggest that the material beginning with the statement quoted above be removed from the value of solar discussion and placed in program design several pages later.

I further argue that staff have given too much credence to utility arguments about cross-subsidization in the case of solar generation. Michigan utilities rarely evince concern about cross-subsidization in their rate designs that is several orders of magnitude larger than any cross-subsidization that will result from any decision the Commission makes about compensation for solar generators. Examples include cross-subsidization from 24-hour industrial operations to those that operate only day shifts, cross-subsidization from retail stores to offices within the commercial classes, cross-subsidization from low-income households without air conditioning, or with limited use of air conditioners to wealthier households who use air conditioning extensively. Utility motives in raising this issue with respect to distributed generation must be suspected of being self-serving.

Reference page 29

"Solar module costs are not expected to decline significantly, however it is likely that the soft cost portion will continue to decline as more projects are developed."

This statement is true for the moment but fails to capture the importance of local experience and scale in lowering soft costs. There is also a significant series of innovations in the pipeline that will reduce module costs in the long run. I recommend re-writing as "Solar module costs are not expected to decline significantly in the near future, but the soft costs of solar systems should be reduced significantly as Michigan gains experience and scale with solar generation."

Reference pages 33-39 "Potential Achievable Program Designs"

Staff's discussion of solar program options does a good job of clearly presenting the effects of decisions about the treatment of delivery charges for distributed solar generation. Thank you.

I am concerned that the target payment of $0.15 per kwh may be too small. First, for tracking arrays and arrays oriented to the southwest to better meet peak loads, the amount may actually be less than the value of solar.

Second, it is also unclear whether staff intends that the target compensation for solar be $0.15 per kwh in the first year, with the solar generator benefitting from expected increases in the price of grid power or for this to be a PPA price for many years. If this is just the first year compensation, then I am aware of some solar installers who are able to profitably offer solar leases on those terms, but if it is a fixed price

for many years, we don't have any market experience indicating that this will stimulate growth of solar in Michigan at a rate that would satisfy the diversity and economic development goals of PA 295. If Staff's intention is that these options take the form of standard-offer PPAs, then the calculations should further credit solar for its hedge value and increase the target payment level or reduce the REC payments needed to achieve the target payment level.

I therefore recommend that the first 5-10 MW tranche of solar development recommended by staff be subdivided, starting with a higher price and degressing the price over the course of that first tranche.

Staff estimate the costs of renewable energy credit purchases for each of the options but potentially leave the reader assuming that these REC purchases would require increased utility customer surcharges. In fact, both DTE and Consumers Energy renewable energy plans show that the companies expect significant regulatory liabilities in 2029 reflecting surcharge collections in excess of the incremental cost of compliance with the renewable programs. These funds must be returned to customers in 2029 but could be used now to cover the costs of improved solar programs without increasing the surcharges on current customers.

Reference page 39 "Community Solar"

Staff's discussion of community solar models is very helpful for sorting out the various options that are available for the ownership, control, and operation of community solar systems. However, I recommend including a clear definition of community solar that distinguishes it from a simple PPA. Community solar occurs when the utility provides bill credits to the subscribers of the solar system, rather than making a single payment to the manager of the system who then distributes the revenue appropriately to the system's owners.

COMMENTS ON THE MPSC SOLAR WORKING GROUP STAFF REPORT

General

The report fairly accurately relates what was discussed, developed and presented in the meetings of the solar working group. In order for it to be more informative to the Commissioners, the staff needs to add more analysis or at least some explanation as to why there are conflicting statements/analyses by various parties.

Specific Points That Need to be Strengthened

1) The real importance of seamlessly continuing the programs and eliminating the boom and bust and uncertainty of the lottery systems currently in place, but ending soon.
2) The point that the utilities went to lottery systems specifically because the programs were too small in size.
3) The requirement for diversity set in PA295 has not been met and that the addition of more solar is the way to meet that requirement, thereby requiring a continuation of the solar programs beyond the current closing dates.
4) The 30 million dollars that were collected by the utilities for this program can best be used as incentives for solar. Doing this will provide a greater return to the utility customers, by creating a more diverse power supply. Events that continue to occur, almost monthly (IPCC report, EPA coal plant standards, extreme weather events causing shortages in fuel supplies, EIA and IEA estimates of shale gas reserve downgrades, and events in the middle east, to name but a few) indicate great uncertainty in future energy supplies in both price and availability. Maximizing generation diversity may have great benefit to utilities, their customers, and the State's economy far beyond what the 30 million will be worth in 2029 when it is scheduled to be returned to the customers. Risk management needs to be a priority of the MPSC given the current rules that allow extreme, unpredicted costs to the utilities to be merely passed on to its customers.
5) The current installed capacity of solar in Michigan is below all of its surrounding states which puts Michigan at risk for increased electric cost instability, lack of economic development, and not getting new industrial facilities like the 1GW solar panel manufacturing plant that Solar City is now planning for New York State.
6) The proposed stepped plan for solar incentives is dependent upon getting the size of the program large enough so that the steps don't get filled too quickly. The alternative control of reducing the incentives so there is less demand for the program does not meet the goal of more production diversity.
7) The programs should be between 50-100MW in order to meet the diversity requirement and the 30 million dollars already collected can support a programs of this scale.
8) The Value of Solar values proposed by working group members and outside presenters varied by a wide margin, but only because of the outliers of the DTE and the Edison Institute values. If those are disavowed, the others including ones

from utilities like Austin Energy are not that far apart. One has to view those created by DTE and the Edison Institute with some degree of skepticism.

9) The argument put forth by the Edison Institute that solar production does not perfectly align with consumption peaks, and therefore is of little or lesser value fails to take into account that both Consumer's Energy and DTE have use of the Luddington Pumped Storage Facility which can be used to eliminate the misalignment at a reasonable cost.

These comments are solely my own and do not necessarily reflect those of the Ann Arbor Energy Commission.

Wayne Appleyard
Chair of the Ann Arbor Energy Commission

Stow, April (LARA)

From: Wayne Appleyard <wayneapple@aol.com>
Sent: Friday, June 20, 2014 6:04 PM
To: EComer@eei.org; Baldwin, Julie (LARA); albertcalderon1953@gmail.com; anne.woiwode@sierraclub.org; bqueen@nmc.com; Binkley, David (LARA); Blair, Daniel (LARA); bqueen@nmc.edu; brad.vanguilder@sierraclub.org; BKlein@elpc.org; brainc@mlui.org; brian@mlui.org; charlesg@ecocenter.org; christina@cec-mi.org; dave@homelandbuildersgroup.com; dleahy@dovetailsolar.com; david.ronk@cmsenergy.com; davidw@ecocenter.org; djester@5lakesenergy.com; ekeller@cleanwater.org; NGeisler@a2gov.org; Gottschalk, Daniel (LARA); gregorskit@michigan.gov; harlowj@michgian.gov; harwoodd@dteenergy.com; "'harwoodd <'harwoodd"@dteenergy.com; schwutke@gmail.com; Howard, Tania (MEDC); info@fourelements-energy.com; Isakson, David (LARA); jim@carterlaw.us; james@environmentalcouncil.org; jasonjbing@gmail.com; jenny@cec-mi.org; jeremy@oakelectric.com; jfreeman13@comcast.net; "'jfreeman13 <'jfreeman13"@comcast.net; jimdulzo@mlui.org; jkinch@michiganenergyoptions.org; johnsarver3@gmail.com; kahnj@dteenergy.com; karen.wienkE@cmsenergy.com; karl@rabagoenergy.com; KEITH.TROYER@cmsenergy.com; Kitts, Gary (LARA); konkle@toast.net; Krause, Kevin (LARA); laura.collins@cmsenergy.com; lclark@5lakesenergy.com; "'lclark <'lclark"@5lakesenergy.com; lisa.delacy@cmsenergy.com; lohrmannt@dteenergy.com; "'lohrmannt <'lohrmannt"@dteenergy.com; londoj@dteenergy.com; lori.fobes@cmsenergy.com; mczinski@comcast.net; ferdam@mc-mc.com; mark@cec-mi.org; McLean, Steven (LARA); mglinsea@mei.net; MICHAEL.ROSS@cmsenergy.com; monica@hispanicsinenergy.com; nancy.popa@cmsenergy.com; O'Brien, Michael (LARA); padgettj@dteenergy.com; "'padgettj <'padgettj"@dteenergy.com; Proudfoot, Paul (LARA); zoiar@dteenergy.com; warnerre@dteenergy.com; paradigmric@gmail.com; rob@charthouseenergy.com; sarahb@sunrun.com; sarah@environmentalcouncil.org; "'sarah <'sarah"@environmentalcouncil.org; reed@cec-mi.org; pruss@5lakesenergy.com; teresa.mchugh@sierraclub.org; tjmierzwa@cmsenergy.com; "'tjmierzwa <'tjmierzwa"@cmsenergy.com; tom.hunt@easycleanenergy.com; tstanton@nrri.org; Trachsel, Katherine (LARA); Wallace, Sally (LARA); waltonk@gvsu.edu; "'waltonk <'waltonk"@gvsu.edu; warnerr@dteenergy.com; williamsma@dteenergy.com; "'williamsma <'williamsma"@dteenergy.com; Woolcock, Susana (LARA)
Cc: Harlow, Jesse (LARA)
Subject: Re: Draft MPSC Staff Solar Working Group Report

Julie, Kevin, and Jesse,

One final thought. There has been talk about "subsidies" and how we can't have non-solar customers subsidizing solar customers.

Much, if not all of what the utilities do have some subsidy attached to it and making it possible for the utility to make money off of it. All we are asking for is that the some individual who puts solar on their home to at least get a return on their investment. Not anywhere near the return that DTE is getting on the nuclear plant that they could only build because the U.S. government (ie. we the people) gave them free insurance that they couldn't buy no insurance company would provide them at any price (to name only one of the thousands of subsidies the fossil fuel industry gets and has gotten for the last 50 years.

We the producers of clean electricity from the sun only want a little portion of the subsidies that the utilities get for subjecting us all sorts of environmental issues that are not corrected and we, the consumers, are not compensated for.

Please, step back far enough to see that if "subsidies" become an issue; they need to be looked at across the board, weighed in relation to all the other "subsidies" or discounted as unimportant in relation to all the really important problems facing us today.

Wayne Appleyard

-----Original Message-----
From: Comer, Ed <EComer@eei.org>
To: Baldwin, Julie (LARA) (LARA) <baldwinj2@michigan.gov>; Albert Calderon <albertcalderon1953@gmail.com>; anne.woiwode <anne.woiwode@sierraclub.org>; Bill Queen <bqueen@nmc.com>; Binkley, David (LARA) (LARA) <binkleyd@michigan.gov>; Blair, Daniel (LARA) (LARA) <blaird@michigan.gov>; bqueen <bqueen@nmc.edu>; Brad Van Guilder <brad.vanguilder@sierraclub.org>; Bradley Klein <BKlein@elpc.org>; brainc <brainc@mlui.org>; Brian <brian@mlui.org>; Charles Griffith <charlesg@ecocenter.org>; 'Christina Li' <christina@cec-mi.org>; Dave Friedrichs <dave@homelandbuildersgroup.com>; Dave Leahy Dovetail <dleahy@dovetailsolar.com>; David F. Ronk <david.ronk@cmsenergy.com>; 'David Wright' <davidw@ecocenter.org>; Douglas Jester <djester@5lakesenergy.com>; ekeller <ekeller@cleanwater.org>; Geisler, Nathan <NGeisler@a2gov.org>; Gottschalk, Daniel (LARA) (LARA) <GottschalkD@michigan.gov>; gregorskit <gregorskit@michigan.gov>; harlowj <harlowj@michgian.gov>; harwoodd <harwoodd@dteenergy.com>; "'harwoodd <'harwoodd"@dteenergy.com; Heiner Schwutke <schwutke@gmail.com>; Howard, Tania (MEDC) (MEDC) <howardt2@michigan.org>; info <info@fourelements-energy.com>; Isakson, David (LARA) (LARA) <IsaksonD@michigan.gov>; James Carter <jim@carterlaw.us>; James Clift <james@environmentalcouncil.org>; Jason Bing <jasonjbing@gmail.com>; 'Jenny Oorbeck' <jenny@cec-mi.org>; jeremy <jeremy@oakelectric.com>; jfreeman13 <jfreeman13@comcast.net>; "'jfreeman13 <'jfreeman13"@comcast.net; Jim Dulzo <jimdulzo@mlui.org>; John Kinch <jkinch@michiganenergyoptions.org>; John Sarver <johnsarver3@gmail.com>; kahnj <kahnj@dteenergy.com>; karen.wienkE <karen.wienkE@cmsenergy.com>; karl <karl@rabagoenergy.com>; KEITH G. TROYER <KEITH.TROYER@cmsenergy.com>; Kitts, Gary (LARA) (LARA) <kittsg@michigan.gov>; Konkle <konkle@toast.net>; Krause, Kevin (LARA) (LARA) <KrauseK@michigan.gov>; laura.collins <laura.collins@cmsenergy.com>; lclark <lclark@5lakesenergy.com>; "'lclark <'lclark"@5lakesenergy.com; lisa.delacy <lisa.delacy@cmsenergy.com>; lohrmannt <lohrmannt@dteenergy.com>; "'lohrmannt <'lohrmannt"@dteenergy.com; londoj <londoj@dteenergy.com>; lori.fobes <lori.fobes@cmsenergy.com>; Margo Czinski <mczinski@comcast.net>; Mark Ferda <ferdam@mc-mc.com>; Mark Rabinsky <mark@cec-mi.org>; McLean, Steven (LARA) (LARA) <mcleans1@michigan.gov>; mglinsea <mglinsea@mei.net>; MICHAEL H. ROSS <MICHAEL.ROSS@cmsenergy.com>; monica <monica@hispanicsinenergy.com>; nancy.popa <nancy.popa@cmsenergy.com>; O'Brien, Michael (LARA) (LARA) <OBrienM4@michigan.gov>; padgettj <padgettj@dteenergy.com>; "'padgettj <'padgettj"@dteenergy.com; Proudfoot, Paul (LARA) (LARA) <proudfootp@michigan.gov>; Raymond Zoia <zoiar@dteenergy.com>; Regina Warner <warnerre@dteenergy.com>; Ric Evans <paradigmric@gmail.com>; rob <rob@charthouseenergy.com>; Sarah Bertram <sarahb@sunrun.com>; sarah <sarah@environmentalcouncil.org>; "'sarah <'sarah"@environmentalcouncil.org; 'Sean Reed' <reed@cec-mi.org>; 'Skip Pruss' <pruss@5lakesenergy.com>; Howard, Tania (MEDC) (MEDC) <howardt2@michigan.org>; Teresa McHugh <teresa.mchugh@sierraclub.org>; tjmierzwa <tjmierzwa@cmsenergy.com>; "'tjmierzwa <'tjmierzwa"@cmsenergy.com; Tom Hunt <tom.hunt@easycleanenergy.com>; 'Tom Stanton' <tstanton@nrri.org>; Trachsel, Katherine (LARA) (LARA) <TrachselK@michigan.gov>; Wallace, Sally (LARA) (LARA) <wallaces2@michigan.gov>; waltonk <waltonk@gvsu.edu>; "'waltonk <'waltonk"@gvsu.edu; warnerr <warnerr@dteenergy.com>; 'Wayne Appleyard' <wayneapple@aol.com>; williamsma <williamsma@dteenergy.com>; "'williamsma <'williamsma"@dteenergy.com; Woolcock, Susana (LARA) (LARA) <woolcocks1@michigan.gov>
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Sent: Fri, Jun 20, 2014 3:27 pm
Subject: RE: Draft MPSC Staff Solar Working Group Report

Julie and Team: Thank you for your hospitality in inviting me to appear before your work group. I am attaching a few comments on the Draft Report.

Ed

Edward Comer
Vice President, General Counsel
and Corporate Secretary
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From: Baldwin, Julie (LARA) [mailto:baldwinj2@michigan.gov]
Sent: Tuesday, June 10, 2014 5:06 PM
To: Albert Calderon; anne.woiwode@sierraclub.org; Baldwin, Julie (LARA); Bill Queen; Binkley, David (LARA); Blair, Daniel (LARA); bqueen@nmc.edu; Brad Van Guilder; Bradley Klein; brainc@mlui.org; Brian; Charles Griffith; 'Christina Li'; Dave Friedrichs; Dave Leahy Dovetail; David F. Ronk; 'David Wright'; Douglas Jester; Comer, Ed; ekeller@cleanwater.org; Geisler, Nathan; Gottschalk, Daniel (LARA); gregorskit@michigan.gov; harlowj@michgian.gov; harwoodd@dteenergy.com; 'harwoodd@dteenergy.com'; Heiner Schwutke; Howard, Tania (MEDC); info@fourelements-energy.com; Isakson, David (LARA); James Carter; James Clift; Jason Bing; 'Jenny Oorbeck'; jeremy@oakelectric.com; jfreeman13@comcast.net; 'jfreeman13@comcast.net'; Jim Dulzo; John Kinch; John Sarver; kahnj@dteenergy.com; karen.wienkE@cmsenergy.com; karl@rabagoenergy.com; KEITH G. TROYER; Kitts, Gary (LARA); Konkle; Krause, Kevin (LARA); laura.collins@cmsenergy.com; lclark@5lakesenergy.com; 'lclark@5lakesenergy.com'; lisa.delacy@cmsenergy.com; lohrmannt@dteenergy.com; 'lohrmannt@dteenergy.com'; londoj@dteenergy.com; lori.fobes@cmsenergy.com; Margo Czinski; Mark Ferda; Mark Rabinsky; McLean, Steven (LARA); mglinsea@mei.net; MICHAEL H. ROSS; monica@hispanicsinenergy.com; nancy.popa@cmsenergy.com; O'Brien, Michael (LARA); padgettj@dteenergy.com; 'padgettj@dteenergy.com'; Proudfoot, Paul (LARA); Raymond Zoia; Regina Warner; Ric Evans; rob@charthouseenergy.com; Sarah Bertram; sarah@environmentalcouncil.org; 'sarah@environmentalcouncil.org'; 'Sean Reed'; 'Skip Pruss'; Howard, Tania (MEDC); Teresa McHugh; tjmierzwa@cmsenergy.com; 'tjmierzwa@cmsenergy.com'; Tom Hunt; 'Tom Stanton'; Trachsel, Katherine (LARA); Wallace, Sally (LARA); waltonk@gvsu.edu; 'waltonk@gvsu.edu'; warnerr@dteenergy.com; 'Wayne Appleyard'; williamsma@dteenergy.com; 'williamsma@dteenergy.com'; Woolcock, Susana (LARA)
Cc: Proudfoot, Paul (LARA); Harlow, Jesse (LARA); Krause, Kevin (LARA)
Subject: Draft MPSC Staff Solar Working Group Report

Hello Solar Working Group – The MPSC Staff's draft solar working group report is attached. We are looking forward to your comments. In order for us to have an opportunity to carefully review all of the comments, please send them via email and copy Jesse Harlow harlowj@michigan.gov , Kevin Krause krausek@michigan.gov and me baldwinj2@michigan.gov by the end of the day on Friday, June 20.

We plan to make the comments publicly available – either by posting them on the solar website or by attaching them as an appendix to the final report. Since we do not know how many comments will be received or how many total pages will be submitted, we may not be able to include all comments in the appendix.

We expect to place a copy of the final report in the U-17301 and U-17302 electronic dockets by the end of the day on June 30, 2014.

Julie Baldwin, Manager
Renewable Energy Section
Electric Reliability Division
Michigan Public Service Commission
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Baldwin, Julie (LARA)

From: robert rafson <rob@charthouseenergy.com>
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Cc: Harlow, Jesse (LARA)
Subject: Re: Draft MPSC Staff Solar Working Group Report

Julie,

Thanks for giving me a chance to review your draft report before it goes out for review. I think it is a good review of all that went through all the presentations.

Your conclusions done come to a conclusion. I believe that legislators will read the conclusions as a recommendation. I think they need to be rewritten with that in mind. From the comments throughout the documents there are conclusions that the staff have made. They need to be collected into a cohesive statement and recommendations.

If you would like my conclusions I would be happy to provide them.

Rob

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On Tuesday, June 10, 2014 5:45 PM, "Baldwin, Julie (LARA)" <baldwinj2@michigan.gov> wrote:

Hello Solar Working Group – The MPSC Staff's draft solar working group report is attached. We are looking forward to your comments. In order for us to have an opportunity to carefully review all of the comments, please send them via email and copy Jesse Harlow harlowj@michigan.gov , Kevin Krause krausek@michigan.gov and me baldwinj2@michigan.gov by the end of the day on Friday, June 20.

We plan to make the comments publicly available – either by posting them on the solar website or by attaching them as an appendix to the final report. Since we do not know how many comments will be received or how many total pages will be submitted, we may not be able to include all comments in the appendix.

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Consumers Energy Comments on Michigan Public Service Commission Solar Working Group Staff Report dated June 10, 2014

Executive Summary

Consumers Energy Company ("the Company") appreciates the opportunity to provide comments on the Solar Working Group – Staff Report written by the Electric Reliability Division, Renewable Energy Section of the Michigan Public Service Commission ("MPSC"). The Staff of the Michigan Public Service Commission is to be commended for preparing the report summarizing the Solar Work Group's efforts related to 1) developing a value of solar (VOS) tariff, 2) exploring options to modify existing solar programs and 3) developing a community solar proposal. Consumers Energy applauds the work of the work group and will continue to support solar energy for Michigan.

We agree with concepts of crediting customers for over production of energy from self-generation facilities at rates that equal the cost the utility would otherwise incur. Such concepts are fair for the oversupplying customer and do not disadvantage customers that ultimately consume the oversupplied energy. We would not necessarily limit the application of this concept to solar powered generation, but would apply this concept to all generation technology.

We are troubled by concepts where customers are allowed to avoid the fixed costs of providing reliable service by certain policies such as net-metering.

We are also concerned by concepts where wholesale developers are able to avoid competitive bidding requirements by adopting a value of solar tariff rate. Where a Value of Solar application keeps customers indifferent, a competitive bid situation should be viewed as an opportunity to improve the supply cost for customers and thus should continue to be required for developers that propose to build facilities larger than the host customer typically consumes.

In summary, Consumers Energy supports the expansion of solar energy when the true costs are paid by participating customers.

The Company welcomes the opportunity to develop and market a solar program following closure of the EARP enrollment process in 2015. We plan to combine the lessons from the Solar Work Group with our experiences from the Experimental Advanced Renewable Pilot Program to propose a renewable customer self-generation tariff and an expandable community solar program design by the end of 2014.

Introduction

In 2009 the Company included in its initial Renewable Energy Plan a pilot program to encourage a limited number of customers to install solar powered electric generation facilities so as to obtain experience with technology that showed promise of becoming price competitive with conventional power supply technology over the next 10 to 20 year period. Through this Experimental Advanced Renewable Pilot program ("EARP") the Company expected to identify processes that would need to be modified in the event solar-powered electric generation became an economic choice for customers to own and install on their premises. Through the

experiences gained with the implementation of EARP, the Company has made several improvements to in its interconnection process, billing system and program administration. The first two phases of that program awarded 102 contracts for a total of about 2,000 kW on a first come-first serve basis. As a result of that experience in 2011 the Commission encouraged the Company to extend the program and modify the design to as to avoid the perceived "boom and bust" cycles that resulted from a first come-first serve type of queue system. The Company complied with its extended EARP program Phases 3 through 25 awarding about 1,000 kW per year between 2012 and 2015.

In 2013 the Company filed its Renewable Energy Plan in MPSC Case No. U-17301. One Intervener advocated for an expansion of the EARP, including the development of a community solar program. In Briefs, staff recommended that the Company participate in a work group to explore the framework for a community solar pilot program, including options for value of solar pricing. The Proposal for Decision adopted staff's recommendation.

In 2014 the Company welcomed the opportunity to participate in the work group.

Discussion

Subsidies

As a business an electric utility has to be concerned about providing value to its customers through cost effective rates and excellent service. The risk associated with deviating from a least cost philosophy to supporting subsidies for a particular technology is significant and cannot be ignored. In both the Company's EARP program and DTE's Solar Current program the risk associated with subsidies has been limited by the program size. The Company recommends that any expansion of solar programs be accomplished without subsidies.

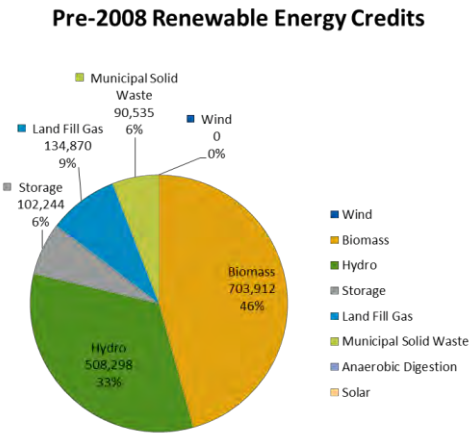
The continued and substantial growth of solar energy across the country proves that the boom and bust cycle for manufacturing and installation services has passed. The Solar Energy Industry Association's most recent report[1] states:

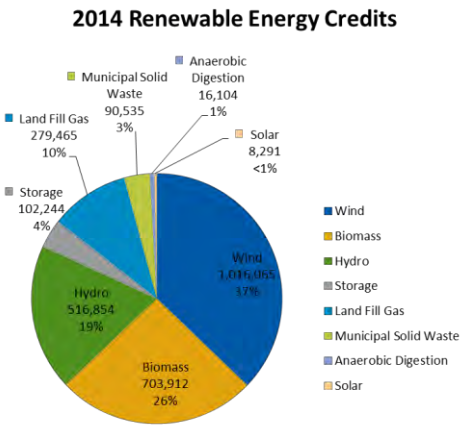
- Photovoltaic installations reached 1,330 MW in Q1 2014, up 79% over the same quarter in 2013
- Cumulative operating PV capacity is 13,395 MW, with 482,000 systems online as of Q1 2014
- For the first time ever, more than 1/3 of residential PV installations come on-line without any state incentive in Q1 2014.

As a result, it is clear that a utility subsidy is not necessary or appropriate to further a particular renewable technology, especially when there are renewable technologies that are significantly more cost effective.

[1] U.S. Solar Market Insights Report Q1 2014, GTM Research and Solar Energy Industries Association

Some have suggested that subsidies are necessary to increase diversity in fuels and supply technology (specifically solar) as required by PA 295. The PA 295 goal of increasing the diversity of renewables in Michigan has been met by Consumers Energy as shown below.





Given the successful maturation of the technology as stated by the Solar Energy Industry Association and the fact that the diversity of renewables in Michigan have increased substantially, the Company believes that solar subsidies beyond federal subsidies are not in the best interest of our customers on the whole. The report clearly states that one of the goals of each of the sub-groups was to develop solar programs that do not rely on subsidies from non-participating customers. Consumers Energy agrees with this goal as cross subsidization of a certain technology penalizes customers that are currently satisfied with the diverse renewable energy portfolio already provided for under Public Act 295 of 2008 (PA 295), for the benefit of a few customer groups and particular industries.

The three options offered up in the draft Solar Working Group Report as possible future solar programs all appear to contain subsidies which will ultimately penalize non-participating customers. Alternative options to subsidies which meet the goals of the sub-group will be discussed in more detail in *Solar Program Designs* section.

Value of Solar (VOS) Methodology

The report highlights the range of values that can result using the VOS methodology and the broad views on appropriate inputs. Consumers Energy supports an avoided cost rate; aimed at assuring that the non-participating customers are economically neutral to the energy supply.

Consumers Energy supports the approach that DTE Energy shared at the May 20, 2014 work group meeting where fuel cost, variable operating and maintenance (O&M) costs and capacity costs based on historic locational marginal prices (LMP) and Planning Resource Auction

Clearing Prices are used to develop a renewable tariff. Consumers Energy does not support the inclusion of variables that cannot be accurately assessed such as avoided distribution and transmission system investments. The Company is also opposed to the inclusion of VOS components that are not currently being paid by customers for their electric service such as environmental costs not included in variable O&M and fuel price hedge costs. However, if these costs were to be included in electric service rates in the future, the Company would support the appropriate inclusion of them in VOS methodology. Additionally, costs for back-up capacity due to the intermittency of solar, fixed O&M and program administration costs need to be considered.

We note that to the extent that the method fails to specify the specific measures used to calculate the components of the VOS rate, the greater the opportunity for measures to be designed on a piecemeal basis to serve a particular purpose. Given the complexities with the Renewable Energy Plan transfer prices, it would seem as if determining VOS components annually based on historical values calculated and published by others would provide a simple and transparent process for setting the VOS rate.

Additionally, the report comments on whether the value of solar construct should be based on actual historical costs that are updated on a regular schedule or costs that are forecasted for a future period and provide a certain revenue stream to the developer. Staff reports on pages 17 and 18 that Utilities agreed that as long as the flat contract rate or an escalating schedule is financially equivalent we have no preference for which of the two is used. We do not agree that the Company would be indifferent to a long term fixed tariff structure. In addition to flexibility, accurateness, and risk transference to other customers, a fixed tariff tied to a point in time valuation will be burdensome to administer as customers are added to the program over multiple years. We do support actual historic costs that are updated on a regular schedule.

The use of the VOS methodology is intended to provide transparency and consistency in price determination. It is concerning that the Solar Program Design Options #2 and #3 utilize the VOS methodology and then add a component identified as a renewable energy credit (REC) that is really a subsidy.

Solar Program Designs

Consumers Energy agrees with the Program Design Sub-Group recommendation to not implement changes to the existing programs as they complete their allocation phases.

As part of the Program Design Sub-Group's work, MPSC Staff developed a model that estimates the levelized cost of solar power under various assumptions. We are in general agreement with the model and its results for the assumptions utilized. Nevertheless, the use of this data in designing customer programs seems contrary to the sub-group's principles of sustainable and non-cost shifting. Non-cost shifting program designs inherently need costs to be borne by the participating customer and therefore the levelized cost to break-even seems irrelevant to program design.

The MPSC report attempts to address customer and installer concerns with lotteries by recommending adoption of a series of “blocks”, each priced at sequentially lower prices. In theory, as one block fills, customers move to the next block and so forth. In fact, the current lottery system addresses the very problems that the capacity block system produced when both Consumers Energy and DTE Electric used the block system in the initial phases of the EARP and Solar Current pilot. We believe the lottery method has served a valid purpose well. If subsidies are not present, then market forces limit demand and supply and the need for a lottery is eliminated as well.

Comments on the individual Options are discussed below.

Option 1: Category 1 Net Metering and REC Credits

Option 1 relies on Net Metering to provide a significant subsidy to the participant. Additionally, Option 1 utilizes the Renewable Energy Plan to fund an additional subsidy in the form of a REC payment. The result will be a non-transparent funding source that will impact general rates, PSCR rates and the renewable energy surcharge which will all negatively impact non-participating customers.

The brief discussion related to the inclusion of the REC credit in a Renewable Energy Plan (REP) amendment and collecting the costs in the renewable energy surcharge does not go far enough to understand how it would fit in with the current law. The report seems to suggest that the utility will agree to pay customers a fixed price for RECs, however that would seem to suggest that if the utility is willing to pay those customers a fixed price for RECs, it should be willing to pay other resources a fixed price for RECs. We can see where this can evolve into a situation where the utility has an obligation to buy all RECs at a set floor price, which is not a provision that is currently included in PA 295.

Option 2: Buy All and Credit All

Consumers Energy supports the Buy All and Credit All philosophy but does not support the additional REC payment which again does not meet the goals related to not shifting costs to non-participating customers. The “Buy All” part of the option does support the sub-group’s goals in that distribution system charges are recovered by all users of the system. The “Credit All” portion of the option proposed relies on a VOS, although the example uses a value that is much higher than the value calculated by DTE Energy based on 2013 actual LMPs and supported by Consumers Energy.

Option 3: Buy Net and Credit Net

The net metering portion of this model shifts fixed costs as does the REC credit to non-participating customers. The Company does not support this model for reasons stated related to Options 1 and 2.

Alternative Option 4: Buy All and Credit All

As stated earlier, Consumers Energy supports the Buy All and Credit All approach in which 1) the participating customer pays for usage based on the customer's rate schedule and 2) the participating customer's solar energy is metered and credited at the renewable tariff based on avoided costs (energy, capacity, variable O&M and credit for distribution and transmission system line losses). In this alternative option, the goals of the sub-group are met in that the option is sustainable and cost shifting to non-participating customers does not occur. The non-participating customer is indifferent to the price the utility credited to the participating customer and lastly, the participating customer can install any self-generation technology desired.

Alternative Option 5: Voluntary Customer Participation Community Solar

The company is supportive of voluntary community solar for several reasons including 1) the economy of scale is expected to reduce the cost of solar for our customers that want solar, 2) Community Solar is an opportunity to provide solar to our customers that otherwise may not have the proper location or space to install customer owned solar and 3) customer accessibility to solar increases allowing low levels of participation and enabling customers to purchase solar energy in monthly increments thereby meeting one of the work group's goals related to accessibility.

Community Solar proposals generally involve a utility building a facility and utility customers participate by contributing either an up-front or ongoing payment to support the project. In exchange, the customers receive a payment or credit on their electric bills that is proportional to 1) their contribution and 2) how much electricity the solar project produces.

If the customer has not used their self-generation rights already, the customer may participate in the community solar project and will receive a credit as they would for self-generation based on the value of solar.

If a third party builds a community solar system and it is not fully subscribed, the excess generation would be sold to the utility at the wholesale rate in order to preserve cost competitive rates for all customers.

Consideration should be given to a pilot Voluntary Customer Participation Community Solar program.

Regulatory Construct Issues

A Value of Solar tariff raises some interesting conceptual issues that will probably require additional legal analysis beyond the analysis provided to the Solar Work Group to resolve. Traditionally electric utilities provide service based on a least cost basis. While there have been pilot programs that have allowed a feed in tariff, those programs have been limited. The VOS proposal now introduces a new standard that applies to only one technology and that

technology may not be least cost and supply under the VOS may not constitute least cost for that technology. Furthermore, the volume of supply is not limited.

MPSC Staff suggests that at least a portion of the VOS could be recovered as part of the Renewable Energy Plan Incremental Cost of Compliance if the utility purchases the REC only, but the plan is based on purchases of capacity, energy and REC as a bundled product, and in that case, PA 295 is clear that the value of the energy and capacity is to be determined based on the transfer price. Recently the MPSC has modified the transfer price process used by several utilities from a method that explicitly recognized the energy and capacity price in a manner similar to the VOS proposal to a method that fails to differentiate solar value from the value of any other type of energy, which seems to be in conflict with the VOS proposed.

Net metering is briefly described on page 23. Consumers Energy believes it is important to discuss net metering in the report in more detail as it is currently a contentious issue across the country and is central to the discussion of expansion of solar energy.

PA 295 requires a net metering program that allows customers to generate a part or all of their electricity using renewable resources to receive generation credit. A customer's bill is credited with net generation based on a bidirectional meter that records and measures energy use and generation. In small systems (<20 kW) customers are billed and credited at the Full Retail rate plus other volumetric (kWh) charges. The full retail rate is defined as the power supply and distribution components of the cost of electric service. This program shifts costs to non-participating customers when participating customers are credited with the distribution components of the cost.

The Company supports the elimination of net metering and the adoption of alternatives to net metering discussed in the *Solar Program Designs* section of the comments that do not result in subsidization.

Program Caps

A program that avoids subsidies and provides for rate recalculation on a regular basis need not be limited by an arbitrary program size.

Overall Costs

Page 37 of the MPSC report states that REC credits will be funded through the monthly renewable energy surcharge…which may not result in an increased surcharge. Consumers Energy has presented its Renewable Energy Plan which demonstrates compliance with all statutory requirements for capacity and RECs, such that additional renewable resources are not necessary and would serve only to increase customer costs.

Page 31 of the MPSC report characterizes the estimated generation attributable to a 50 MW program as 61,320 MWh/year. If DTE Energy's VOS calculation is used as well as the Staff's

levelized cost calculation, the subsidy paid by non-participating customers is approximately $6.8 million per year for Consumers Energy customers.

Regardless that this subsidy is spread over many customers, it is approximately $6.8 million worth of renewable energy that can be provided by significantly less costly renewable resources under the current approved Renewable Energy Plan. If customers desire to have distributed generation that is more costly than traditional resources, they must be willing to pay for it. Additionally, it is $6.8 million worth of renewable energy that Alternate Energy Suppliers are not required to supply resulting in a competitive disadvantage for the utility's customers.

Conclusion

Consumers Energy supports the expansion of solar energy when the true costs are paid by participating customers.

The Company supports fairly crediting customers for their solar energy production based on avoided costs, to assure that non-participating customers are not negatively impacted by these customer's choices.

The Company welcomes the opportunity to develop and market a solar program following closure of the EARP enrollment process in 2015. We plan to combine the lessons from the Solar Work Group with our experiences from the Experimental Advanced Renewable Pilot Program to propose a renewable customer self-generation tariff and an expandable community solar program design by the end of 2014.

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter, on the Commission's own motion, regarding the regulatory reviews, revisions, determinations, and/or approvals necessary for DTE Electric Company to fully comply with Public Acts 286 and 295 of 2008.	)	Case No. U-17302

DTE ELECTRIC COMPANY'S COMMENTS ON MICHIGAN PUBLIC SERVICE COMMISSION SOLAR WORKING GROUP STAFF REPORT

Pursuant to the December 19, 2013 Commission Order in DTE Electric Company's ("DTE" or the "Company") most recent Renewable Energy Plan Case No. U-17302, the Commission Staff ("Staff") was instructed to convene a work group to "discuss and determine possibilities for improving the customer-owned SolarCurrents program including means for incorporating community solar into the program." DTE recently participated in all six sessions of the Solar Working Group as well as each of the various sub-group meetings. The Company was pleased to have participated in the meetings of the Working Group and we appreciated Staff's diligence and efforts in facilitating a productive Working Group.

The Staff's draft report, titled "Solar Working Group – Staff Report" (the "Report"), is a summary of the sessions and faithfully captures a large portion of what was presented. In addition to the comments provided here, the Company suggests that the Report indicate that it is a summary of the sessions and is not meant to indicate that the Staff, or the Working Group as a

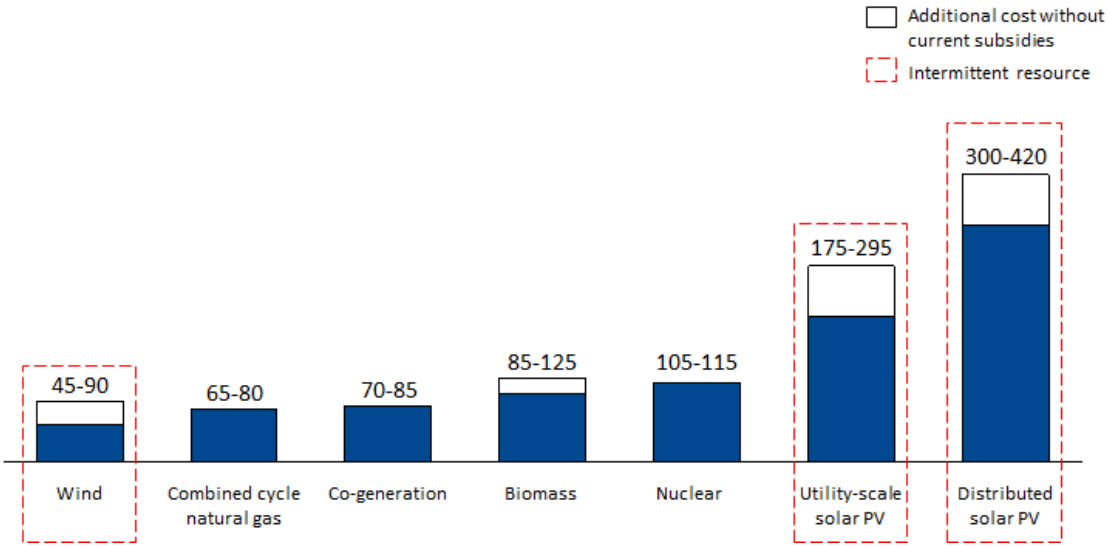
whole, endorses all of the information presented. It is also important for the Report to note that the three customer-owned "program options that could be considered,"[1] as well as the various community solar approaches, which were investigated and discussed within the Report are just a few of many potential ways to implement solar programs, and they do not represent agreed upon recommendations or endorsements of the Staff or of the Working Group.

DTE is very supportive of renewable energy as a part of a diversified generation portfolio. As the largest investor in solar energy in Michigan to date, with 22 MW of ongoing solar programs funded by our customers, DTE has gained significant knowledge about the costs, operational characteristics, maintenance requirements, and energy and capacity benefits delivered from solar. Our experience has shown that solar energy – despite cost reductions over the past few years – remains the most expensive renewable technology for Michigan. Solar energy is three to six times more expensive than large scale wind energy, which the Company has recently procured for less than $0.05 per kWh. **Figure 1** depicts the costs of various new generation technologies, including solar.

DTE believes it is important to help educate customers on the true cost of solar so they can make informed decisions about their potential solar investments and their support of solar programs in the state. If an informed customer wants to make a solar investment, we continue to respect that decision, and will facilitate interconnection to our electrical system. We support paying solar customers for the full and fair market value of the excess energy their system produces. At the same time, we believe that solar customers should bear the true and actual costs of their investment and use of the electrical grid, and their decision should not impact other customers.

[1] Draft Solar Working Group – Staff Report, page 30.

Figure 1: Levelized costs of new generation technologies ($/MWh) [2]



DTE does not support extending or increasing cross-customer subsidies for solar, such as those currently provided through net metering and DTE's SolarCurrents program. As the Report makes clear, customers who have chosen distributed solar under the current net metering law do not pay their true costs and are being unfairly subsidized by other customers. DTE's positions are consistent with the common goal of the Working Group summarized well by the Staff in the Report, which was "to develop solar programs that are open and accessible to all participants including low income customers, that do not require limitation of participants, are sustainable, and do not rely on subsidies from non-participating customers."[3] Our evaluation of the potential options investigated and discussed in the Report is based on how well the Company believes the program options succeed in achieving this fundamental goal. The following points are respectfully submitted for incorporation within the final Report.

[2] Energy Information Administration and DTE experience
[3] Draft Solar Working Group – Staff Report, page 5.

The Report correctly identifies that net metering results in cross-subsidization from non-participating customers

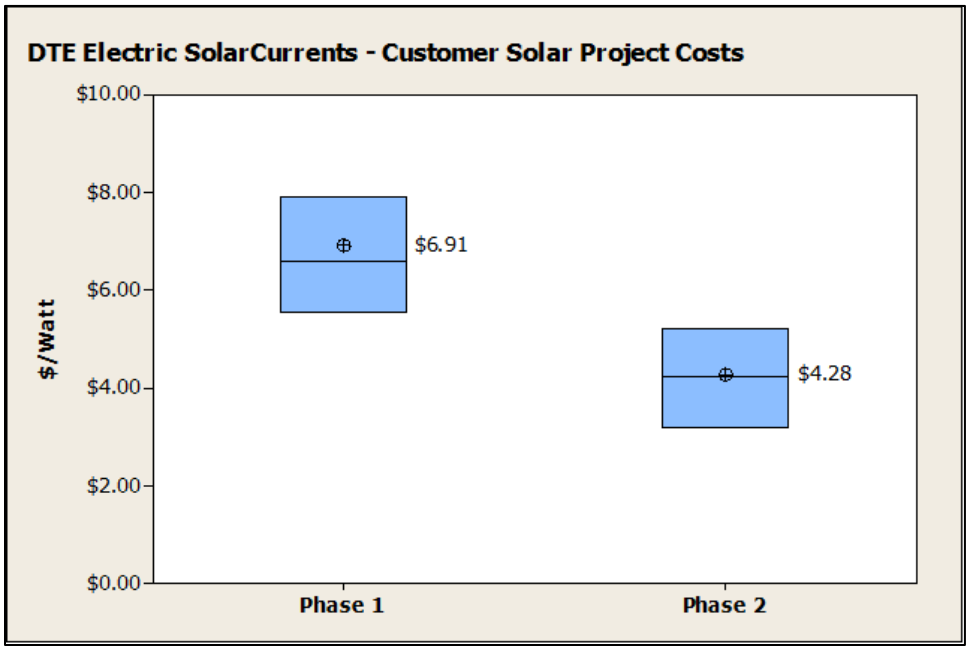
The Report identifies on Page 6 that customers installing distributed solar under the current net metering rules are paying less than their share of fixed costs, resulting in rate increases for all other non-participating customers. In addition to avoiding paying for services they receive, net metering participants are also being credited for excess energy they produce at a much higher value than market prices, sending an incorrect market signal and providing a second tier of subsidy. Even though the existing net metering program has caps, a program which relies on customer cross-subsidization is neither fair nor sustainable and is inconsistent with the common goal of the Working Group. As the NRDC/EEI agreement presented to the May 20th Work Group session states, "customers deserve assurances that costs will not be shifted unreasonably to them from other customers." In DTE's presentation to the Working Group on March 18th, and as summarized in the Report, the Company estimates that the unrecovered fixed costs from net metering participants are currently $0.09 per kWh. Monica Martinez, of Hispanics in Energy, presented to the May 20th Working Group session that increases to the cost of electricity due to these subsidies burden low income customers to a greater extent than those at higher income levels, and subsidies which may appear small can have a significant impact on these low income households. The existing net metering policy needs to be revised or amended to correct this unfair cost shift, which is inconsistent with Michigan's established cost of service ratemaking principles and the common goal of the Working Group.

The cost of solar in Michigan is currently three to six times the cost of wind energy

The Report concludes that the 20-year levelized cost of solar, based on an installed cost of $2.50 to $4.00 per Watt, is $0.15 per kWh. Based on the Company's experience implementing its

7 MW customer program, where it reviews the final invoiced cost of each customer, actual installed costs are not within the range projected by Staff, and are significantly higher. Average installed costs of the SolarCurrents Phase 1 program were $6.91 per Watt and costs in the current Phase 2 program are averaging $4.28 per Watt. See **Figure 2** below. Based on these actual installed costs, solar cost averaged $0.45 per kWh for the Phase 1 program and averages $0.28 per kWh for the Phase 2 program. Comparatively, DTE recently contracted for wind energy from the Pheasant Run Wind project at less than $0.05 per kWh, which is three times less than Staff's assumed cost of solar and approximately six times less than our estimate based on actual costs. At this time, the most cost-effective way to achieve the environmental benefits of renewable energy in Michigan is to invest in wind generation.

Figure 2: SolarCurrents program installed costs (*average cost shown*)

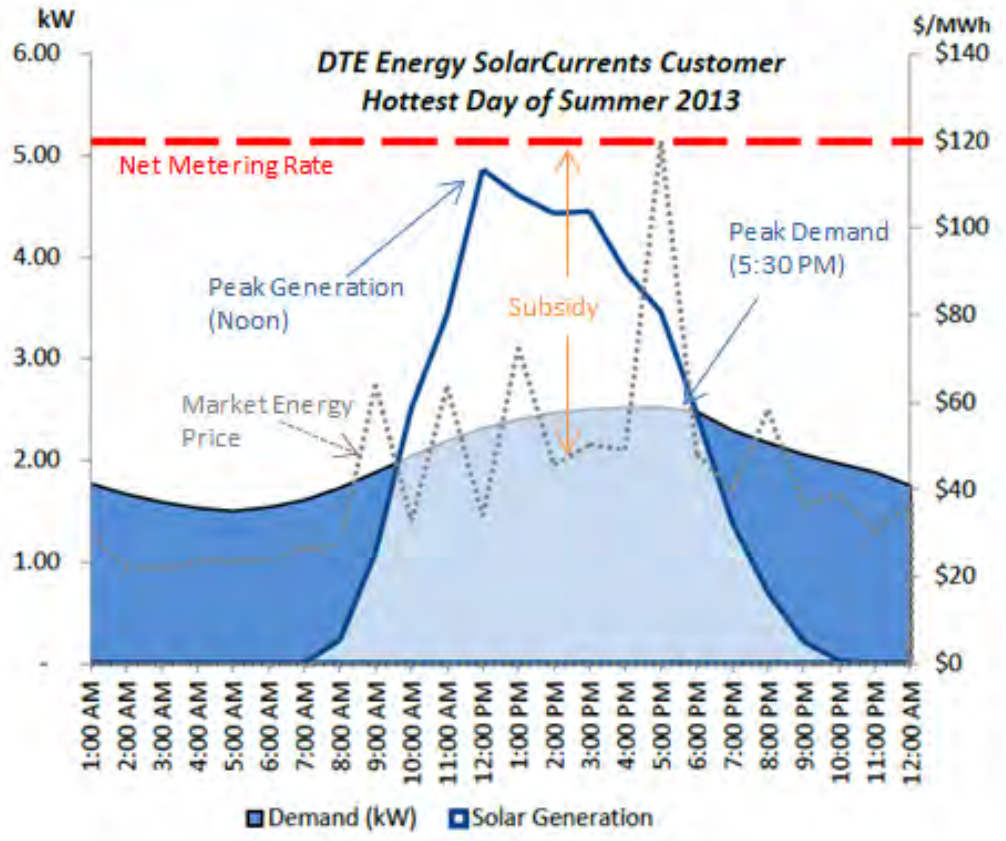


The "Value of Solar" components need to be actual avoided costs and should not distort market signals

The Working Group considered a concept known as "Value of Solar" (VOS), even though this task was not included in the December 19, 2013 Order from the Commission. The Report, on page 6, indicates that the goal of VOS rate design is to determine a price for customer-generated solar electricity that does not result in cross-subsidization. The later practical examples of the implementation of this concept in Austin, TX and Minnesota, however, are examples that do not achieve this goal. Notably, the Austin model continues to rely on explicit subsidies above the VOS rate. As Edward Comer (Edison Electric Institute) presented to the Working Group on May 20th, fair payment for solar generation needs to be based on actual avoided costs, after taking into account any additional costs that may be incurred to integrate solar generation with the utility system. Solar customers interact with the utility grid even more than non-solar customers, and this interaction with the grid is complex.

Figure 3 represents actual data from the DTE grid in 2013. It is clear from this data that solar generation is not well correlated with peak demand (with generation also ramping down while demand ramps up). The price credited to distributed solar customers for energy under net metering is well above actual market prices and reflects the large subsidy currently provided from net metering.

Figure 3: Solar generation is not well correlated with peak demand and is being subsidized above its market value



The Report correctly points out the complexity of designing a VOS rate. A side-by-side comparison of the various VOS concepts discussed in the Working Group would show wide variation in the components. Inclusion of speculative costs that have not been avoided, or societal costs and externalities not traditionally recovered in utility rates, results in improper market signals and yields a deployment model that continues to rely on unsustainable cross-subsidization and is inconsistent with the common goal of the Working Group. The well-established approach of setting utility rates based on actual market prices and costs is one which provides the clarity and transparency that businesses and consumers can easily understand. To ensure this transparency and to avoid subsidization, actual VOS should be determined using market prices for energy and capacity.

The May 20th presentation to the Working Group on market-based value of solar in DTE's service territory shows that the value of distributed solar energy in 2013 was $0.039 per kWh. Residential net metering rates that are currently compensating distributed solar generators at ~$0.125 per kWh are providing an $0.086 per kWh subsidy, which is shifted to other non-participating customers for recovery.

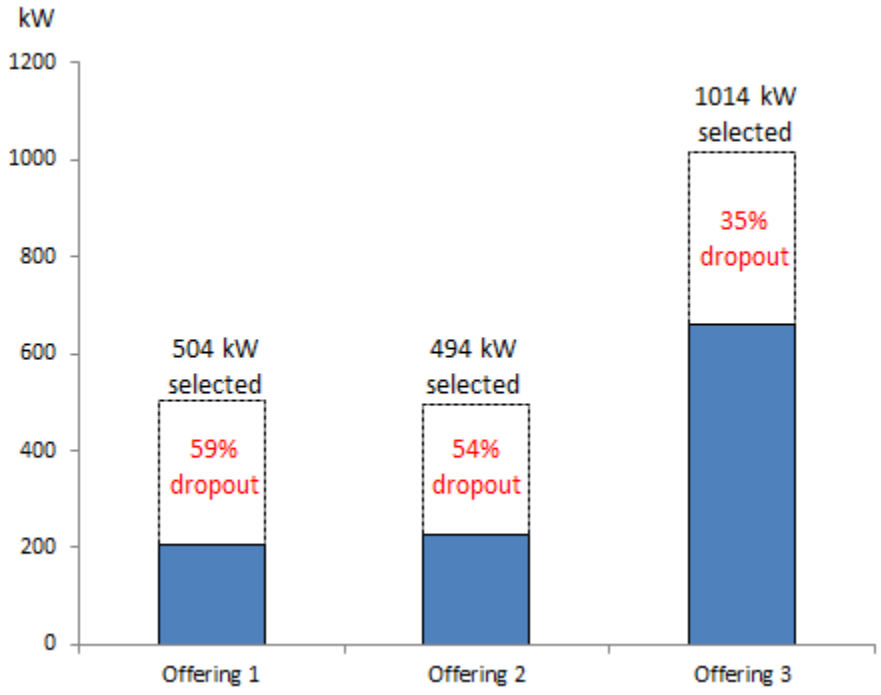
Claims that existing solar programs are creating "boom and bust" cycles were not supported with data

Significant portions of the Report discuss views that existing utility programs are contributing to "boom and bust" industry cycles, and that the process for providing subsidies is inefficient and is leaving pent-up demand. There was no data introduced that quantified these impacts in either the SolarCurrents or the net metering programs. Federal subsidies, such as the Section 1603 treasury grant and the 30% investment tax credit, are much more likely to cause industry shocks.

The high dropout level of projects awarded subsidies in DTE's Commission-approved SolarCurrents program indicate that pent-up demand does not exist, even at highly subsidized levels. **Figure 4** provides details on the total capacity awarded in each of our selection events as well as the amount of capacity that was ultimately not installed due to customers dropping out of the program. Through three selection events, the Company has awarded subsidies to 2,012 kW of projects, and 46% of this total has ultimately dropped out or has not moved forward with connecting projects. In DTE's most recent offering, a backup queue of projects was implemented to fill space created by these dropouts. Even after inviting this entire backup queue to participate in the program, only 47% of this queue has indicated a desire to enroll. Even with the significant subsidies already provided from the combination of net metering and our existing program, DTE

is not seeing high levels of demand.

Figure 4: Nearly 50% of the total capacity offered in DTE Electric's SolarCurrents selection events has not enrolled



<u>None of the three conceptual designs fully achieve the common goals of the Working Group</u>

The Report evaluates three potential solar program options, none of which meet the goals or are supported as a consensus recommendation of the Working Group. The final Report should indicate these options as such. For reasons which will be discussed in greater detail, each of the three options fails to achieve the common goals of the Working Group of accessibility for all customers, no limitation on participation, sustainability, and no reliance on subsidies from non-participants. As the Staff openly admits in the Report, the economics of solar are not at a point where "a completely unsubsidized VOS rate or net metering are sufficient."[4] Each of the three options discussed within the Report rely on subsidies, the cost of which will need to be recovered

[4] Draft Solar Working Group – Staff Report, page 29.

from customers who are not participating. It is not reasonable to expect that non-participating customers support the return requirements of a solar customer. If clear price signals are provided to customers, then they should be able to evaluate the economic choice to install solar generation and come to their own conclusions about whether the investment provides sufficient return. The Company's issue with these subsidies reflects our strong desire to protect the interest of the entirety of our customers, the vast majority of which are not participating in distributed solar programs.

Potential Option 1

Under potential option 1, the Report describes a program model that is similar to DTE's existing SolarCurrents program, but is larger and includes a complex REC subsidy. This hypothetical 50 MW model relies both on subsidies through net metering as well as an additional "REC Credit" subsidy that is provided to get the customer to a target return level of revenue. Across each of the three potential options discussed in the Report, the "REC Credit" value is a floating subsidy amount to provide the customer with the return deemed necessary. Renewable Energy Credit (REC) value should be based on market signals for what a REC is worth, and should not be inflated to further increase subsidy levels. Requiring utilities to pay an inflated rate for RECs distorts the market and adds to the subsidies. To preserve transparency, and to allow customers to make informed decisions, this customer cross-subsidy should be explicitly called out as such.

This potential option fails to meet the common goal of the Working Group due to its reliance on unsustainable customer cross-subsidization, and its failure to provide accessibility to customers who may not own a home, or a home with the right orientation, or those customers who may not be able to afford (or qualify for financing for) the up-front cost of a solar array. An

example of the cross-subsidization inherent in this option, using DTE's calculation of the value of solar of $0.039 per kWh, shows that 74% of the assumed bill savings is the result of subsides. (See **Figure 5**)

Figure 5: 74% of the Potential Option 1 bill credit is a subsidy which will need to be recovered from non-participants [5]

	Rate	Bill Without Net Metering or REC Credit	Bill With Net Metering and REC Credit	Subsidy Included in Bill Components with Net Metering and REC Credit using $0.039 VOS
Customer Charge (per month)	$6.00	$6.00	$6.00	$0
Energy Charge (per kWh)	$0.075	$48.75	$10.43	$18.40
Distribution Charge (per kWh)	$0.050	$32.50	$6.95	$25.55
Sub-total		$87.25	$23.38	$43.95
REC Credit (per kWh)	$0.025		$12.78	$12.78
Total Bill With REC Credit			$10.60	$56.72
Total bill savings provided (difference between bills)				$76.65
Subsidy included in bill with Net Metering and REC Credit				$56.72
Percent of bill savings that is subsidized				74%

Potential Option 2

Under potential option 2, a VOS credit amount is used instead of net metering credits. Depending on the VOS components, the $0.10 per kWh credit for generation also includes subsidies, and no explanation on its calculation was provided in the Report. DTE's estimate for the VOS, based on actual data from 2013, was $0.039 per kWh. Also, potential option 2 continues to rely on a "REC Credit" subsidy so the customer can achieve a target return level of revenue, albeit this time with a higher REC subsidy amount. This potential option again fails to meets the common goal of the Working Group, and the Staff notes the complexity of establishing a VOS

[5] Example uses the assumed rates and generation amounts from the example shown on pages 31-32 of the Report: customer monthly usage 650 kWh; solar generation 511 kWh; and REC Credit of $0.025/kWh of solar generation. DTE Calculation of subsidy amount assumes the value of solar is $0.039/kWh and that any credit provided in excess of the value represents a subsidy.

tariff.

Potential Option 3

Potential option 3 is similar to option 2 in that it relies on a VOS mechanism that is not well defined, and includes subsidies. Customer credits provided for behind-the-meter generation under this model would also need to consider services that utilities provide over short term periods, such as the necessary in-rush current to support startup power needs of equipment such as air conditioners and refrigerators. Allowing solar customers to avoid paying their share of the costs of these services will result in customer cross-subsidization. This model, again, relies on a "REC Credit" subsidy so the customer can achieve a target return level of revenue. With a mix of behind-the-meter generation and excess energy sales, accurately metering and accounting for the RECs created would be complex. Utility billing systems would likely need significant configuration to support a model such as this, and these costs would need to be investigated.

The Report indicates the annual subsidy costs of these three options could range from $1 million to $6 million in incremental REC subsidy cost alone. These are not minor sums. If DTE were to invest an incremental $6 million, this investment would be best made in a way that maximizes benefits to all customers.

A cost-based, voluntary solar program model could achieve the common goal of the Working Group

A potential way to implement an expanded solar program that is accessible to all, avoids cross-subsidization, is sustainable, and would be supported by the Company is to establish a voluntary program. This program would be based on the actual costs of solar and these costs would be entirely recovered by customers who participate. Instead of establishing an arbitrary size that may not be fully subscribed, the size of program would be driven by customer demand.

The Company would also support and could quickly pilot a voluntary community solar

model using one of DTE's company-owned arrays at full and fair cost, with no subsidies. Customer participation would be open to all, even those who do not own a home. Allowing a utility to control the siting would ensure that the array could integrate with the grid in a way that provides maximum benefit. DTE encourages the Staff to include this potential option in the final Report.

Any third-party ownership models must be evaluated to determine their consistency with established statute and any value of solar amount paid to a third-party under a power purchase agreement arrangement would need to be consistent with avoided cost principles. This model should not be implemented if it allows third-party developers to circumvent the consumer protections provided through MPSC oversight of entities that provide electric service to end use customers.

Conclusion

DTE understands that Staff will incorporate these comments in the final version of the Solar Working Group Report or include these comments in the e-docket for Case No. U-17302. As the Company has learned through the implementation of its Commission-approved solar programs, distributed solar implementation is not without costs and challenges. Currently, these costs in Michigan are three to six times higher when compared with wind energy.

The Company remains supportive of renewable energy in order to diversify its generation mix and solar energy does have a place within a diversified renewable energy portfolio. DTE remains supportive of a customer's informed choice to participate in installing solar at their home or business. But, the costs of that solar installation should not be subsidized by customers who are not participating. DTE encourages policy changes that remove these cross-subsidies and

protect customers from their undue share of costs.

It should be noted that while the State may regulate with a view to enforcing reasonable rates and charges, the Company manages and is responsible for its Renewable Energy Plan and the implementation of any program changes. As indicated in the Report, any ultimate modification to DTE's SolarCurrents program will be proposed by the Company consistent with the provisions of Act 295 and cannot result from proposals made and designed by others.

The Company would like to thank the other members of the Solar Working Group for their commitment to an informative discussion of solar energy deployment in Michigan, as well as their support of DTE's existing and ongoing solar programs. Many thanks to the members of the Commission Staff who devoted much time and effort towards facilitating the Working Group.

Respectfully submitted,

DTE ELECTRIC COMPANY

June 20, 2014

Stow, April (LARA)

From: Tom Hunt <tom.hunt@easycleanenergy.com>
Sent: Friday, June 20, 2014 4:56 PM
To: Baldwin, Julie (LARA); Harlow, Jesse (LARA); Krause, Kevin (LARA)
Subject: RE: Draft MPSC Staff Solar Working Group Report

Hi Julie, Kevin, and Jesse-

Thank you for all of your effort on this, and the in depth consideration of community solar as an option going forward. We appreciate the recognition of the benefits of competition in community solar and third-party development of these projects.

I have one specific comment on options 2 and 3, both of which include community solar.

In these options, large projects are limited at 500 kW and include community solar. Given that community solar projects serve many customers, this limit may be unnecessarily restrictive. In our experience developing these projects nationwide, we have seen economies of scale in the 1 MW range, while still utilizing small parcels of land and allowing us to work with utilities to site projects in locations beneficial to the grid. Thus, Michigan should consider allowing a larger project size limit of 1-2 MW for community solar projects. Limits on the sizes of subscriptions may be utilized to ensure that the focus on the community is retained.

Thank you for the opportunity to comment. Best,

Tom

Tom Hunt | Director of Research & Government Affairs
Phone: 720.360.3037 | Cell: 203.417.4027

Clean Energy COLLECTIVE
Community-owned Solar
www.easycleanenergy.com

How Community Solar Works

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From: Baldwin, Julie (LARA) [mailto:baldwinj2@michigan.gov]
Sent: Tuesday, June 10, 2014 3:06 PM
To: Albert Calderon; anne.woiwode@sierraclub.org; Baldwin, Julie (LARA); Bill Queen; Binkley, David (LARA); Blair, Daniel (LARA); bqueen@nmc.edu; Brad Van Guilder; Bradley Klein; brainc@mlui.org; Brian; Charles Griffith; 'Christina Li';

Dave Friedrichs; Dave Leahy Dovetail; David F. Ronk; 'David Wright'; Douglas Jester; ecomer@eei.org; ekeller@cleanwater.org; Geisler, Nathan; Gottschalk, Daniel (LARA); gregorskit@michigan.gov; harlowj@michgian.gov; harwoodd@dteenergy.com; 'harwoodd@dteenergy.com'; Heiner Schwutke; Howard, Tania (MEDC); info@fourelements-energy.com; Isakson, David (LARA); James Carter; James Clift; Jason Bing; 'Jenny Oorbeck'; jeremy@oakelectric.com; jfreeman13@comcast.net; 'jfreeman13@comcast.net'; Jim Dulzo; John Kinch; John Sarver; kahnj@dteenergy.com; karen.wienkE@cmsenergy.com; karl@rabagoenergy.com; KEITH G. TROYER; Kitts, Gary (LARA); Konkle; Krause, Kevin (LARA); laura.collins@cmsenergy.com; lclark@5lakesenergy.com; 'lclark@5lakesenergy.com'; lisa.delacy@cmsenergy.com; lohrmannt@dteenergy.com; 'lohrmannt@dteenergy.com'; londoj@dteenergy.com; lori.fobes@cmsenergy.com; Margo Czinski; Mark Ferda; Mark Rabinsky; McLean, Steven (LARA); mglinsea@mei.net; MICHAEL H. ROSS; monica@hispanicsinenergy.com; nancy.popa@cmsenergy.com; O'Brien, Michael (LARA); padgettj@dteenergy.com; 'padgettj@dteenergy.com'; Proudfoot, Paul (LARA); Raymond Zoia; Regina Warner; Ric Evans; rob@charthouseenergy.com; Sarah Bertram; sarah@environmentalcouncil.org; 'sarah@environmentalcouncil.org'; 'Sean Reed'; 'Skip Pruss'; Howard, Tania (MEDC); Teresa McHugh; tjmierzwa@cmsenergy.com; 'tjmierzwa@cmsenergy.com'; Tom Hunt; 'Tom Stanton'; Trachsel, Katherine (LARA); Wallace, Sally (LARA); waltonk@gvsu.edu; 'waltonk@gvsu.edu'; warnerr@dteenergy.com; 'Wayne Appleyard'; williamsma@dteenergy.com; 'williamsma@dteenergy.com'; Woolcock, Susana (LARA)
Cc: Proudfoot, Paul (LARA); Harlow, Jesse (LARA); Krause, Kevin (LARA)
Subject: Draft MPSC Staff Solar Working Group Report

Hello Solar Working Group – The MPSC Staff's draft solar working group report is attached. We are looking forward to your comments. In order for us to have an opportunity to carefully review all of the comments, please send them via email and copy Jesse Harlow harlowj@michigan.gov , Kevin Krause krausek@michigan.gov and me baldwinj2@michigan.gov by the end of the day on Friday, June 20.

We plan to make the comments publicly available – either by posting them on the solar website or by attaching them as an appendix to the final report. Since we do not know how many comments will be received or how many total pages will be submitted, we may not be able to include all comments in the appendix.

We expect to place a copy of the final report in the U-17301 and U-17302 electronic dockets by the end of the day on June 30, 2014.

Julie Baldwin, Manager
Renewable Energy Section
Electric Reliability Division
Michigan Public Service Commission
517 241-6115
Baldwinj2@michigan.gov

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June 20, 2014

Julie Baldwin, Manager
Renewable Energy Section
Electric Reliability Division
Michigan Public Service Commission
517 241-6115
Baldwinj2@michigan.gov

Dear Julie and the MPSC Staff,

Thank you for planning, coordinating and summarizing the efforts of the Solar Working Group. An important group of stakeholders were convened and an equally important conversation and dialogue took place over the course of only a few short months.

The initial report draft that was developed is promising in that it recognizes and states that the "ultimate goals" of customer solar programs are to "encourage distributed generation, increase the use of clean energy, provide customers with control over their energy supply and continue to increase knowledge about renewable energy." We believe these are important objectives and fully support MPSC efforts to achieve them.

Though we believe Staff did a commendable job of trying to include a sufficient amount of information from SWG presentations in the report, we have the following additional comments and observations:

1. We believe Staff should better qualify the assumptions provided by DTE in the VOS discussion. More scrutiny and critical analysis needs to be applied to numbers presented before they should be admitted for serious consideration in the report. The assumptions vary widely from other analyses and calculation methodologies performed by respected agencies and professionals in industry, government and other third party institutions. Generally, in the VOS discussion, all information - including that submitted by the Edison Institute and the solar advocates – should be appropriately qualified by Staff and included for consideration based on the weight of evidence that supports it.

2. We believe Staff has appropriately described and summarized how the current lottery system adds costs, delays and frustration to the customer experience in Michigan. Through the SWG process, Staff determined that at least three different solar program options exist that would allow for greater market confidence, the elimination of boom-and-bust cycles and more responsiveness to the falling price of solar materials, labor and balance of system costs. Each could significantly expand the existing utility programs while costing less than the current programs. This leads us to believe this report should offer some clearer conclusions and recommendations to improve and expand the utility programs in order to meet the goals of the Commission and the objectives of PA 295.

3. In summary:
   - because the utilities have already over-collected (up to) an estimated $50 million in customer funds; and
   - because an expanded program could be developed with no impact on ratepayers; and
   - because Michigan law requires a diversified electricity grid; and
   - because Michigan is rapidly falling behind other Midwest states on solar energy development (less than Ohio, Illinois, Wisconsin, and Indiana); and
   - because consistent and fair market solar policy has been demonstrated to create jobs and business opportunities; and
   - because expanding solar programs can help restore our environment and address challenges of climate change; and
   - because carbon rules recently released from the EPA may offer an additional opportunity to meet state obligations through solar investments; and
   - because residents, businesses and government agree that Michigan needs solar investment;

   We believe MPSC Staff has outlined enough information and been presented with enough evidence to make a strong recommendation to expand the current solar programs here in Michigan.

We thank you for your efforts in this process and we look forward to a future in Michigan that includes serious investment and strong commitment to powering our communities with solar.

Sincerely,

Jason Bing, RA, LEED AP
Healthy Buildings Director, *Climate and Energy Team*

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cc: Jesse Harlow harlowj@michigan.gov, Kevin Krause krausek@michigan.gov

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Power by Association℠

Edison Electric Institute

Edward H. Comer
Vice President, General Counsel & Corporate Secretary

June 20, 2014

Ms. Julie Baldwin, Manager
Michigan Public Service Commission

Dear Ms. Baldwin,

On behalf of the Edison Electric Institute (EEI) I wish to thank you for the opportunity to provide an industry-wide perspective to the discussions of the Solar Working Group. Renewable energy sources, particularly solar and wind, are an important and growing segment of our nation's fuel mix and will play an even more important role in the future. Our industry recognizes that many consumers support the use of solar energy and should have options to support solar by installation of solar facilities on their homes, purchasing community solar production or purchasing a renewable energy option from their energy supplier. We are pleased that the staff report considers all these options.

We would like to emphasize a few points as your team finalizes the Draft Report:

1. The Draft Report correctly acknowledges that solar facilities in Michigan require subsidies. Ideally, program design should help promote cooperation between utilities and solar providers, not create hidden subsidies for one element of the public at the expense of others. In addition to discussing Michigan's varied solar programs, it would be useful to note that many states have adopted a variety of approaches to support solar outside of the utility rate arena. These include property and income tax credits, sales and use tax exemptions, corporate tax credits, loan programs, rebate programs, renewable energy programs and renewable energy credits. A comprehensive listing of these is found at the Desire website, funded by the federal government. http://www.dsireusa.org/documents/summarymaps/PV_Incentives_Map.pdf . The advantage of many of these types of approaches is that they are transparent to the public and easy to understand and apply.

2. The decision how to promote solar should be made with awareness of what are the most cost-effective solar and renewable alternatives in Michigan. Since

renewable sources of energy vary in cost and cost effectiveness often on a geographic basis, the Report can add an important perspective by comparing the relative costs of different kinds of solar installations and other renewable sources of energy in Michigan. Such cost information would help guide decision makers if they choose to focus their efforts on the more cost-effective renewable options.

3. All customers must pay for the fixed costs of the grid. The rise of new technologies requires that the grid be transformed to serve as the platform for more renewable and customer-friendly technologies. Most utility rate policies were developed under the assumption that they operate in monopoly service situations. However, when customers can self-generate (an option we support), rate policies have to be fashioned differently. They must assure that utility rates are neither subsidized nor burdened beyond appropriate cost allocation methods in a way that distorts the competitive playing field. In effect, the introduction of alternative supply sources inevitably leads to the "unbundling" of fixed delivery costs from energy sales. In practice, this often requires increasing the portion of rates that directly recover fixed costs.

4. Concerns about the "hidden subsidy" in net metering have unfortunately distracted from a cooperative working relationship with some solar providers. We are seeing more cooperation in some states to develop win-win approaches that benefit utilities, solar providers and all electricity customers. We encourage similar approaches in Michigan that move away from hidden cost-subsidies to more appropriate rate designs for the current situation.

5. We reiterate our concerns about some of the approaches to the "Value of Solar" that are summarized in the Draft Report. The same approaches should be used for determining the value of solar as are used for determining utility rates. Any hybrid approach will distort the pricing system to produce unfair and inefficient results. While attributes such as avoided emissions are desirable, it is not fair to pay in rates a value for such avoided emissions to some solar facilities if utilities are not paid for the same attributes from their clean generation sources. Moreover, Norm Bay, FERC's current Director of Enforcement and now a nominee for the Commission, recently reiterated that PURPA does not allow for the payment of avoided emissions in a response to Senator Murkowski during his nomination process. He stated "Commission precedent thus holds that any recognition of the costs of environmental externalities in PURPA avoided cost rates must be based upon a finding that those costs are real costs that would be incurred by a utility. If confirmed, I do not at this time see a reason to depart from this precedent."

http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=198f6249-394c-482d-9c7e-0d0ec80692cf, p. 79.

6. Finally, we found the options for the potential solar program designs confusing and difficult to compare. We agree that it is useful to review different options that include net metering, Buy all- Credit all and Value of Solar, as well as a REC option. However, since the values attributed to the solar credit and the REC credit varied with each option, it is confusing and impossible to get a true comparison of the potential cost and other impacts of using each approach. It would be better to keep these assumptions reasonable and consistent throughout. The staff could supplement the comparisons with a discussion of the solar development implications of each alternative and the policy options available if the option alone did not achieved desired results.

In closing, thank you so much for the opportunity to participate in this workshop process and to comment on your draft report.

Sincerely,

Edward H. Comer
Vice President, General Counsel & Corporate Secretary

ENVIRONMENTAL LAW & POLICY CENTER
Protecting the Midwest's Environment and Natural Heritage

ELPC Comments on the Staff Solar Working Group Draft Report

Introduction

ELPC greatly appreciates Staff's leadership in pulling off this challenging exercise of convening nearly 50 opinionated stakeholders, moderating a civil conversation, gathering feedback, and pulling together a very technical report about a challenging subject under a tight deadline. We know this was not easy and we appreciate the work that has gone into this effort.

ELPC has been involved in proceedings at the Commission since Act 295 was adopted in 2008. Over the past six years, under the Commission's guidance and leadership, DTE and Consumers have both implemented successful renewable energy plans that have resulted in hundreds of megawatts of utility scale wind that have helped to significantly drive down the cost of wind farm development in Michigan. These programs have been so successful that, just yesterday, the Commission approved Consumers Energy's proposal to eliminate its renewable energy surcharge altogether. This is good news for Michigan ratepayers, good for economic development, and good for the environment.

We are now at an exciting turning point. The cost of solar has plunged dramatically over the past few years and the market is booming. This solar boom has spread beyond the "usual suspect" northeast and west coast states (although the growth there is staggering) and is now creating opportunities in all corners of the country and across the political spectrum. **South**

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Carolina just passed a bill to drive 300 MW of solar development. **Georgia** is headed for 1,000 MW. Rocky Mountain Power is buying 320 MW of solar in **Utah**. El Paso Electric, a **Texas** utility with 400,000 customers, just announced it will be coal free by 2016 and inked a deal to purchase utility-scale solar power for 5.79 cents a kilowatt-hour. **Tennessee** has nearly 100 MW of solar, with much more coming soon. Closer to home, **Indiana** installed more than 50 MW of solar in 2013 alone. **Minnesota** is about to launch several new programs with a goal of nearly 500 MW of solar. **Illinois** has aggressive solar and DG targets and has allocated $30 million for a new distributed solar procurement program in 2015, with much more to come. Even **Iowa**—one of the leading states for wind power—is taking steps to support the growth of solar, with the Iowa Senate voting 46-0 to triple Iowa's solar tax credit for farmers, homeowners, and businesses in the last legislative session.

It is very encouraging that Staff's draft report concludes that what is possible in all of these other states is also possible in Michigan. <u>The draft report identifies at least three different program options that could enable DTE and Consumers to expand their customer-owned solar programs by at least 50 MW at a lower cost per MW than the companies' current programs and likely without requiring any new customer surcharges</u>. Staff's suggestions are very reasonable, conservative, and reflect best practices that are being deployed all across the country today. They are consistent with Staff's responsibilities to carefully balance all available information to establish fair and reasonable conditions of service for the State's utility customers that help to promote the State's economic growth and enhance the quality of life of its communities.

We appreciate the participation of DTE and Consumers in the working group process. The growth of distributed generation presents new disruptive challenges for utilities. These challenges will require a concerted effort by all stakeholders to work together in good faith to

arrive at new business models that reconcile consumer and societal preferences with the utilities' responsibilities to provide safe and reliable electricity service at a low cost. The New York PSC's "Reforming the Energy Vision" (REV) docket is a good example of this type of collaborative and goal-oriented process that will ultimately be necessary in all 50 states.[1] We look forward to continuing this conversation in Michigan.

What is important at this stage, however, is not to allow the utilities' well-founded concerns about distributed generation writ large to kill Michigan's solar industry in its infancy. Michigan's economy and environment will require a healthy and diverse electricity sector that likely will include gas, nuclear, solar, wind, energy storage, enhanced energy efficiency and a more intelligent transmission and distribution system to dispatch these resources efficiently in a carbon constrained future. Staff's modest 50 MW solar program recommendations in this draft report are a good first step to help the solar industry get off the ground, but do not approach anything near the type of scale that would justify immediate regulatory reforms. As noted in the draft report, the amount of solar generation recommended by Staff represents <u>well less than half of one percent of Consumers' and DTE's annual sales.</u> The utilities' expressed concerns about fixed cost recovery and lost revenue may be legitimate in a much broader conversation about Michigan's energy future, but that's not what this report is about. This report just recommends some initial and modest steps that can and should be taken to help achieve the resource diversity goals of Act 295. The broader conversation about utility business models will continue with a much broader set of stakeholders and will ultimately need to be resolved with the participation of the Commission, the Governor, and the State Legislature.

[1] *See* NY PSC, Docket 14-M-0101 – Reforming the Energy Vision (REV) (available at *http://www3.dps.ny.gov/W/PSCWeb.nsf/ArticlesByTitle/26BE8A93967E604785257CC40066B91A*).

At the first working group meeting, Paul Proudfoot led a conversation with all of the stakeholders about what they wanted to achieve with the working group process. The overwhelming consensus of that conversation was that working group members wanted a final report that was "actionable" and could help lead to real change. We've made tremendous progress in a short amount of time. We didn't agree about everything, but nobody expected as much. The lack of "consensus" about the details should not prevent Staff from considering the different viewpoints expressed at the meetings and making some recommendations. One thing that's clear is that the status quo is no longer acceptable or appropriate. DTE's and Consumers' customer-owned solar programs have not appreciably changed since they were launched as "pilots" in 2008, even though the solar market has fundamentally transformed, and they are no longer functioning to help the industry scale up in a smooth and sustainable way.

We are pleased that the draft report reflects the principles that the Commission has provided to guide our work. On several occasions, the Commission has expressed concern about "boom-and-bust" cycles that can undermine market growth and has expressed a preference for solar programs "that are long term, consistent and that foster steady growth." In light of the imminent expiration of DTE's and Consumers' customer-owned programs, the recommendations in this report are timely and urgent. The Commission is looking to Staff's leadership to chart a course towards meaningful solar program improvements that can be accomplished in a reasonable and cost-effective way.

Recommendations

Overall, ELPC believes that Staff's draft report is a major achievement under very challenging circumstances. We have the following recommendations to help sharpen, clarify, and in some cases improve the readability and value of the report.

(1) The report should more clearly articulate its conclusions and recommendations in a separate Executive Summary and Conclusion section.

There are very significant conclusions embedded in the text of the report that have significant value for policymakers and other stakeholders in conversations about Michigan's energy future. However, we believe there is room for improvement in how these conclusions are presented and communicated in the report. Most importantly, the report would benefit greatly from an Executive Summary and Conclusion section that summarize some of the main "takeaway" points so that they can be read at a glance instead of having to read through the entire 44-page report. We believe the conclusions listed in the bullet points below are critically important to communicate to the Commission and other policymakers as they determine the next steps for solar program development in Michigan:

- The report clearly describes how there's considerably more interest in solar than the available space in the utilities' existing programs. Michigan home and business owners *want* to go solar, but they've been stymied by the small program size and inefficient program design of the utilities' existing programs. For example, the report does a good job describing how the current lottery system adds costs, delays and frustration to the customer experience in Michigan. (p. 22) It is important to note that the utilities implemented lottery systems precisely because the programs are too small in size.

- Fortunately, however, the report concludes that there are clear and specific "improvements that can be made to allow for greater market confidence, the elimination of boom and bust cycles and more responsiveness to the falling price of solar materials, labor and balance of system." (p. 19) ELPC is encouraged that the report includes three specific program design options for customer programs as well as recommendations for a community solar program. The program details will need some careful vetting, but there are some very good ideas here. The real takeaway is that each of Staff's options would significantly expand the utilities' existing programs while at the same time costing less than the current programs. (See p. 30). In fact, given the fact that the utilities have already over-collected approximately $50 million in customer funds, the Staff's recommended program expansions could easily be funded out of those resources alone without any increase in existing customer renewable energy surcharges.[2] The report confirms that the total costs of these programs would be well under the amount the utilities have already collected from customers, and that's before even accounting for all the job creation and environmental benefits that these programs would bring to Michigan. (See pp. 37-38) It also concludes that third party leasing/PPA options would help make these programs even more accessible to customers with lower income levels. (p. 30)

[2] Douglas Jester's testimony in cases U-17301 and U-17302 estimates the available regulatory liability balance for both utilities and concludes that allocating some of this funding to solar program expansions would avoid the need for any increase in customer surcharges. The Commission's June 19th Partial Order in U-17301, which rejected Consumers' request to adjust its transfer price, means that even more funding will be available in Consumers' regulatory liability balance than what Mr. Jester predicted. His ballpark estimate, as of this morning, is that Consumers will have in the neighborhood of $30 million in present day dollars and DTE will have approximately $17-18 million in present day dollars available for solar program expansion. This is more than enough to fund the three recommended 50 MW programs in the draft SWG report.

- Moreover, the draft report points out that there is some urgency to these recommendations and that there would be a great deal of benefit from expanding solar programs now, before the 30% federal investment tax credit expires. (See pp. 36, 43). Fortunately, the report is clear that the net metering-based program "could be implemented quickly." (p. 36) This could be initiated by Commission Order or by an amended plan filing by each of the utilities.

- Although we believe the report's conclusions could be stated more strongly, the report does include data that puts the utility arguments about "cross-subsidies" into appropriate perspective. Most of the utility statements on net metering "subsidies" focus only on the costs of net metering and ignore the benefit side of the equation. Importantly, the report acknowledges that "it is not possible to determine the net cross-subsidy resulting from net metering without considering the benefits of solar." (p. 25) This point should be firmly established in the Executive Summary and Conclusions. There is no data that supports the utility view that net metering or any of the existing solar programs are having any kind of measurable effect on other customers in Michigan. Furthermore, the existing base of net metering customers in Michigan is tiny (see p. 23) and the program itself is capped. The report also explains that the recommended 50 MW solar program expansions would represent only 0.18% of Consumers' and 0.14% of DTE's annual retail sales. (See p. 31) The recommended programs are reasonable and modest steps for the utilities, but they carry real and tangible benefits for customers, for job creation, and for the environment.

- The report also highlights how far out of step DTE's positions on solar "value" is with other utilities and independent experts across the country. For example, DTE argues that solar has a "value" of only 3.9 cents/kWh. (See p. 25). That is way out of line with draft calculations in Minnesota (13.5 cents/kWh) (see p. 11), Austin Energy's calculations in Texas (between 10.7-12.8 cents/kWh) (see p. 8), independent NREL numbers for Michigan (13.8 cents/kWh) (see p. 24 of report). In fact, University of Michigan researchers found that *just the externality value of solar alone* exceeds DTE's *entire* solar-value calculation.[3] As Karl Rabago (who is one of the country's foremost experts on this subject) explains in his attached comments, "published evaluations of costs and benefits almost never suggest the level of subsidy alleged by DTE." (See Attachment A).[4] There's no credible evidence to support DTE's argument that Michigan-built solar is worth only 28% of the value of Minnesota-built solar or that independent NREL researchers somehow overestimated Michigan's solar value by 350%.

- It is also encouraging that the draft report recognizes that the "ultimate goals" of customer solar programs are to "encourage distributed generation, increase the use of clean energy, provide customers with control over their energy supply and continue to increase knowledge about renewable energy." (page 28) It is also

[3] The University of Michigan Dow Sustainability Fellows Project evaluated three categories of solar externalities (Environmental Benefit value, Reactive Supply & Voltage Control Value, and Fuel Price Hedge Value) and calculated a total additional $0.042/kWh of value. *See* presentation to SWG at http://michigan.gov/documents/mpsc/uofmsolardowfellow_456921_7.pdf.

[4] Karl cites to the meta-analysis recently conducted by Rocky Mountain Institute (available at http://www.rmi.org/elab_empower) and the "Regulator's Guidebook" recently published by the Interstate Renewable Energy Council (available at http://www.irecusa.org/2013/10/experts-propose-standard-valuation-method-to-determine-benefits-and-costs-of-distributed-solar-generation/).

important to make sure the report accurately reflects the Commission's continuing concerns about the "uncertain and irregular nature" of the utilities' programs and its prior determinations that larger solar programs are necessary to meet the generation diversity goals of Act 295. *See, e.g.,* Partial Order in U-17301 (June 19, 2014). This context is important to include in an Executive Summary and Conclusion section to help illustrate the Commission's intent for the SWG.

2) The report should appropriately qualify utility points of view instead of presenting them as fact.

At times, the report includes statements and opinions from various parties without identifying them as advocacy positions. Where there are significant differences of opinion, the Staff should attempt to evaluate the parties' advocacy positions and reach Staff's own conclusions and recommendations instead of simply reporting the alternative viewpoints. This is particularly important with respect to the utility arguments about alleged "subsidies" and VOS calculations. Without this critical analysis, the Report may inadvertently legitimize arguments that lack evidentiary support. (This is the same type of effect that results when reporters publish "alternative viewpoints" on climate change without mentioning which "viewpoint" is supported by the overwhelming majority of scientists.) The separate narrative comments from Karl Rabago and Douglas Jester as well as our joint "redline" document (Attachment B) indicate some of the areas of particular concern that we believe should be tightened up in the final report.

3) The report should include relevant information from the solar advocates' presentations.

There are several instances in the report where the utility perspective and presentations are included in the report while the solar advocates' presentations and viewpoints on the same

issues are not. This creates an impression of bias for the reader. Information and charts from ELPC, 5 Lakes Energy, and other solar advocates should be included in appropriate places in the report. We have attempted to suggest some appropriate places for this information in our joint redline document (Attachment B). This information should be critically evaluated and appropriately qualified by Staff in the same manner as the utility information, based on the weight of evidence that supports it.

4) The report should include more of the context and history that led to the SWG discussions.

The final report should reflect some additional context from some of the utility cases and Commission orders that led to the development of the SWG. As mentioned above, the Commission has frequently expressed its concern about "boom-and-bust" cycles that can undermine market growth and has expressed a preference for solar programs "that are long term, consistent and that foster steady growth." Solar advocates have presented compelling evidence that Consumers' and DTE's existing programs are no longer achieving those goals. (Katie Rever's testimony in U-17301 and U-17302 tells this story in a compelling way.) The following points provide important context for the SWG discussions and should be included in the report:

- The Commission has repeatedly ruled that Michigan law requires a diversified electricity grid that includes distributed generation.
- MPSC rulings and reports reinforce the state's need to grow its solar capacity in a sustainable way that avoids boom-and-bust cycles.
- Applications from residents and businesses have consistently outpaced available program capacity.

- The utilities' current programs are not appreciably different from the "pilot" programs launched nearly six years ago, despite the fact that the solar market has fundamentally transformed. They are no longer working to help the industry scale up in a smooth and sustainable way.

This context is important to give the Commission and other Michigan policymakers a sense of the larger picture as they weigh and balance the costs and benefits of taking action. The Commission's Partial Order in U-17301 (filed yesterday) makes clear that the Commission has continuing concerns about the "uncertain and irregular nature" of the utilities' solar programs. The Commission is looking to Staff to provide clear recommendations in the SWG report to help overcome these problems in a reasonable and cost effective way. It is our hope that the SWG report will help bring Michigan's utilities together with their customers, with the business community, and with the Commission to help build a stronger and more resilient electricity grid, diversify the State's energy supply, create jobs, and restore the environment.

* * *

ELPC greatly appreciates the opportunity to participate in the SWG process and to share our comments on Staff's draft report. Attachment A to this document includes separate narrative comments from Karl Rabago of Rabago Energy LLC. Attachment B is a copy of the draft SWG report with suggested "redline" edits that reflect the recommendations of ELPC, 5 Lakes Energy, and Rabago Energy LLC that we have consolidated with the consent of Douglas Jester and Karl Rabago for ease of use. We hope that these comments assist Staff's revisions and preparation of a final report and look forward to next steps in this process.

Dated: June 20, 2014

Respectfully submitted,

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Attachment A

RÁBAGO ENERGY LLC

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20 June 2014

Comments of Karl R. Rábago, Rábago Energy LLC

On Behalf of

Environmental Law and Policy Center

On

Michigan Public Service Commission

Staff Solar Working Group Draft Report (dated 10 June 2014)

1. The report should be modified to carefully characterize advocacy positions as such. In several places, the report refers to positions taken by DTE as if Staff accepts those positions as true and correct, without expressly stating whether Staff has taken such a position. The pasting of DTE's "solar value calculation" figure, without also reporting that DTE did not provide backup documentation or analysis for its numbers, creates the potential to mislead readers of the report. In particular, the report repeats DTE's assertions regarding the existence and magnitude of subsidies without any comment or qualification.

The report should recognize that DTE's "net metering subsidy" number of $0.09/kWh is completely unsupported by analysis in the record, and is therefore suspect and should not be cited with qualification. All assertions regarding subsidies should account for both costs and benefits, and should be supported by appropriate studies. The DTE numbers fail this standard. As documented in the value of solar meta-analysis conducted by Rocky Mountain Institute in the report "A Review of Solar PV Benefits and Costs," available at http://www.rmi.org/elab_empower, published evaluations of costs and benefits almost never suggest the level of subsidy alleged by DTE.

For example, Austin Energy found that the value of solar exceeds the retail rate. The example calculation performed by the firm that developed the Value of Solar Methodology also shows that solar value exceeds the average retail rate. Georgia Power, in setting an avoided cost for its advanced solar initiative, found an avoided cost value for solar ranging from near $0.10, and therefore no possibility of subsidies at the level asserted by DTE.

Given the emotional baggage that often accompanies use of a term like "subsidy" in economic regulation, Staff and this report should be careful to require some documentation of the gross magnitude of the alleged subsidy in question. In the instant case, we are discussing a potential subsidy that, even assuming the unsubstantiated allegation from DTE is true, is almost impossible to measure along side the total revenues of the company and the many ways all rates deviate from unity. This is because very few customers in Michigan today have solar. The net metering program cap itself is evidence of the legislature's appreciation and weighting of the potential subsidy issue. For all these reasons, any discussion of the value of solar and the potential for subsidies under net metering or any other regulatory construct should be grounded in transparent, verifiable data and analysis.

2. Numerous statements made by EEI's spokesperson, Edward Comer, are also reported as statements of fact as opposed to statements of opinion. Mr. Comer advocated for a limited subset of the principles contained in a joint statement entered into between NRDC and EEI. The report should not report Mr. Comer's preferred principles out of context, and especially should not characterize Mr. Comer's selection as "some of the key recommendations."

3. The report characterizes the value of solar calculation process as "highly complex because it utilizes utility data that is not generally publicly available," and requires data forecasts extending "as much as 30 years into the future." Actual experience shows that while sound value of solar analysis is sophisticated, it is not "highly complex," and, in fact, draws on analytical processes routinely used by utilities in resource planning. Parties in Minnesota, for example, had no difficulty generating values and valuation techniques for the various cost or benefit components. Managing the process to develop a single methodology did, indeed, take some time. The value of solar methodology was developed in Minnesota in less time, however, than normally accompanies resolution of contested resource planning, avoided cost, or certification proceedings.

4. The Option 2, "Buy All and Credit All" framework raises significant tax issues that the report should clearly call out.

5 In October 2013, the Interstate Renewable Energy Council (IREC) published a report authored by Karl R. Rábago and Jason Keyes relating to valuation of distributed solar generation entitled "A Regulator's Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation," available at http://www.irecusa.org/2013/10/experts-propose-standard-valuation-method-to-determine-benefits-and-costs-of-distributed-solar-generation/. This report from Staff should note the availability of a report that details best practices in quantifying the value of costs and benefits of distributed generation.

NOTE: Specific line edits and additional comments have been provided in a redline version of the draft report.

ATTACHMENT B TO ELPC COMMENTS

Combined "redline" edits from ELPC, 5 Lakes Energy and Rabago Energy LLC

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Michigan Public Service Commission

Solar Working Group – Staff Report

June 30, 2014

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Electric Reliability Division

Renewable Energy Section

MICHIGAN PUBLIC SERVICE COMMISSION

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[EXECUTIVE SUMMARY]

Comment [K1]: The document would benefit from an Executive Summary and Conclusion section as recommended in the narrative comments of ELPC. The ELPC comments suggest several important "takeaway" points to consider for possible inclusion in the Executive Summary.

Introduction

On December 19, 2013 the Commission issued an order in the DTE Electric Company's (DTE) Renewable Energy Plan (REP) Review Case No. U-17302 approving the plan. The Order also charged Commission Staff (Staff) with the task of convening a work group "to discuss and determine possibilities for improving the Company's customer SolarCurrents program including means for incorporating community solar into the program." Participation in the Solar Working Group (SWG) was open to representatives from DTE and other interested stakeholders. During this same period, Consumers Energy Company (Consumers) also requested approval of its REP Review in Case No. U-17301. In briefing, Staff suggested a similar work group to discuss and determine improvements to Consumers' Experimental Advanced Renewable Program (EARP) and a way to incorporate community solar into its program. Consumers volunteered to participate in the SWG along with DTE and a single SWG was formed.[1]

On February 4, 2014 Staff held the kick-off SWG meeting. In attendance were 42 interested parties, Consumers and DTE representatives and Staff. At the initial meeting the SWG developed three primary goals: 1) develop a value of solar (VOS) tariff; 2) explore options to modify existing solar programs; 3) develop community solar proposals for both companies. To facilitate accomplishing these goals the SWG divided into three sub-groups. The sub-groups were: 1) Value of Solar; 2) Solar Tariff,

[1] Minutes, presentations and attendance lists are provided here: http://www.michigan.gov/mpsc/0,4639,7-159-16393_55246_55249-321593--,00.html

Rate Impact and Program Caps (Solar Tariff); and 3) Program Design. Each group contained 14 to 26 participants with at least three Staff members and at least one representative from both DTE and Consumers.

Solar Working Group Meetings

The six SWG meetings started on February 4, 2014 and ended on May 20, 2014. The purpose of the SWG meetings was for each of the sub-groups to provide updates on activities and to provide informational presentations.

The February 4, 2014 SWG meeting established the timing for subsequent meetings and the final report. Additionally, the scope and goals of the SWG were discussed, and the three sub-groups were formed.

At the February 25, 2014 SWG meeting, Jesse Harlow, Staff Engineer, providing support for the Program Design sub-group, gave a background presentation on the Consumers' EARP and DTE's SolarCurrents Programs. He also updated the group regarding the information gathered from sub-group participants about the positive and negative aspects of the EARP and SolarCurrents programs and concepts for community solar programs. Julie Baldwin, Staff Manager of the Renewable Energy Section, providing support for the VOS sub-group, gave an overview of the Minnesota Value of Solar process. Dave Konkle, on behalf of the Great Lakes Renewable Energy Association and author of *A Guidebook for Community Solar Programs in Michigan Communities*[2], presented information on community solar programs. Karl Rábago, formerly Vice President, Distributed Energy Services at Austin Energy where the VOS methodology was created, presented background on the calculation methodology for VOS.

[2] http://www.michigan.gov/documents/mdcd/Michigan_Community_Solar_Guidebook_437888_7.pdf

At the March 18, 2014 SWG meeting, Steve McLean, Staff Manager of the Rates and Tariffs Section, provided background about how cost-of-service utility rates are developed. Jesse Harlow provided a presentation on renewable energy cost recovery under 295 PA 2008. Keith Troyer, from Consumers' Transactions and Wholesale Settlements group and Todd Lohrmann, Manager of DTE's Renewable Energy Business Development group provided a joint presentation on the "utility perspective" of rates and solar programs.

At the April 8, 2014 SWG meeting, solar installers provided comments regarding their experience with solar programs in Michigan and discussed various policy ideas that could support the solar industry. Dan Alway and Art Toy of Four Elements Energy, and Jeremy Zinn of Oak Electric provided remarks. Jesse Harlow provided an update regarding the Program Design sub-group's brainstorming efforts to develop ideas to improve the existing solar programs for DTE and Consumers. Kevin Krause, Staff Auditor, providing support for the Solar Tariff sub-group, discussed efforts to design tariffs for VOS programs. Julie Baldwin provided an update on the VOS calculation methodology. Douglas Jester of 5 Lakes Energy presented a dynamic pricing tariff model that utilizes the ability of smart meters to provide hourly (or sub-hourly) solar generation and usage data to the utility and incorporates real time pricing for both the customer's solar generation and utility deliveries.

At the April 29, 2014 SWG meeting, Staff presented updates to the work conducted by the sub-groups. Julie Baldwin reported that the Value of Solar sub-group was working with the Midcontinent Independent System Operator (MISO) to better understand solar capacity credits. She also reported that Staff was working on program design details for community solar programs. Kevin Krause reported that the Solar Tariff sub-group was working on cost estimates for several program options. Brad Klein, of the Environmental Law and Policy Center, presented options for customer solar program expansions. He described a program that has been successful in other states where prices

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paid or credits for solar are adjusted based on blocks of capacity. As each block of capacity becomes full, the incentives are reduced. This could be a bridge to a future with no solar incentives.

The final SWG meeting took place on May 20, 2014. Josh Cornfeld, Rachel Chalet, and Ali-Heji, University of Michigan Dow Fellows, presented their work on solar externality values. Edward Comer from the Edison Electric Institute presented concerns about the costs of customer distributed generation. Monica Martinez, Hispanics in Energy, explained that increases in the cost of electricity generally burden low income customers to a greater degree than middle to upper income customers. DTE's Todd Lohrmann presented the company's calculation of the VOS.

A website to give the SWG access to relevant documents and meeting agendas, minutes and presentations was created.

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Sub-Group Actions

Staff conducted numerous sub-group meetings throughout the five month period. Most of the sub-group activity took place via telephone conference and email. Each group had specific and unique goals that took advantage of the expertise in the particular sub-group. While the goals were unique, all tasks were focused on a common effort to develop solar programs that are open and accessible to all participants including low income customers, that do not require the limitation of participants, are sustainable (i.e. that eliminate boom and bust cycles), and do not rely on subsidies from non-participating customers.

Value of Solar

Establishing a price for electricity generated from solar based on the value of solar (VOS) is a recent concept that is in place at Austin Energy and is in the process of implementation in Minnesota. A VOS rate is calculated by determining the value of the distributed solar generation and paying (or

crediting) utility customers that rate through either a tariff or standard-offer contract. The VOS ~~price~~ has also been used as a comparison to the value of net metering credits to determine if net metering cross-subsidization is occurring.[3,4] A VOS rate is based on avoided utility costs[5,6].

~~, whereas, a feed-in tariff or standard-offer contract price is typically based on the project developer's costs.[7,8]~~ It is helpful at this point to define certain terms that are used in this report and are commonly used in discussions of compensation for solar generation:

1. A **tariff** is a rate charged by or paid by a utility in transactions with its customers, which is established by the utility with approval of the Public Service Commission. A tariff may be changed from time to time and those changes will affect transactions that occur subsequent to the tariff change. When applied to solar generation by a customer, this means that the amount paid to a customer for solar generation may change from time to time in a manner that is not prescribed by an agreement with the customer.

[3] See http://www.nrri.org/web/guest/research-papers?p_auth=S2C9NToK&p_p_auth=E4xH14pI&p_p_id=20&p_p_lifecycle=1&p_p_state=exclusive&p_p_mode=view&_20_struts_action=%2Fdocument_library%2Fget_file&_20_groupId=317330&_20_folderId=0&_20_name=7627 State and Utility Solar Energy Programs: Recommended Approaches for Growing Markets, NRRI, Tom Stanton, Daniel Phelan, July 2013.

[4] Current ratemaking principles result in rate structures where a significant portion of a utility's fixed costs are recovered via a per kWh charge. One of the major drivers for this is to encourage conservation. When a customer installs a distributed solar project that results in less kWh purchases from the utility, that customer makes less of a contribution to the fixed costs. In the next utility rate case, fixed costs are spread over fewer kWh resulting in non-participating customers making increased payments toward fixed costs. Michigan's net metering program limits ratepayer cross-subsidization by capping participation in the net metering program. For example, Michigan's net metering program for small projects is limited to 0.5% of the previous year's peak load.

[5] See Austin Energy Solar Tariff http://my.austinenergy.com/wps/wcm/connect/c6c8ad20-ee8f-4d89-be36-2d6f7433edbd/ResidentialSolar.pdf?MOD=AJPERES

[6] See Minnesota Value of Solar: Methodology https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7bEE336D18-74C3-4534-AC9F-0BA56F788EC4%7d&documentTitle=20141-96033-02

[7] ~~See Austin Energy Solar Tariff~~ http://my.austinenergy.com/wps/wcm/connect/c6c8ad20-ee8f-4d89-be36-2d6f7433edbd/ResidentialSolar.pdf?MOD=AJPERESHttp://my.austinenergy.com/wps/wcm/connect/c6c8ad20-ee8f-4d89-be36-2d6f7433edbd/ResidentialSolar.pdf?MOD=AJPERES~~http://my.austinenergy.com/wps/wcm/connect/c6c8ad20-ee8f-4d89-be36-2d6f7433edbd/ResidentialSolar.pdf?MOD=AJPERES~~

[8] ~~See Minnesota Value of Solar: Methodology~~ https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7bEE336D18-74C3-4534-AC9F-0BA56F788EC4%7d&documentTitle=20141-96033-02https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7bEE336D18-74C3-4534-AC9F-0BA56F788EC4%7d&documentTitle=20141-96033-02~~https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7bEE336D18-74C3-4534-AC9F-0BA56F788EC4%7d&documentTitle=20141-96033-02~~

2. A **power purchase agreement (PPA)** is a contract whereby a utility contracts to accept and pay for power generation for a fixed term. Power purchase agreements typically have duration approaching the remaining life of the generation system and either provide a fixed rate schedule for the entire contract or index the rate to some external reference not controlled by the parties to the agreement. In common usage, a power purchase agreement is agreed either as a result of a reverse auction or custom negotiation.
3. A **standard-offer PPA** is a power purchase agreement in which the utility announces the available terms and enters contracts with anyone who agrees to accept the terms of the offer. A standard-offer PPA foregoes the price-setting precision of a reverse auction but radically reduces the transactions costs of power purchase, and can thereby produce lower total utility purchase costs and/or lower costs to society than a reverse auction. Across the economy, homogeneous and low-cost purchases are commonly done through standard offers, either to buy or sell, while large and heterogeneous purchases are typically done through auctions or negotiations. It is therefore reasonable for a utility to use standard-offer terms for purchasing power from small generators and use auction or negotiation processes for purchasing power from large generators.
4. A **feed-in tariff**, unfortunately named, is a standard-offer PPA in which the price offered for purchased power is based on an estimate of the payment rate required for the generator to recover their reasonably-incurred costs of owning and operating the generation system. This approach assumes that the utility desires, or is required, to purchase power from particular forms of generation. Paying a rate sufficient for the generator to recover their reasonably-incurred costs of owning and operating the generation system is the way that utilities are compensated in traditional rate-making.
5. An **avoided-costs tariff,** also sometimes called a **fair-value tariff**, assigns value to the generated power based on what it would have cost the utility to provide equivalent power at the same time and place, absent the generation compensated through the tariff. Controversy concerning avoided costs arises predominantly over whether the avoided costs are only short-term operational costs or also include long-term capital costs. An avoided-costs tariff, like an avoided-costs standard-offer PPA, leaves it to the erstwhile generator to determine whether the compensation offered warrants incurring the costs of owning and operating the generation system. In this sense, an avoided-costs tariff or standard-offer PPA functions like a technology-neutral market for purchasing power.
6. An **avoided-costs standard offer PPA** is a standard-offer PPA in which the terms are based on projected utility costs to provide equivalent power at the same time and place as is to be supplied by the contracted generation. An avoided-costs standard offer PPA may reasonably include a payment for the value of future-cost risks avoided by the utility or its customer through the contract.
7. A **value-of-solar tariff** is a tariff based on summing the utility's avoided costs of generating equivalent power at the same time and place as is supplied by a solar generator PLUS certain additional amounts reflecting additional value to society that are not included in the utility's avoided costs, such as local economic development or avoided pollution.
8. A **value-of-solar standard offer PPA** is a standard-offer contract in which the terms are based on projected utility costs to provide equivalent power at the same time and place as is projected to be supplied by the contracted solar system PLUS certain additional amounts

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reflecting additional value to society that are not included in the utility's avoided costs, such as local economic development or avoided pollution. Like avoided-costs standard-offer PPAs, a value-of-solar standard-offer PPA may include a payment for the value of future-cost risks avoided by the utility or its customers through the contract.

One goal of the VOS is to determine a price for customer or third-party community solar-generated electricity that does not result in unreasonable ratepayer cross-subsidization. As part of a presentation to the Solar Working Group, both DTE and Consumers Energy provided an analysis showing their view of the total ~~incentice~~incentiv~~e~~e, some of which is a subsidy, in dollar per kWh built into the customer SolarCurrents and EARP programs[9] respectively. The quantities that the companies referred to as subsidies in **Figure 1** are the SolarCurrents Renewable Energy Credit (REC) payment and DTE's fixed costs (fixed generation and distribution system costs) that are recovered from customers in the form of a variable (per kWh) rate. Consumers defines the EARP subsidy as the program's incremental cost of compliance as shown in **Figure 2**. ~~Not all parties agreed with the utilities' characterization of subsidies.~~

Comment [DJ52]: All current utility rate designs in Michigan create a significant amount of ratepayer cross-subsidization.

Comment [KR3]: This report characterizes utility positions as statements of fact. These edits are intended to appropriately qualify the statements.

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[9] DTE's customer SolarCurrents and Consumers Energy's EARP programs are described in the Program Design section of this report.

Figure 1: Solar Currents Funding Mechanism

DTE Energy

Consumers Energy
Count on Us

SolarCurrents and Net Metering funding mechanism for residential customers

	SolarCurrents (Phase 1)	SolarCurrents (Phase 2)	Funding Mechanism
Up-front solar subsidy	$2.40/W	$0.20/W	Renewable Surcharge
On-going solar subsidy	$0.11/kWh	$0.03/kWh	Renewable Surcharge
Net metering subsidy (unrecovered fixed cost)	$0.09/kWh	$0.09/kWh	*Unrecovered fixed costs are funded by non-solar customers
Total SolarCurrents and Net metering subsidy	**$0.20/kWh**	**0.12/kWh**	

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Figure 2: EARP Solar Funding

DTE Energy

Consumers Energy
Count on Us

EARP-Solar Funding (cont.)

- Total Funding: $26,825,341
- Total PSCR Expense: $12,681,277
- Total ICC Expense: $14,144,064
- Total Generation: 91,028,099 kWh

- Subsidy (ICC/Generation): $0.155 per kWh
  - Original EARP-Solar: $0.321 per kWh
  - **EARP-Solar Expansion: $0.087 per kWh**

- The lower offer-price of the EARP-Solar Expansion has aided in reducing the subsidy attributed to solar in our Renewable Energy Plan

Not all parties agreed with the utilities' characterization of subsidies. Five Lakes Energy's response was that "An avoided cost, by definition, is not a subsidy. In the long-run, there are no fixed generation costs so it is inappropriate to accept at face value DTE's assertion that fixed generation costs not recovered from a customer who practices self-service generation are a subsidy. In addition, DTE's

claim is inconsistent with the structure of PA 295, which defines the incremental cost of compliance by comparison to the full cost of power supply, not just the variable cost.

Further, purchase of renewable energy credits, either separately or bundled, is a legal obligation of these utilities; therefore DTE's REC purchases from SolarCurrents customers and Consumers Energy's incremental costs of compliance calculations for the EARP program are not subsidies except to the extent they exceed the costs of compliance by an alternative means.

DTE's claim that fixed costs of distribution not recovered from a customer who practices self-service generation are a subsidy is also inappropriate unless the Company also considers all other heterogeneities amongst customers that affect the amount of power delivered to a customer as constituting cross-subsidies."

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As mentioned in the Solar Working Group Meeting Section and as part of the efforts to support the VOS sub-group, Karl Rábago presented an overview of the VOS approach and explained the benefits of this type of analysis as follows:[10]

- Reduces or eliminates class subsidies
- Explicitly charges for consumption; keeps utility whole on cost of service
- Incentive for efficiency
- Annual adjustment prevents over- or under- payment as utility costs change
- Better aligns with sound rate making principles
- Reduces simple payback; reduces pressure on incentive

The VOS "is intended to reflect the value of distributed solar energy to the utility—a "break-even" value for a specific kind of distributed generation resource, and a value at which the utility is economically neutral to whether it supplies such a unit of energy or obtains it from the customer." [11]

Austin Energy

In 2012, Austin Energy, a municipal utility serving more than 420,000 customers, became an early adopter of the VOS concept. The components of the calculation are forecasted for the life of the

[10] http://michigan.gov/documents/mpsc/Rbago_448782_7.pdf
[11] http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=TX35R&re=0&ee=0

project (25 years) and then levelized. The initial solar tariff was 12.8 cents per kWh and only available to residential customers with projects no larger than 20 kW.[12] It does not apply to commercial or industrial customers nor to community solar installations. The VOS rate is recalculated annually and all customers, including existing customers, receive the new VOS rate. **Figure 3** shows the elements that comprise the calculation and the recently updated 10.7 cents per kWh 2014 VOS rate for Austin Energy. In a month where customers generate more solar PV than they use, non-refundable credits are carried forward for use in future months. To encourage customers to plan for a zero net energy household and to remove the potential for a solar customer VOS payments to be considered taxable income, credits are reset to zero annually. The customer buys all ~~of his~~net energy usage from the utility at the retail rate and is credited for all solar generation at the VOS rate. The reduction in rate from 12.8 cents per kWh to 10.7 cents per kWh ~~is~~ was due to several factors including a decrease in forward natural gas prices and a revision of the assumed project life from 30 to 25 years.[13, 14] ~~To complement the solar tariff,~~ Austin Energy also provides an up-front rebate equal to $1.25 per watt (limited to a $15,000 per year cap~~).~~), and has provided rebates for some seven years. Over time, Austin's rebates have been reduced as the solar market has matured and grown, including the period since the VOS rate was established and implemented. Just 3 months into the year, the utility reported that 70% of the rebate funding was claimed.

Figure 3: Austin Energy Value of Solar Calculation for 2014

Value Component	Basis	Distributed PV Value $/kWh
Guaranteed Fuel Value	Cost of fuel to meet electric loads and T&D losses inferred from nodal price data &	$0.055

[12] http://energy.gov/savings/austin-energy-value-solar-residential-rate-texas
[13] http://www.cleanpower.com/wp-content/uploads/2014-VOS-at-Austin-Energy-Results-2013-10-21.pdf page 43.
[14] www.austinenergy.com then About, News, December 6, 2013, "New Value of Solar Rate Takes Effect January."

	guaranteed future NG prices	
Plant O & M Value	Costs associated with operations and maintenance	$0.005
Generation Capacity Value	Capital cost of generation to meet peak load inferred from nodal price data	$0.017
Avoided Transmission & Distribution Capacity Cost	Cost of money savings resulting from deferring transmission & distribution capacity additions	$0.010
Avoided Environmental Compliance Cost	Cost to comply with environmental regulations and policy objectives.	$0.020
	Total	**$0.107**

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Minnesota

In 2013, Minnesota passed legislation that provides investor owned utilities the option to develop a VOS tariff as an alternative to net metering. The VOS rate will also be used as the rate for community solar projects. The legislation required that the elements shown in **Figure 4** be used in the VOS calculation and also required that solar customers be billed for gross electricity consumption under applicable tariffs and receive a VOS credit for their gross solar electricity production. Clean Power Research prepared a report, *Minnesota Value of Solar: Methodology,* that was submitted to the Minnesota Department of Commerce, Division of Energy Resources (MN DOER) on January 31, 2014 providing the methodology to be used. The methodology, as detailed in the report, was approved by the Minnesota Public Service Commission on March 12, 2014. The MN DOER describes the VOS as "…the value of distributed solar to the utility, its customers, and society."[15]

The Minnesota VOS rate is a present value of a 25 year payment stream similar to a long term contract rate. Under the framework of the Minnesota VOS rate, the customer may choose a fixed rate

[15] https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={007DDF1B-C60D-4D37-8066-275A67968CCD}&documentTitle=20143-97059-01

or an escalated rate with a lower starting point. The net present value of the two options would be identical. Similar to the Austin Energy VOS tariff, any unused credit expires after 12 months. The VOS is updated annually for each new group of VOS tariff customers. The MN DOER does not consider VOS to be a "buy all/sell all" arrangement because the customer is credited through a bill mechanism that does not result in any sale of solar energy by the customer. At the time this report was being prepared, no utility had made a VOS tariff filing with the Minnesota Public Utilities Commission.

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Figure 4: Minnesota Value of Solar Example Calculation[16]

25 Year Levelized Value	Gross Starting Value ($/kWh)	× Load Match Factor (%)	× (1 + Loss Savings Factor (%)) =	Distributed PV Value ($/kWh)
Avoided Fuel Cost	$0.061		8%	$0.066
Avoided Plant O&M - Fixed	$0.003	40%	9%	$0.001
Avoided Plant O&M - Variable	$0.001		8%	$0.001
Avoided Gen Capacity Cost	$0.048	40%	9%	$0.021
Avoided Reserve Capacity Cost	$0.007	40%	9%	$0.003
Avoided Trans. Capacity Cost	$0.018	40%	9%	$0.008
Avoided Dist. Capacity Cost	$0.008	30%	5%	$0.003
Avoided Environmental Cost	$0.029		8%	$0.031
Avoided Voltage Control Cost				
Solar Integration Cost				
				$0.135

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5 Lakes Energy

During the Solar Working Group meeting on April 8, 2014, 5 Lakes Energy presented its solar tariff concepts that includes the following elements:[17]

- Bill Credit (up to the total bill amount)
- Dynamic Rate to Value Power
- Buy-net, Sell-net One-way Delivery Charge[18]
- Renewable Energy Credits
- Externality Payments

5 Lakes Energy argued for use of a bill credit up to the bill amount because that is likely to minimize tax exposure for the solar generator and will minimize transaction costs for both the utility and its customer.

Allowing solar customers to buy or sell power at a dynamic power supply rate that is determined by standard rate-making principles and is available to customers who do not engage in self-service generation avoids the need for special consideration of value of solar, by embedding the analysis in standard rate-making, and prevents utilities from cherry-picking considerations when developing a value of solar tariff. This guarantees that the dynamic rates are set to reflect the long-term avoided costs to

[16] https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7bEE336D18-74C3-4534-AC9F-0BA56F788EC4%7d&documentTitle=20141-96033-02

[17] http://www.michigan.gov/documents/mpsc/5lakessolar.pdf_452989_7.pdf

[18] Buy-net/Sell-net: A customer is "credited" at the full retail rate when using their solar generation behind the meter. Solar generation sent back to the grid receives a credit of the retail rate less the delivery charge. When the customer uses electricity delivered by the utility, they buy the net additional electricity at the standard retail rate.

supply power at the same time and place as the solar generation being compensated through this approach. Because a properly constructed dynamic rate will allocate generation capacity costs to peak load hours that roughly coincide with the times of solar generation, this approach also captures most of the value of solar in contrast to other forms of generation. This approach to setting a value-of-solar tariff is also simpler than adding up the cost elements as has been done by Austin Energy and in Minnesota, because those elements are already determined in the proper design of a dynamic rate. ~~A key component of the 5 Lakes Energy proposal is that it incorporates dynamic rates. Dynamic rates are also known as real time pricing and may reflect rate periods of one hour or less.~~ 5 Lakes Energy also provided a chart shown in **Figure 5** to illustrate that a utility's load is impacted by the sun for the hour ending 15 (3 pm) for each day of the year. ~~The proposal also included crediting solar customers with a capacity charge allocated over high load hours.~~

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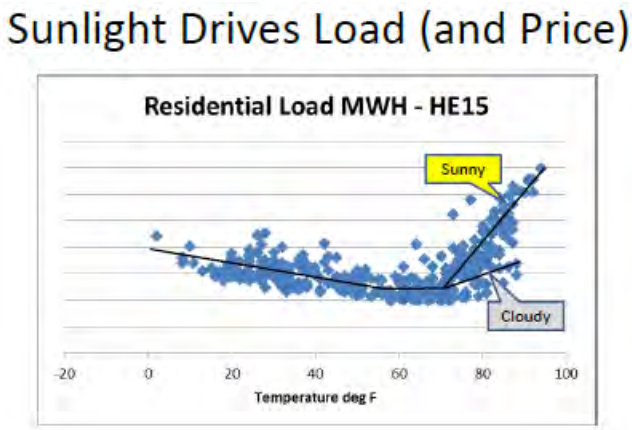
Figure 5: Temperature vs. Load



Because utility load and market price is correlated with sunlight at any given temperature, using hourly dynamic pricing to credit solar customers will better reflect the value of solar than calculations based on averages by season and time-of-day.~~Based on the assumption that utility load and market price is most likely correclated with sunlight and temperature , using hourly dynamic pricing to credit solar customers should reflect the true VOS to the utility.~~ 5 Lakes also argued that using actual dynamic rates as a basis for compensating solar generation provides the correct incentives for solar system orientation and tracking technology based on their value to the utility, unlike a fixed rate that applies to all systems.

5 Lakes Energy advocated the buy-net, sell-net one way delivery charge as the right way to charge solar-generating customers for use of the distribution grid, while applying the same principles used in charging other customers. This approach would allow solar-generating customers to avoid delivery charges on power they generated and consumed on site, but would charge for delivery of any power delivered to the customer from the grid even if that is offset by net generation at other times. This was illustrated as treating on-site generation equivalent to energy efficiency or other changes to electricity consumption.

Figure 6 shows the average customer credit that would result from applying 5 Lakes Energy's approach to DTE's current Company-owned solar systems. Actual credits would depend on individual system performance, weather, and utility year-to-year marginal cost variation.

~~**Figure 6** shows 5 Lakes Energy's Average Customer Credit.~~

Comment [DJ54]: I recommend substituting the figure from the later slide that shows my full valuation.

Figure 6: 5 Lakes Example Solar Credit Calculation

Example Solar Credit Calculation
(Fixed South-facing Array, Net Zero Energy, Average Customer)

Factor	Value
DTE D-1 Rate > 17kwh/day	$0.1326/kwh
Distribution Charge	$0.05/kwh
Power Supply Charge	$0.0826/kwh
Secondary Customer Line Loss	11.5%
Power Supply Cost FOB Substation	$0.0731/kwh
Load-weighted LMP	$0.0353/kwh
Imputed Capacity Cost FOB Substation	$0.0378/kwh
Imputed DTE Capacity Cost per year	$1,745,737,359
Imputed DTE Capacity Cost FOB Substation	~$158.703/kw-yr
Imputed DTE Capacity Cost FOB Secondary Customer	~$179.325/kw-yr
Solar ELCC	52% kw/nameplate-kw
Solar Capacity Value	$93.249/nameplate-kw-yr
Solar Generation per Solar Nameplate	1113 kwh/nameplate-kw-yr
Solar Capacity Value per Annual Solar Output	$0.0837/kwh
Average Solar Power Supply Credit	$0.1050/kwh
Buy-net, Sell-net Delivery Charge Savings	39.45%
Average Delivery Charge Savings on Gross Consumption	$0.0197/kwh
Average Customer Credit per kwh Solar Generation	$0.1147/kwh

www.5lakesenergy.com

Example Solar Credit Calculation (Fixed South-facing Array, Net Zero Energy)

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DTE D-1 Rate > 17kwh/day	$0.1326/kwh
Distribution Charge	$0.05/kwh
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Solar ELCC	52% kw/nameplate-kw
Solar Capacity Value	$93.249/kw-yr
Solar Generation per Solar Nameplate	1113 kwh/kw-yr
Solar Capacity Value per Annual Solar Output	$0.0837/kwh
Externality Payment	$0.02/kwh
Average Solar Power Supply Credit	$0.1250/kwh
Buy-net, Sell-net Delivery Charge Savings	39.45%
Average Delivery Charge Savings on Gross Consumption	$0.0197/kwh
Average Customer Credit per kwh Solar Generation	$0.1447/kwh
REC Income	$0.0112/kwh
Total Average Solar Credit	$0.1556/kwh

DTE

On May 20, 2014, at the final Solar Working Group meeting, DTE presented its VOS calculation using hourly generation data from its 386 kW (DC) DTE Energy Training and Development Center Solar Array in Westland, MI. DTE's calculation uses LMP and capacity market data from 2013. ~~The~~The summary of the company's calculation is shown in **Figure 7**.

Comment [DJ55]: It would be helpful if staff clarified the principal reasons for the differences between values cited by DTE and those in other presentations. In particular, the difference between DTE capacity value and 5 Lakes Energy avoided capacity cost is that DTE used the value of capacity in the MISO capacity market while 5 Lakes Energy used the value of capacity that DTE is receiving through current rates approved by the Public Service Commission.

Some discussion and clarification is likely needed in the report to explain that DTE's VOS calculation is dramatically lower than the independent 3rd party calculations from NREL, from Minnesota, from Austin, and from the other VOS studies from around the country.

Comment [KR6]: Reporting this table is very misleading in the absence of a complete description of how the company calculated each of the values, the assumptions used, and the responses of other stakeholders to the methods and assumptions.

Figure 7: DTE Solar Value Calculation

Based on actual production and distribution load profile, the fair market value of solar in 2013 was $0.039/kwh

DTE Energy

Components of the Minnesota VoS	
Fuel Cost and Variable O&M Costs	$0.0388/kWh
Generation Capacity and Reserve Capacity Cost	$0.00028/kWh
Fixed O&M Costs	Not Avoided
Distribution Capacity	Not Avoided
Transmission Capacity	Not Avoided
Environmental Costs	Included in Fuel and Variable O&M Cost
DTE Value of Solar in 2013	**$0.039/kwh**

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Edward Comer presented the Edison Electric Institute's (EEI) comments on net metering and the VOS concept at a Solar Working Group meeting[19]. It is important to note that neither Mr. Comer nor the utility spokespersons have conducted or presented a cost-of-service study associated with solar customers. Mr. Comer provided **Figure 8** comparing hourly solar PV production and residential customer consumption for a typical small residential customer. The utility view is that b~~B~~ecause the solar PV generation and customer usage are not perfectly aligned and the solar peak does not coincide with the utility's entire peak usage period[20] which drives infrastructure investment, Mr. Comer ~~commented~~ takes the position that the customer is using grid services and increasing grid costs. The utility view is b~~B~~ecause most rates recover a large share of fixed costs through variable charges that are offset by net metering credits, net metering customers are shifting costs to non-net metering customers~~.~~ by the act

Comment [KR7]: Subsequent statements are not attributed to their source, and are phrased as statements of fact when they are opinions.

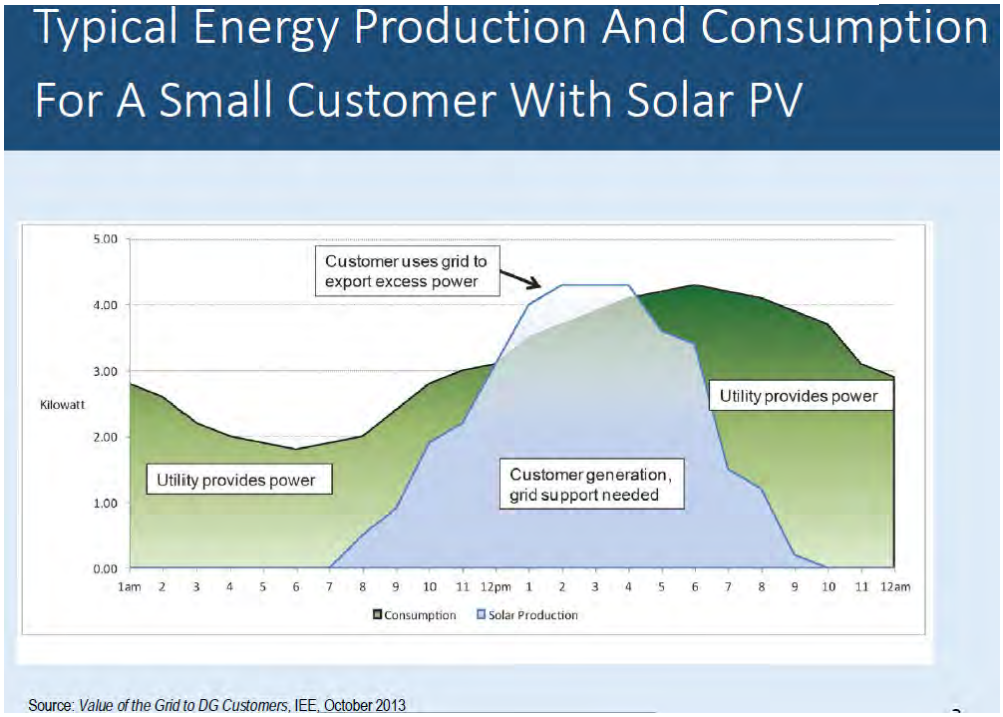
Comment [K8]: It would be helpful to put this assertion into perspective, especially given the very small size of Michigan's overall net metering program. It seems clear that this statement does not take into account the benefits to the grid and other customers of distributed generation.

[19] http://michigan.gov/documents/mpsc/May_20_EEI__Value_and_Cost_of_Distributed_Solar_456969_7.pdf

[20] The SWG noted that most solar arrays are positioned with a Southward azimuth to optimize solar production. Repositioning the array shifts the production to better align with peak use periods, however, this panel alignment is likely to produce less kWhs than southward facing arrays.

of reducing their consumption of energy. As will be discussed later, Michigan's net metering program is capped by statute. The cap for Category 1 (projects up to 20 kW) is limited to 0.5% of each utility's previous year's peak load, while the cap for Category 2 (projects greater than 20 kW – 150 kW) is limited to 0.25% of each utility's previous year's peak load. These program caps would limit the overall impact of net metering in Michigan. DTE currently serves less than 8 MW of total net metering capacity.

Figure 8: EEI Residential Energy Consumption and Solar Generation



The NRDC and EEI signed a joint statement addressed to utility regulators in February 2014 with recommendations regarding distributed generation and the utility distribution system.[21] Mr. Comer

[21] http://docs.nrdc.org/energy/files/ene_14021101a.pdf

presented ~~some of the key recommendations from the~~a selected subset of language from that joint agreement.~~:~~

- ~~Recovery of utilities' non-fuel costs should reflect the costs of maintaining and improving the electricity grid, and should not be tied to levels of retail commodity sales.~~
- ~~Owners and operators of on-site distributed generation must provide reasonable cost-based compensation for the utility services they use, while also being compensated fairly for the services they provide.~~
- ~~Customers deserve assurances that costs will not be shifted unreasonably to them from other customers.~~

Comment [KR9]: It is misleading to cite Mr. Comer's extract of concepts out of the full context. The entire agreement should be included in the report, or none at all.

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Mr. Comer listed six of his concerns alleged to exist with the VOS concept:

1. Predictions Highly Speculative; Likely to Be Wrong
2. Claims of Grid Savings Unlikely; True Grid Impacts and Costs of Controlling Distributed Generation Still Unknown
3. Seeks Payment for Attributes Never Paid to Utilities
4. Causes Undue Discrimination with Other Non Carbon Emitting Generation – about 30% of Michigan's Power
5. Increases Electricity Rates for Other Customers
6. Conflicts with FERC Jurisdiction; PURPA Avoided Cost Cap

Staff Value of Solar Discussion

Comment [K10]: There is no discussion of the UM grad students' research conclusions regarding externality values in the section above. Can we include the high level takeaways from that research?

The VOS calculation ~~is~~ ~~highly complex because it~~ utilizes utility data that ~~is~~ may not ~~generally~~ ~~not~~be publicly available or typically shared by utilities in solar rate communications. ~~and, in the case of~~ Austin Energy and Minnesota used ~~, requires either~~ locational marginal price (LMP) or natural gas price, generation capacity, and distribution and transmission system expansion forecasts ~~extending~~extended~~ing~~ as much as 30 years into the future. The Institute For Local Self-Reliance ~~pointed out~~stated in a recent report that "The complexity of these benefits explains why the adoption of the *methodology* alone in Minnesota required 6 months of research, stakeholder meetings, and deliberation

Comment [KR11]: In the world of utility ratemaking, the VOS calculation is not "highly complex." Austin's VOS methodology was set out on a fairly simple spreadsheet tool. Most of the data is collected in preparing the annual fuel charge calculations. The forecasting tools are used by utilities in their resource planning processes and are well-understood by utilities and other stakeholders.

by two government agencies."[22] A more fair statement is that a comprehensive stakeholder engagement process is necessary to establish confidence and agreement around the source data, the methods for forecasting, and the correct tools for quantifying value components.

The SWG examined the Minnesota and Austin Energy VOS calculations and discussed various methods to determine each of the calculation inputs as shown in **Figure 9.** The SWG did not reach consensus on how each component should be calculated. However, it is noteworthy that many different parties understood the categories of costs and benefits easily, and had a spirited discussion about appropriate data sources and quantification techniques. As in Austin and Minnesota, a workable, empirically justified methodology could be developed in Michigan.

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[22] See http://www.ilsr.org/wp-content/uploads/2014/04/MN-Value-of-Solar-from-ILSR.pdf page 7.

Figure 9: Value of Solar Calculation Discussion

Value Component	Solar Working Group Discussion
Avoided Fuel Cost	MISO's LMPs associated with the hours of solar generation are a reasonable approximation of avoided fuel costs. The SWG did not reach agreement on whether it was appropriate to use the previous year's LMPs only or whether the ultimate number used in the calculation should be a levelization of a long term (25 – 30 year) LMP forecast. There was agreement that LMPs should be adjusted upward to reflect that distributed solar enters the utility system after distribution line losses. The group discussed using the line loss percentages provided in each utility's rate book related to customer choice service. (Consumers Energy Rate Sheet E-27.00, DTE Rate Sheet E-20.00) The University of Michigan Dow Fellow students recommended that the solar fuel price hedge value for Michigan should be at least $0.019/kWh.[23]
Avoided Plant Operations & Maintenance - Fixed	The SWG did not reach agreement on how to calculate this number. Options discussed included using the $5/kW Minnesota number with possible long term escalations or assuming this value is included in the MISO capacity auction market. This cost is included in the 5 Lakes Energy dynamic rate calculation because it is embedded in the utility's approved required revenue and is not included in the LMPs that are subtracted in that method to obtain the cost of capacity.
Avoided Plant Operations & Maintenance - Variable	Several SWG participants suggested that these variable costs are included in the MISO LMPs.
Avoided Generation & Reserve Capacity Cost	There were several SWG suggestions about determining this value: paying solar customers the same capacity payments utilities receive through the ratemaking process, using the MISO capacity market or the MISO Cost of New Entry (CONE).
Avoided Transmission & Distribution Capacity Cost	The SWG did not reach agreement on whether any of these costs might actually be avoided in a 25 – 30 year timeframe. The utility position was that there are never any avoided transmission & distribution costs. The 5 Lakes Energy position is that transmission costs as assigned to the utility by MISO are affected by both energy and transmission demand, so that a portion of transmission costs are therefore avoided by distributed generation. The 5 Lakes Energy position is that distribution costs will commonly not be avoided by distributed solar generation but that in certain locations where a distribution bus is congested, it will either improve voltage levels or avoid/delay capacity investments. No distribution cost avoidance was assumed in the 5 Lakes Energy method, but in circumstances where it could provide additional value, utilities should offer an increment on the tariff reflecting that value.
Avoided Environmental Cost	The avoided SOx and NOx allowance costs are included in the MISO LMP. These are avoided environmental compliance costs but do not necessarily equal the marginal costs of health and environmental effects of these pollutants. The fixed costs of pollution controls and the costs of health and environmental effects of other pollutants that are not regulated through a cap-and-trade system are not included in LMPs.~~The avoided SOX and NOX costs may have already been reflected in the MISO LMP~~. The SWG considered adding a REC value to represent this cost. Some participants had concerns that this represented a subsidy or that RECs are not environmental costs.

Comment [DJ512]: This is correct, but a key point is missing. In a solar tariff that changes over time to reflect evolving avoided costs, the customer who is generating with solar will receive the benefits of any unexpected fuel price escalation. This would be the case with both net metering and the 5 Lakes Energy dynamic rates proposals. The fuel price hedge is realized when the utility enters a long-term contract with a fixed price schedule and should be applied in that case; an indexed contract will likely have a partial hedge value but the amount will be different than with a fixed price schedule.

[23] http://michigan.gov/documents/mpsc/uofmsolardowfellow_456921_7.pdf

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	The Minnesota PUC agreed to use the Federal Social Cost of Carbon for this value. The University of Michigan Dow Fellow students recommended that the value for Michigan should be at least $0.023/kWh.[24]
Avoided Voltage Control Cost	This is an emerging area of study and implementation. Minnesota opted to save this for future evaluation. The University of Michigan Dow Fellow students calculated that the Federal Social Cost of Carbon corresponds to a value of solar generation for Michigan of approximately ~~recommended that the value for Michigan should be at least~~ $0.002/kVARh.[25]
Solar Integration Cost	This is an emerging area of study and implementation. Minnesota opted to save this for future evaluation.
Avoided REC Costs	Absent RECs for solar, RECs must be generated from some other source. The cost of RECs from the other source(s) is thus an avoided cost. The alternatives that were mentioned are the market value of RECs and the average cost utilities incurred for RECs using other technologies.

Tariff Design and Structure

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Tariff design and structure is a separate issue from valuation methodology. Installers agreed that there is no strong preference for tariff structure although net metering is easy for customers to understand and Consumers and DTE both have well-established programs. SWG discussions indicated that a flat contract rate or an escalating schedule are acceptable and that customers may prefer more than one option. Utilities agreed that as long as the two are financially equivalent they have no preference for which of the two is used. The discussion also addressed whether there should be a guarantee that the VOS rate will not decrease, however there was not clear consensus on this point. There is an interest in using a real time LMP for the variable portions of the VOS, under a dynamic pricing scheme that is made possible with advanced metering.

The utilities expressed concerns about how fixed distribution costs would be credited in the VOS. ~~This~~ They argued that a VOS rate would lead to under-recovery of fixed distribution costs and would complicate charges to electric choice customers. It is important to note that such potential under-

[24] http://michigan.gov/documents/mpsc/uofmsolardowfellow_456921_7.pdf
[25] http://michigan.gov/documents/mpsc/uofmsolardowfellow_456921_7.pdf

recovery is first an issue of forecasting. For utilities correctly forecasting solar deployment in the most recent rate case, the issue of under-recovery does not occur. To the extent that customer installation rates differ from those projected by the utility, the appropriate regulatory issue is whether actual under-recovery is financially significant, that is, whether it arises to the point of challenging the financial integrity of the utility. Given the volume of solar development in Michigan, and the relative deviations in planned versus actual revenue collection that normally occur for a wide range of reasons, such as weather, economic conditions in general, and other factors, it is extremely unlikely that net under-recovery for any Michigan utility related to solar deployment is likely to be material.

It was also understood that if renewable energy credits (RECs) were included in the payment to customers that the cost of those would need to be included in an Act 295 case.

Incentives

Incentives were a topic of major interest for all parties. There were three basic positions that emerged from the discussions. The utilities had no issues with determining a VOS rate provided it was based on ~~true~~ utility avoided costs. For example, utilities take the position that avoided carbon emissions are not currently an ~~true~~ avoided cost because utilities do not currently pay for them ~~.~~ , notwithstanding any impacts these emissions could have on customers directly or through future utility costs. The utilities further stated they wanted no further incentives beyond the true VOS because of ratepayer cross-subsidy concerns~~.~~, notwithstanding federal and state policy that supports incentives for renewable energy development. The utilities took no position on imbedded subsidies relating to conventional generation technologies. An alternate point of view stated that there are benefits to all customers from increasing solar in Michigan, ~~and that some level of incentive~~that incentives are appropriate to advancing that policy and to overcome market failures and inefficiencies for these emerging markets, and that incentives leverage federal tax benefits. Incentives are also effective at

Comment [KR13]: This statement should be attributed. WHO was this understood by?

Comment [K14]: The word "true" is problematic here. The fact that avoided carbon emissions are not currently utility avoided costs dosen't mean they're not a real or "true" cost. They need to be accounted for somewhere. The utilities will be expected to avoid carbon emissions under new 111(d) rules, for example. That's a "real" avoided cost.

Comment [DJ515]: My specific perspectives on including avoided externalities in a VOS rate is missing from this discussion. My view is that under Chapter 460 of Michigan Compiled Laws the Commission has the power to authorize a utility to purchase a more costly form of power generation if it is less harmful to the public health, safety, and welfare and that the Commission may be obligated to such a course pursuant to the Michigan Environmental Protection Act. If a utility does so with permission or at the behest of the Commission, then the utility is clearly entitled to the reasonable and prudent costs of acquiring that less polluting generation. Thus, it would be appropriate for the Commission to approve or order a utility to pay a premium for solar generation up to the value of avoided health and environmental effects. Further, given the pendency of the EPA rule on carbon pollution from existing electric generation sources, Michigan utilities will soon face direct costs of reducing carbon pollution, which might therefore be considered as avoided utility costs. Those costs likely will not exactly equal the Federal Social Cost of Carbon, but could be reasonably approximated by that value since EPA's obligation under Section 111d of the Clean Air Act is to establish the Best System of Emission Reduction and the stringency of that system should logically create marginal costs of emissions reductions approximately equal to the social cost of the pollution avoided.

Comment [DJ516]: This statement and the subsequent discussion should not be in the same paragraph as the preceding material relating to externalities. These are logically separate subjects. Incentives for the purpose of promoting the use of solar in Michigan don't really belong in the value of solar calculation or a tariff; they should be an add-on for the purpose of meeting the objectives of the programs if and as necessary. I suggest that the material beginning with the statement quoted above be removed from the value of solar ... [1]

Comment [K17]: This is not just an "alternative point of view." It is backed up consistently by studies all across the nation. The utilities have never provided data to justify their "cross-subsidy concerns" that actually include the benefits of DG.

It would be very helpful if the Staff Report evaluated these arguments with a more critical eye to help the reader understand which of these "points of view" is supported by the weight evidence and which are primarily conjectural and philosophical.

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promoting technological and resource diversity benefits from solar energy. ~~is necessary because it is helpful to take advantage of tax breaks while they are in place, but that installation prices have not currently come down enough to create reasonable interest in installing systems. Also mentioned in this perspective is the value of diversity and what solar adds to the generation portfolio.~~ Given the challenges associated with establishing self-sustaining solar energy markets and the benefits of harvesting the economic development, jobs, and other benefits available from increased solar deployment, advocates for solar energy also pointed out the need for incentives that are durable, robust, efficient, targeted, predictable, stable, and substantial. In support of these statements, advocates point to the Commission's continuing concerns about the "uncertain and irregular nature" of the utilities' existing solar programs and its preference for incentive programs "that are long term, consistent and that foster steady growth." (U-17301; U-16543) ~~A third point of view was that incentives need to be substantial and likely ongoing in order to stimulate, maintain and sustain job growth in the solar sector.~~

Community Solar

A VOS tariff ~~is~~ offers a way to help enable community solar, as it is clear that the current net metering law is not applicable to solar that is generated off-site. Some adjustments to current VOS models may be appropriate for the benefits and costs associated with community solar installations. ~~Since several of the VOS elements are increased to give credit for the absence of line losses and the amount of line losses varies with the customer service voltage level, the VOS may need to vary by the customer's voltage service levels.~~ If the VOS tariff also requires purchase of RECs from the customers then the cost recovery of those REC purchases must be handled in an Act 295 case.

Comment [KR18]: Existing language deleted as not clear. The VOS methodology assesses the costs and benefits of the solar generator, not the ultimate customer. A tariff design such as in Austin or Minnesota would automatically account for customer voltage level and other cost-of-service attributes.

Staff Recommendation:

The parties demonstrated a strong facility with the principles of solar valuation as well as strong opinions about how valuation should be conducted. Given the importance of reasonable and common valuation of the solar resource in correctly setting incentive levels and in designing effective rates and programs, Staff recommends that the Commission order the initiation of a generic proceeding, led by Staff, designed to develop a Value of Solar methodology for use in Michigan. This proceeding could conclude that value of solar is best recognized by a specific solar tariff or that it is best recognized by use of a dynamic tariff like that advocated by 5 Lakes Energy. Such a proceeding would also help clarify whether or not net metering constitutes a "subsidy" to distributed solar customers.

Solar Program Design

The Program Design group focused on three tasks: 1) improving Consumers' EARP and analyzing the feasibility of an expansion; 2) improving the DTE's SolarCurrents Program and analyzing the feasibility of an expansion; and 3) developing Community Solar models that could be implemented in the near term. Over the last few years, the EARP and SolarCurrents programs have provided the Companies the opportunity to gain a considerable amount of knowledge regarding solar photovoltaic operation and integration. Developers and customers have been able to realize the benefits of the programs, but due to the limited incremental funding, the programs are nearing capacity. Although both the EARP and SolarCurrents Program have been previously expanded and revised, solar advocates are concerned that they remain much smaller than utility programs offered in many other states. Through the working group process, Staff has determined that there are ~~there are SWG-identified~~ additional improvements that can be made to allow for greater market confidence, the elimination of boom and bust cycles and more responsiveness to the falling price of solar materials, labor and balance of system. To introduce the work performed in the Program Design sub-group, an explanation of the existing solar programs in Michigan is necessary.

Existing Programs

Comment [KR19]: In fairness, the description of existing programs should include mention that program design and administration have been the topic of considerable stakeholder analysis and testimony in REP proceedings, including the docket that gave rise to the SWG.

Consumers' original EARP was approved by the Commission in 2009. The maximum program size was 2 MW (2,000 kW) with 1,500 kW reserved for commercial projects and the remaining 500 kW allotted to residential projects. In June 2011, the company announced that the program had become fully subscribed after completing 102 agreements. Solar advocates intervened to request an expansion of Consumers' program. After careful review~~ and design~~, the Commission determined that Consumers' program "fail[ed] to comport with the objective of Act 295 to increase the diversity of energy generation sources." (U-16543). Consumers then proposed to expand~~dedexpanded~~ the program by an additional 3 MW. The Commission approved the expanded program in May 2011 with the option for additional capacity should program funding allow. Later in 2011, the Commission approved an addition 0.25 MW for a total of 5.25 MW. As of its most recent biennial renewable energy plan review filed on May 28, 2013, the company expects to solicit a total of 6 MW of solar installations under its EARP. Solar advocates continue to express concerns about the very small size of Consumers' program, arguing that the size and structure of Consumers' program are keeping Michigan's solar industry "artificially small and inefficient." [26]

Under Consumers' original EARP (phases 1 and 2), customers receive a firm price for each kWh generated by the customer's solar generation system over a 12 year period. Phase 1 agreements began in September 2009 paying $0.65 per kWh for residential systems up to 20 kW and $0.45 per kWh for commercial systems up to 150 kW. Phase 2 agreements began in May 2010 paying $0.525 per kWh for residential systems up to 20 kW and $0.375 per kWh for commercial systems up to 150 kW.

The 4 MWs of capacity under the expanded program is split between residential and non-residential customers and ~~will be~~have been awarded in phases pertaining to the respective customer

[26] Direct Testimony of Katie Bolcar Rever, Solar Energy Industries Association, p. KBR-4 (U-17301).

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class. The price is set with a maximum offer of $0.259 per kWh, which adjusts; increasing or decreasing based on interest in prior phases. Additionally, the company offers a $0.001 per kWh bonus for systems constructed using both Michigan labor and Michigan materials.

A system's size is limited to the customer's annual electricity use, similar to the net metering program. This is a change from the original phase 1 and 2 of the EARP that allowed for systems larger than customer use within the respective category. The program will continue to add new participants for three years from the Commission approval and agreements will have 15 year terms or will expire at the end of the Renewable Energy Plan period in 2029, whichever comes first. The program allows for customers to own or lease their systems. Consumers projects that the expanded EARP program will be fully subscribed and closed to new customers later this year.

DTE's 20 MW SolarCurrents pilot program includes a 5 MW customer program and a 15 MW company program. In May 2011, DTE announced that the customer program was fully subscribed. On December 20, 2011, following intervention and expert testimony by solar advocates, the Commission ordered staff to convene a collaborative to explore opportunities for the continuation of the customer SolarCurrents program. ~~Pursuant to the collaborative, t~~The company filed an application for a 2 MW expansion on October 8, 2012 and the Commission approved the application on November 16, 2012. Solar advocates have continued to express concern about the size and structure of DTE's program.[27] The Commission has acknowledged that there is "pent-up demand" for DTE's program, which in part led to the creation of the SWG. (U-17302, Final Order)

Comment [KR20]: This suggests that the "collaborative" reached this result. I did not understand that to be case.

The 5 MW phase 1 customer SolarCurrents program provided an up-front REC payment equal to $2.40 per Watt of installed solar PV which is approximately half of the total system cost. The company will purchase the remaining RECs through a monthly payment/on-bill credit equal to $0.11 per kWh for

[27] *See, e.g.*, Direct Testimony of Katie Bolcar Rever, Solar Energy Industries Association (U-17302).

20 years. System size is limited by the customer's annual electricity use or by the 20 kW size cap (whichever is smaller).

Phase 2 ~~will~~ provided~~provide~~ for an up-front purchase of approximately 30% of the RECs that the company anticipates will be generated over the life of the system. The remaining RECs will be purchased via monthly payments based on actual generation. This purchase is done through cents per kWh payments starting on the agreement execution date and ending on August 31, 2029, for a maximum term of 16 years. The company ~~will be~~ accepted~~ingaccepting~~ applications for the 2 MW phase 2 program from residential customers up to 1.5 MW of the program and non-residential customers make up the remaining 0.5 MW of the program through four 500 kW tranches. The agreements ~~will be~~were awarded using random selection events starting in 2013 with the last tranche being awarded in 2014. Any remaining kW will be awarded during a fifth offering in early 2015. The customer must own the system and cannot participate in a third party lease.

Comment [BK21]: It is very important to highlight this difference between Consumers' and DTE's program and, in our view, to recommend that third-party financing options be made available in all utility customers.

DTE's 15 MW company SolarCurrents program includes large scale solar PV projects that are either located on DTE Energy property or on customer premises. Customers selected to host a solar project receive a one-time, upfront construction payment to cover any inconvenience during installation in addition to an annual easement payment for the life of the installation. Pursuant to two separate competitive solicitations, the company contracted with Nova Consultants to construct up to 15 MW of solar. The panels will be provided by either McNaughton-McKay Electric Company or Inovatus Solar, LLC.

Solar Advocates' Position

Comment [BK22]: It would be helpful to add some material from ELPC's presentation to the program design discussion to add some balance to this discussion and some of the context for why the Commission established the SWG.

Solar advocates have taken the position in several recent MPSC dockets that Consumers' and DTE's existing solar programs are not meeting Act 295's goals to "diversify the resources used to reliably meet the energy needs of consumers in this state" and "encourage private investment" in renewable

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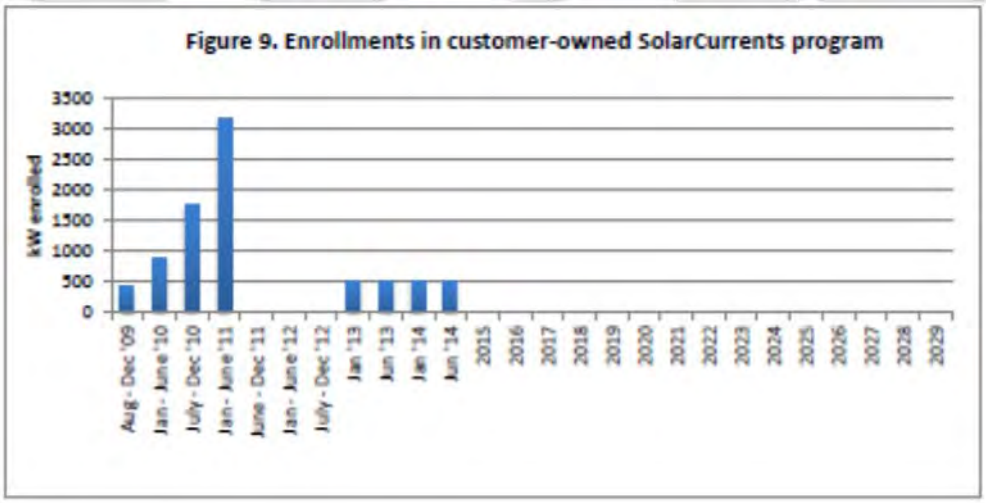
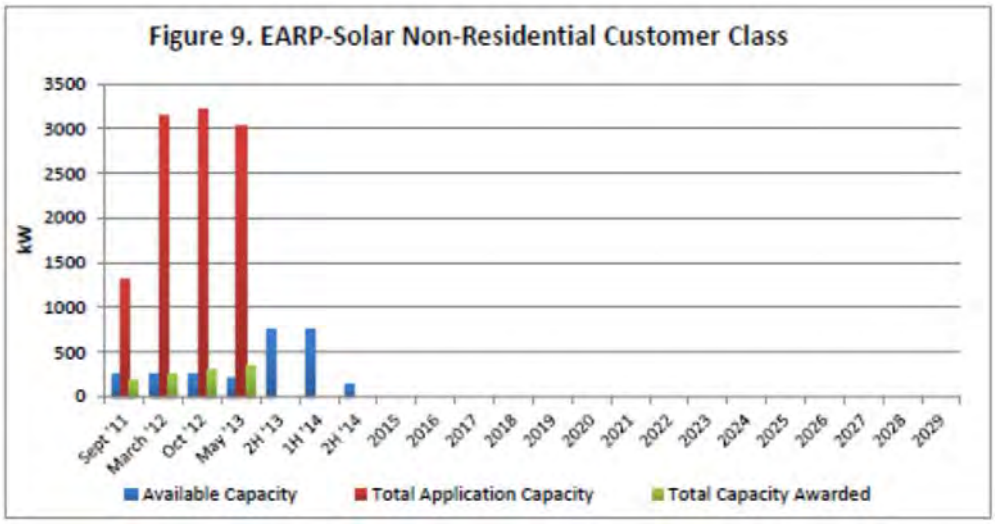
energy technologies.[28] On April 29th, ELPC presented to the SWG. ELPC's presentation highlighted prior Commission Orders that emphasize Act 295's requirement for resource diversity and the Commission's desire for solar programs that are "long term, consistent, and foster steady growth." (U-16543) Specifically, ELPC pointed out that the Commission has previously ordered utilities "to design their solar programs to avoid the 'boom and bust' cycles that can retard the growth of emerging businesses." (U-17302) ELPC senior attorney Bradley Klein presented materials showing that the available capacity in DTE and Consumers' existing programs has remained very small relative to application capacity and that the program design of each has tended to promote boom and bust cycles in the market.[29]



[28] The testimony and briefs of the Environmental Law & Policy Center and the Ecology Center in MPSC cases U-17301 (Consumers) and U-17302 (DTE) contain a full development of the solar advocates' arguments.

[29] The tables below are excerpted from Katie Bolcar Rever's expert testimony in cases U-17301 and U-17302 and were included in Mr. Klein's presentation to the SWG.



ELPC presented one possible program design option that would replace the current lottery system with a "declining capacity block" program, in which blocks of capacity with a declining price schedule would be allowed to fill on a first-come, first-served basis. This "declining block" program structure is modeled on the successful programs in other states, including the California Solar Initiative. Mr. Klein noted that this program could use the REP program funds already collected by DTE and Consumers, so that a very significant program expansion on the order of 30-50 MW per utility could likely be implemented with no increase in the customer surcharge.

Staff Program Design Discussion

During the course of the sub-group work, participants realized that the existing programs are much too close to the end of their funding limits to implement changes. Instead focus was placed on improving future programs that could possibly build on lessons learned from Consumers' and DTE's initial pilot programs. The main complaint concerning the existing programs was the very small size of the programs and the lottery method of awarding contracts in each solicitation. Potential participants must undertake lengthy planning and capital outlay prior to any solar system installation. This planning

Comment [K23]: The utilities could implement changes to their programs at any time, so this sentence is a bit misleading. For example, in 2011 both programs were actually at the end of their funding limits, but the utilities proposed amended programs that expanded the available capacity and included program design changes.

In addition, the Commission has indicated that it will consider the recommendations of the SWG report when determining whether to order Consumers to expand its solar program in Case U-17301. ELPC has requested that the Commission order Consumers to file an amended REP with an expanded solar program within 60 days of the filing of the final SWG report.

Comment [K24]: These "future programs" could be implemented immediately upon the filing of an amended renewable energy plan.

Comment [K25]: The size of the utility programs is actually much more of a concern than the lottery. In fact, the lottery likely would not be necessary if the programs were larger.

may involve discussion, and sometimes deposits with installers, permitting, and discussion with tax professionals and home- owners associations. It also may be necessary to hire structural engineering expertise to analyze roof placement and load calculations. All of these variables make a lottery selection program inefficient, for example, awardees sometimes enter the lottery before performing due diligence to secure a spot, then realize a solar installation is not feasible and drop out. At the same time another potential participant who was not selected in the lottery might have been fully prepared to install his system. This situation also puts additional strain on installers who invest time and resources into customers that are only interested in installing a system if they are selected through the lottery.

The lottery system was ~~implimented~~ the solution proposed by both Consumers and DTE to deal with two issues: 1) administrative burden; and 2) spreading the programs out for multiple years. The initial Consumers EARP and the DTE SolarCurrents Program were first come, first served. Consumers' first EARP offering was oversubscribed in the first several days because the price was set much higher than the costs of solar development.~~.~~ DTE's SolarCurrents had more fluid participation in the beginning but in May of 2011, much to the surprise of many would-be participants and installers, the remaining capacity which was expected to last for several years, was secured. These events caused the companies to implement lotteries to slow down program development and help even out program subscription. In doing so, the administrative demand on the companies could be spread over the course of years instead of months, weeks, or days.

Michigan's net metering program was established in 2008 as part of Act 295. The Category 1 (projects up to 20 kW) net metering program is limited to 0.5% of each utility's previous year's peak load, while Category 2 (projects greater than 20 kW – 150 kW) net metering program is limited to 0.25% of each utility's previous year's peak load. **Figure 10** shows the status of Consumers and DTE's net metering programs.

Comment [K26]: As discussed above, the existence of net metering program caps puts an overall upper limit on the utilities' concerns about cross-subsidization.

Figure 10: Net Metering Program Status			
	Total Program Size MW	**Participation Level MW**	**Remaining Space MW**
Consumers Energy Category 1 (Up to 20 kW)	45	1	44
DTE Electric Category 1 (Up to 20 kW)	53	7	46
Consumers Energy Category 2 (>20 kW to 150 kW)	22	0.8	21
DTE Electric Category 2 (>20 kW to 150 kW)	27	0.7	26

Figure 1, on page 7, illustrates the utility funding mechanism for DTE's SolarCurrents program which incorporates net metering as a key element. DTE asserts that there are 9 cents of unrecovered fixed utility costs in each net metering credit provided to net metering customers. Solar advocates disagree that net metering represents a subsidy. DTE's net metering credit for residential customers is about 12 cents per kWh. According to DTE, ~~The~~ the 3 cent per kWh difference between the net metering credit and the unrecovered fixed utility costs represents fuel and costs that DTE can avoid when the customer's solar PV system is generating. ~~The~~ DTE's ~~expressed concern~~ argument is that when net metering customers do not pay for the utility's fixed and unavoidable costs, then other customers must pay more to make up the difference. Solar advocates point out that proper valuation analysis shows that such cost avoidance does not actually occur over the life of the solar generating unit.

In September 2013, the Rocky Mountain Institute (RMI) issued its report, *A Review of Solar PV Benefit & Cost Studies, 2nd Edition*.[30] The report reviews 16 distributed solar benefit/cost studies by utilities, national labs, and other organizations that were completed between 2005 and 2013. One of the key insights identified by RMI:

[30] http://michigan.gov/documents/mpsc/solar_pv_benefit_and_cost_studies_448376_7.pdf

> While detailed methodological differences abound, there is general agreement on overall approach to estimating energy value and some philosophical agreement on capacity value, although there remain key differences in capacity methodology. There is significantly less agreement on overall approach to estimating grid support services and currently unmonetized values including financial and security risk, environment, and social value.

In October 2013, the Interstate Renewable Energy Council (IREC) published a "Regulator's Guidebook" to propose a standardized valuation methodology for public utility commissions to consider implementing in future studies.[31] IREC drew the following important conclusions from the RMI study:

Comment [BK27]: The IREC Regulator's Guidebook is a very important part of this story. A discussion of the RMI study is not complete without reference to this report.

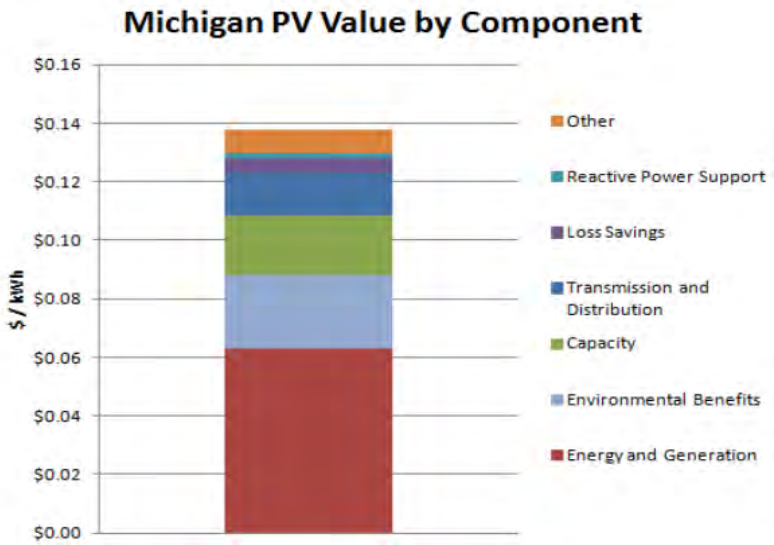
> First and foremost, the calculated benefits [of distributed PV] often exceed residential rates … implying that [net metering] would not entail a subsidy flowing from non-solar to solar customers. Second, commercial customers almost always have unbundled rates and [net metering] has minimal impact on their demand charges because they still have demand after the sun sets. That means that [distributed solar generation] benefits compared to commercial customer energy rates would be strongly positive based on almost all of these studies.[32]

Thus, the RMI report highlights that there are substantial benefits from distributed solar generation even if there isn't universal agreement on how to quantify them at this time.

NREL issued a draft white paper, The Value of Grid-Connected Photovoltaics in Michigan, in January 2012.[33] The resulting value, based on LMP data from 2006 through 2009, is 13.8 cents/kWh shown in **Figure 11**. The LMP market was impacted by the recession beginning in 2008, however, LMP prices in the first months of 2014 are approaching pre-recession levels.

[31] Keyes, J., and Rabago, K., *A Regulator's Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation*, Interstate Renewable Energy Council (October 2013) (available at http://www.irecusa.org/2013/10/experts-propose-standard-valuation-method-to-determine-benefits-and-costs-of-distributed-solar-generation/).
[32] *Id.* at 10.
[33] http://www.michigan.gov/documents/mpsc/120123_PVvaluation_MI_394661_7.pdf

Figure 11: NREL Michigan Solar Value



To determine what portion, if any, of ~~the~~ DTE's asserted 9 cents per kWh fixed costs that are not paid by net metering customers might be offset by the benefits of solar, a utility specific study would be needed. It is not possible to determine the net cross-subsidy resulting from net metering without considering the net benefits of solar. **Figure 7** shows that DTE calculated a 2013 value of solar of 3.9 cents per kWh[34]. As described above, NREL calculated a value of solar of 13.8 cents per kWh. If policy or ratemaking decisions are to be made based on the cost/benefits of solar PV, a study should be conducted to thoroughly examine all aspects of solar generation~~.~~ and to develop a methodology for valuation. The Commission could ~~opt to fund~~order such a ~~study~~ project to inform future net metering rate design and solar policy development.

Comment [K28]: This is a very important point that should be included in the executive summary and/or conclusion section.

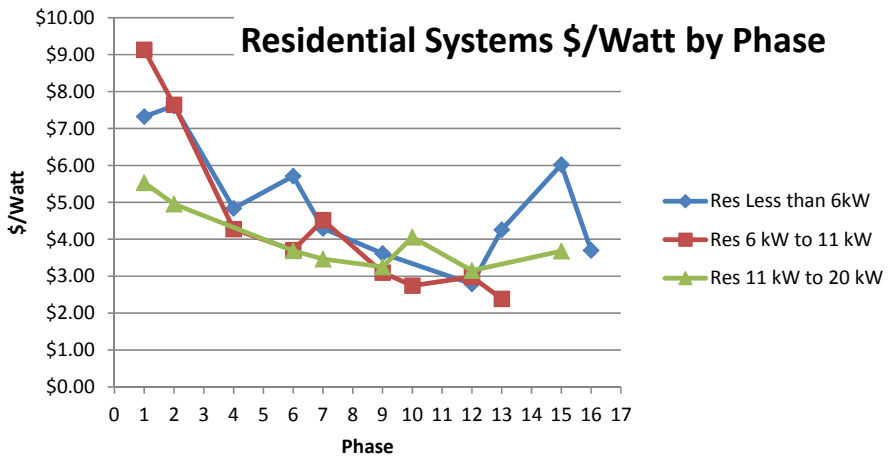
Comment [BK29]: There should be some discussion about how DTE came up with only 3.9 cents / kWh when all other solar valuation studies (including this neutral third-party calculation from NREL) come up with significantly higher numbers.

Estimates of Current Solar Project Costs in Michigan

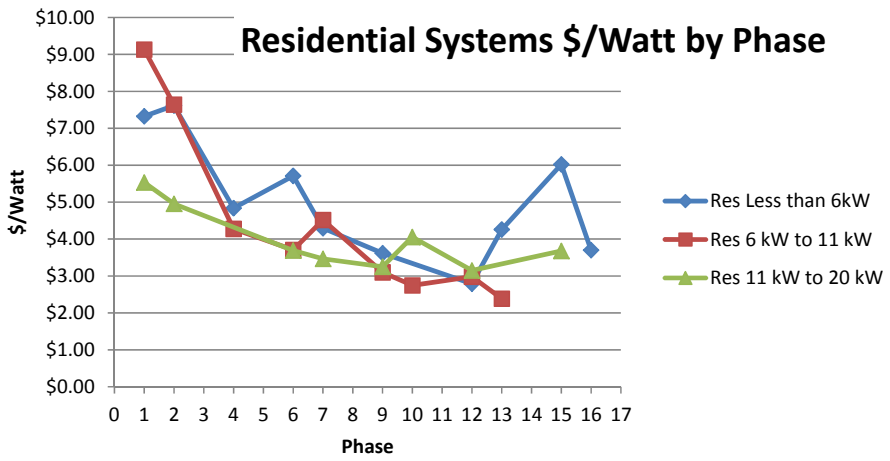
[34] There was not SWG consensus on this number.

Consumers collects cost information from customers participating in the EARP. Residential cost data is presented in **Figure 12**.[35]

Figure 12: Consumers Energy EARP – Customer Solar Project Costs



[35] Data provided by Consumers in May 19 email to MPSC Staff.



Considering the cost data provided by Consumers and through discussions with workgroup participants, Staff opted to evaluate current solar project costs using a range of $2.50 to $4.00 per watt installed. To develop and evaluate different solar program frameworks, Staff developed a model that calculates levelized dollar per kWh prices for solar projects based upon varied assumptions. The model was reviewed by the workgroup and the assumptions were updated to reflect two financing options: 80% project financing (after 30% tax credit) and no financing (project cost is reduced by the 30% tax credit). The two financing scenarios are presented below. Scenario #1 shows that the breakeven point (0% rate of return on the graph) for the range of installed costs considered is between 8 cents and 12 cents per kWh after 20 years. Scenario #2 indicates that the breakeven price range is approximately 16 cents to 25 cents kWh. Considering these price ranges, designing customer programs to at least initially provide a total credit of 15 cents per kWh ~~appearing~~ appears reasonable for the purposes of this discussion. Final program details, including incentive levels, would need to be fully vetted by stakeholders at the time of program review and implementation at the Commission.

Comment [DJ530]: This is likely somewhat low. I recommend that the first tranche start somewhat higher but that the price be adjusted more rapidly than a 5-10MW capacity tranche, in order to discover the right price.

Solar module costs are not expected to decline significantly in the near future, but the soft costs of solar systems should be reduced significantly as Michigan gains experience and scale with solar

generation.~~Solar module costs are not expected to decline significantly, however it is likely that the soft cost portion[36] will continue to decline as more projects are developed.~~ NREL reports that soft costs are now approximately 64% of total residential solar project costs.[37] There could also be a breakthrough in solar panel efficiency that could reduce the levelized costs for solar projects.

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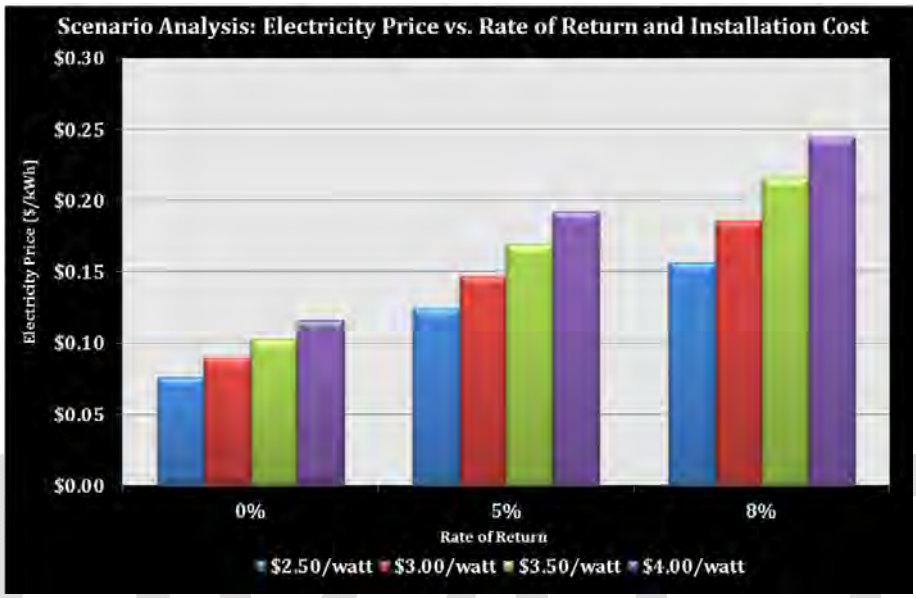
Scenario #1 (No Loans)

Comment [BK31]: You may want to check the capacity factor assumptions embedded in these models. We've heard some feedback from the solar industry that this is higher than the models they are using for solar production in Michigan. 12.5% to 13% is likely a safer estimate.

Installation Size	kW	5
Capacity Factor	%	14
Operation/Maintenance	$/kWh	$0.01
Total Project Cost	$	$17,500
Investment Tax Credit	%	30%
Total Project Cost (Net of Tax Credit)	$	$12,250
Salvage Value as Percentage of Initial Capital Cost:	%	10%
Amount of Project Financed	%	0%
Assets Depreciated	(Yes/No)	No

[36] ~~Solar financing and non-hardware costs including system design, permitting, inspection and interconnection.~~
[37] http://www.nrel.gov/news/press/2013/5306.html


Scenario Analysis: Electricity Price vs. Rate of Return and Installation Cost
$0.30
$0.25
$0.20
$0.15
$0.10
$0.05
$0.00
Electricity Price ($/kWh)
0%
5%
8%
Rate of Return
$2.50/watt
$3.00/watt
$3.50/watt
$4.00/watt

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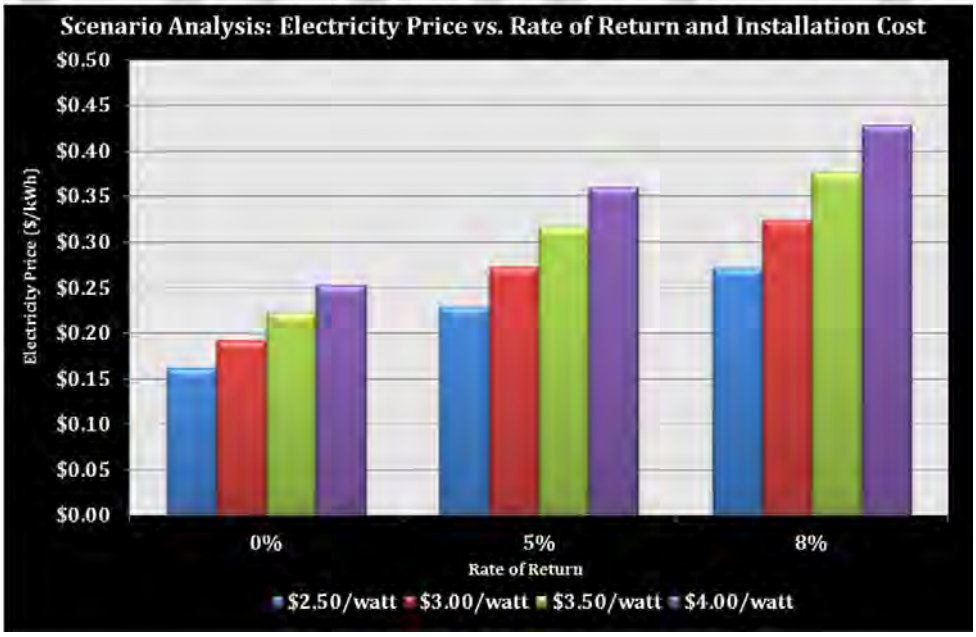
Scenario #2 (80% Financed and 20% Cash)

Installation Size	kW	5
Capacity Factor	%	14
Operation/Maintenance	$/kWh	$0.01
Total Project Cost	$	$17,500
Investment Tax Credit	%	30%
Total Project Cost (Net of Tax Credit)	$	$12,250
Salvage Value as Percentage of Initial Capital Cost:	%	10%
Amount of Project Financed	%	80%
Loan Rate	APR	7%
Loan Term	Years	10
Assets Depreciated	(Yes/No)	No



The ultimate goals of customer solar programs are to encourage distributed generation, increase the use of clean energy, provide customers with control over their energy supply and continue to increase knowledge about renewable energy.

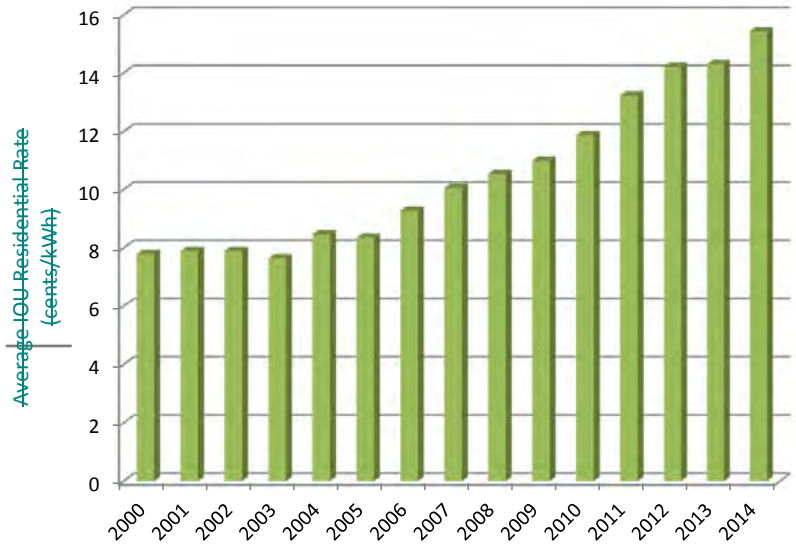
In its 2014 survey of utility customers, Deloitte found:[38]

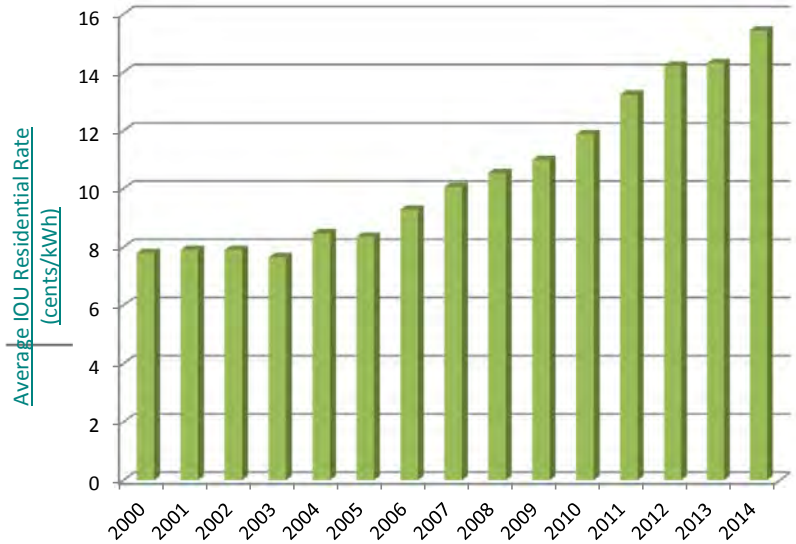
- Desire to increase the use of renewables, particularly solar, continues to trend upward among consumers: 58% ranked "increasing the use of solar power" among the top three energy-related issues most important to them, up from 44% in 2012.
- More than one-fourth (27%) named installing solar panels as among the top five actions they could take in the future, while only about 3% say they are doing this now.
- Top drivers of interest in solar panels are saving on electricity bills (80%) and solar power is clean and does not contribute to climate change (60%); while perceptions of being too expensive (43%) and fears of the panels not working as promised (29%) emerged as the main barriers to consumer interest in solar.

A number of Michigan residents have expressed interest in installing solar projects or participating in a community solar project. The Sierra Club participated in the SWG and submitted 1,800 signatures to Staff encouraging improvement and expansion of existing programs and community solar program implementation. The economics are not quite to the point where it is likely that a completely unsubsidized VOS rate or net metering are sufficient. However, if wholesale LMP market prices and utility retail rates continue to increase and solar project costs continue to decrease, the VOS may become acceptable on its own – without added incentives. **Figure 13** shows average investor owned utility rates for a residential customer using 500 kWh per month from 2000 to 2014.[39] The numbers shown in **Figure 13** include revenue that is not in the net metering credit such as monthly customer charge and certain surcharges.

[38] http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/Energy_us_er/us_er_reSources2014_summary_May2014.pdf
[39] http://www.dleg.state.mi.us/mpsc/electric/download/rates1.pdf

Figure 13: Average Michigan Investor Owned Utility Residential Rates





Based on input from the SWG, Staff has provided the framework for 3 customer solar program options that could be considered for continuing solar efforts. Descriptions and analysis of each option is provided below. These options incorporate incentives or subsidies; however, they are, in almost all cases, less than the current solar programs, and are phased out at the conclusion of the programs. Solar installers would prefer solar options for their customers that do not rely on the lottery system and reduce their transaction costs when working with customers to sell a solar project. Allowing the third party leasing option as well as community solar to be included in all future solar programs may be a way to make solar projects available to customers with lower income levels. Michigan's net metering program does not prohibit third party leasing. Sunrun explained in a presentation to the SWG that in California, third party solar installations represented 70% of the residential solar market share in 2012.[40]

Comment [KR32]: The target should be accomplishment of certain amount of solar capacity installed. That amount should be the amount necessary to support the emergence of a self-sustaining solar market in Michigan. Is there any evidence to suggest that 50 MW is that number?

Comment [K33]: Good takeaway. Should be highlighted in Conclusions.

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~~Potential Achievable~~Staff Recommended Solar Program Designs

Comment [DJ534]: Staff's discussion of the solar program options is somewhat ambiguous as to whether the value of solar in each case is expected to change as avoided costs change through Power Supply Cost Recovery and other rate cases. If not and these are expected to take the form of standard-offer PPAs, then the calculations should further credit solar for its hedge value and reduce the REC payments needed to achieve the target payment level.

The example solar program designs below show billing data for a residential customer with a 5 kW solar PV project. Monthly usage of 650 kWh is assumed to represent the average residential customer in Michigan. A 14% solar capacity factor is assumed which yields 511 kWh per month on average from a 5 kW solar PV project. All three example program options are 50 MW; however, some portion of the 50 MW, with the exception of the net metering option, could be filled with community solar projects. If the entire 50 MW program is subscribed, based on a 14% solar capacity factor, the program's annual generation would be 61,320 MWh per year. This amount of solar generation

[40] http://www.michigan.gov/documents/mpsc/14-0429_Michigan_PSC_solar_working_group1_454793_7.pdf

represents approximately 0.18% of Consumers' and 0.14% of DTE's annual retail sales based on 2012 retail sales data.

Comment [K35]: Important to highlight how small these proposed programs are in comparison to the utilities' overall sales. It helps to put the utility cross-subsidy arguments in proper perspective.

Option 1: Category 1 Net Metering and REC Credit

Under this program, the participating customer would enroll in Michigan's existing net metering program. For this example, the net metering credit is assumed to be $0.125 per kWh and the REC credit is $0.025 per kWh. While the current net metering credit is under the breakeven 15 cents per kWh solar project rate, utility rates may increase as indicated in **Figure 13**, and the REC credit could be reduced or dropped in the future.

Comment [BK36]: Note that there is no inherent reason to require customers to participate in the net metering program in order to be eligible for the REC credit. Some customers may be interested in using PV to offset some of their load and using the REC credit, even though they don't qualify for net metering in Michigan.

One of the goals of the solar program should be balanced market development across residential, small commercial and larger commercial customers and programs should be designed with that factor in mind.

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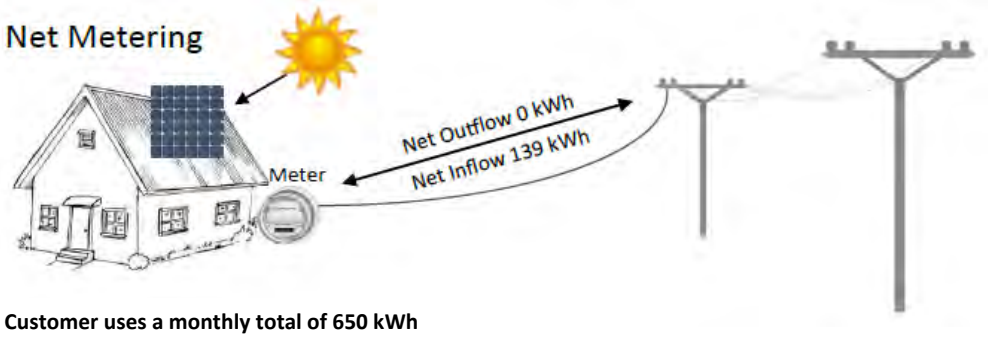
Assumptions for Option 1:

- Program Size - 50 MW (For calculation purposes all 3 program options were sized at 50 MW. Staff is not suggesting an increase in the Category 1 net metering program size.)
- Estimated Participants @ 5 kW per project -10,000 projects
- Participating Customer Class - Any, but mostly likely residential
- Maximum Project Size- 20 kW, limited to 120% of the customer's annual usage in kWh
- Customer Interconnection Costs Limited to $100 interconnection/net metering application fee
- Net Metering Credit – Currently estimated at approximately 12.5 cents/kWh (Does not reflect PSCR factor or other applicable surcharges.) Credits carry forward indefinitely.
- REC Credit – Initially $0.025/kWh ($8 per REC, Solar receives 3.14 RECs per MWh) The utility may issue a check to the customer if REC credits reach a pre-determined level. The REC credit for new participants will decrease when each 5 – 10 MW block of capacity fills.

Comment [KR37]: This may be short-sighted. Systems slightly oversized will generate valuable excess energy that can be used by the utility to serve nearby loads. Multiples (say 1.2X) of rolling averages could be considered.



Customer uses a monthly total of 650 kWh
5 kW Solar Generation 511 kWh

Bill Analysis-Residential Customer

	Example Residential Rates	Bill Without Net Metering or REC Credit	Bill With Net Metering and REC Credit
Customer Charge	$6	$6	$6
Energy Charge	7.5 ¢/kWh	650 kWh * $0.075/kWh = $48.75	(650 kWh – 511 kWh)*$0.075/kWh = $10.43
Distribution Charge	5 ¢ /kWh	650 kW * $0.05/kWh =$32.50	(650 kwh – 511 kWh)*$0.05/kWh = $6.95
Total		$87.25	$23.38
REC Credit	$8/REC or $0.025/kWh		$0.025/kWh * 511 kWh = $12.78
Bill With REC Credit			$10.60
Bill Savings/Solar KWh			($87.25–$10.60)/511 kWh = $0.15 per kWh
Example is simplified and does not reflect power supply cost recovery factor or surcharges.			

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Option 2: Buy All and Credit All

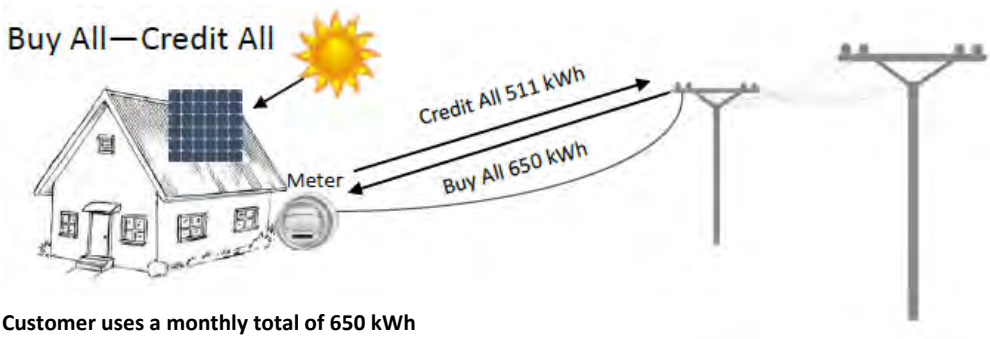
Under this program framework, the participating customer would pay the utility for all monthly kWh usage based on the customer's rate schedule. Solar generation would not be used by the customer "behind-the-meter" as in net metering. All solar generation would be metered and credited at the VOS rate plus a REC credit on the customer's bill. In this example, the VOS Credit is equal to $0.10 per kWh and REC credit equal to $0.05 per kWh to bring the total credit to $0.15 per kWh.

Comment [KR38]: This approach raises potential tax issues that may unnecessarily complicate the arrangement for customers and utilities. Using a credit mechanism as in Austin and Minnesota and keeping the use "behind the meter" avoids these issues. This approach may also make every transaction a "PURPA" sale, and obligate utilities to record the transaction as a long-term contract obligation. This approach may also create property tax issues if the system owner and the site owner are different entities.

Assumptions for Option 2:

- Program Size -50 MW comprised of five 10 MW capacity blocks
- Maximum Project Size
  - Small Projects: 20 kW, limited to the customer's annual usage in kWh
  - Large Projects: 20 – 500 kW (includes Community Solar Program capacity)
- Estimated Participants
  - Small Projects: >125 Projects
  - Large Projects: >15 – 375 Projects

- Participating Customer Class - Any
- Customer Interconnection Costs
  - Limited to $75 interconnection fee for projects less than 20 kW
  - See the MPSC's Electric Interconnection and Net Metering Standards for larger project interconnection costs.
- VOS Credit- $0.10/kWh assumed for the example bill shown below.
- REC Credit – Initially $0.05/kWh ($16 per REC, Solar receives 3.14 RECs per MWh). The REC credit for new participants will decrease when each 5 – 10 MW block of capacity fills.



Customer uses a monthly total of 650 kWh
5 kW Solar Generation 511 kWh

Bill Analysis – Residential Customer

	Example Residential Rates	Bill Without Value of Solar or REC Credits	Bill With Value of Solar or REC Credits
Customer Charge	$6	$6	$6
Energy Charge	7.5 ¢/kWh	650 kWh * $0.075/kWh = $48.75	650 kWh * $0.075/kWh = $48.75
Distribution Charge	5 ¢ /kWh	650 kW * $0.05/kWh =$32.50	650 kW * $0.05/kWh = $32.50
Total		$87.25	$87.25
Value of Solar Credit	$0.10/kWh		511 kWh * $0.10/kWh = $51.10
REC Credit	$16/REC or $0.05/kWh		$0.05/kWh * 511 kWh = $25.55
Bill With REC Credit			$10.60
Bill Savings/Solar KWh			($87.25–$10.60)/511 kWh = $0.15 per kWh
Example is simplified and does not reflect power supply cost recovery factor or surcharges.			

Option 3: Buy Net – Credit Net

This program option uses elements from both the Category 1 Net Metering and REC Credit and the Buy All – Credit All programs previously discussed. Under this program, the customer uses their solar generation "behind-the-meter" similar to net metering. However, any solar generation sent to the

distribution system is credited at VOS and total solar generation receives the REC credit amounts. All kWh delivered by the utility to the customer are purchased by the customer at full retail rate. This program is essentially the Act 295 modified net metering program with the net metering credit set to VOS and the REC credit amounts instead of the generation portion of the retail rate or LMP. For this example, since a VOS has not been established through a contested case, Staff is using a VOS credit equal to $0.10 per kWh. The approximate residential credit for "behind-the-meter" usage is equal to $0.125 per kWh. Determining the appropriate REC credit resulting in an average per kWh credit of $0.15 per kWh is more complicated in this example because "behind-the-meter" usage results in a $0.125 per kWh credit and the VOS credit for kWh sent to the distribution system is $0.10 per kWh. A REC credit of $0.035 per kWh or $11 per REC is used. However, the REC credit can be used to make up the difference between the VOS credit and an average total credit of $0.15 per kWh when the VOS credit is determined.

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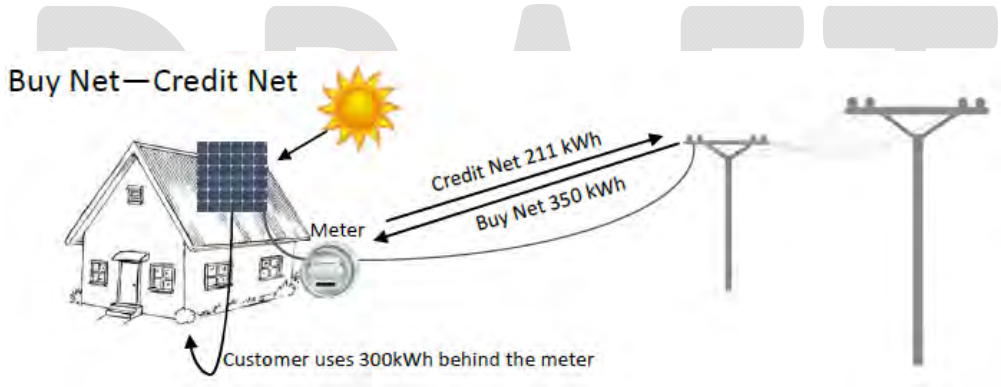
Assumptions for Option 3:

- Program Size -50 MW comprised of 5 capacity blocks
- Maximum Project Size
  - Small Projects: 20 kW, limited to the customer's annual usage in kWh
  - Large Projects: 20 – 500 kW (includes Community Solar Program capacity)
- Estimated Participants
  - Small Projects: >125 Projects
  - Large Projects: >15 – 375 Projects
- Participating Customer Class - Any
- Customer Interconnection Costs
  - Limited to $75 interconnection fee for projects less than 20 kW
  - See the MPSC's Electric Interconnection and Net Metering Standards for larger project interconnection costs.
- VOS Credit- $0.10/kWh assumed for the example bill shown below.

- REC Credit – Initially $0.035/kWh ($11 per REC, Solar receives 3.14 RECs per MWh, which applies to all solar generation). The REC credit for new participants will decrease when each 5 – 10 MW

	Example Residential Rates	Bill Without Value of Solar or REC Credits	Bill With Value of Solar or REC Credits
Customer Charge	$6	$6	$6
Energy Charge	7.5 ¢/kWh	650 kWh * $0.075/kWh = $48.75	350 kWh * $0.075/kWh = $26.25
Distribution Charge	5 ¢ /kWh	650 kW * $0.05/kWh =$32.50	350 kW * $0.05/kWh = $17.50
Total		$87.25	$49.75
Value of Solar Credit	$0.10/kWh		211 kWh * $0.10/kWh = $21.10
REC Credit	$11/REC or $0.035/kWh		$0.035/kWh * 511 kWh = $18.05
Bill With REC Credit			$10.60

block of capacity fills.



Customer uses a monthly total of 650 kWh
Customer purchases 350 kWh from the utility
5 kW Solar Generation 511 kWh
300 kWh are used "behind-the-meter"
211 kWh are sent to the utility's distribution system

Bill Analysis – Residential Customer

Bill Savings/Solar KWh			($87.25–$10.60)/511 kWh = $0.15 per kWh
Example is simplified and does not reflect power supply cost recovery factor or surcharges.			

Discussion of Options

The Net Metering and REC Credit, Option 1, could be implemented quickly because the net metering program is already successfully established. To enable the REC credit element of the program, the utility may file a Renewable Energy Plan amendment requesting approval to implement the REC credit and collect any necessary funding by increasing the monthly renewable energy surcharge, if needed. Michigan solar program participants will benefit if the program is in place to allow use of the 30% federal tax credit. Until a distributed solar cost/benefit study is completed, the extent of ratepayer cross-subsidization, if any, is unknown. ~~However, DTE estimated the net metering subsidy is 9 cents per kWh.~~

Program Options 2 and 3 incorporate both a VOS and REC credit. For purposes of illustration, the VOS has been assumed to be $0.10 per kwh, but the actual VOS would need to be determined through a Commission proceeding, based on either the Minnesota approach or the dynamic rates approach recommended by 5 Lakes Energy. It is likely that a Commission proceeding to establish a VOS credit amount and an amended renewable energy plan proceeding would be needed for full implementation of these programs. Option 1, Net Metering and REC Credit, does not provide a credit with a stable and known amount that potential customers could use to obtain lower cost financing. Options 2 and 3 could be structured to provide a known credit amount similar to the Minnesota VOS program, if that is one of the desired goals. The VOS and REC credits could be deemed taxable income. The likelihood of this has been mitigated in the Austin Energy and Minnesota VOS programs by providing on-bill credits and zeroing out unused credit annually. Options 2 and 3 are structured so that community solar could be incorporated. Under Option 2, the customer pays for all on-site usage

Comment [K39]: This is an important takeaway that should be highlighted in the Executive Summary and Conclusions sections.

Comment [K40]: Unless Staff believes that DTE adequately supported this estimate, I don't believe it should appear in this discussion. At the very least, the opposing perspective (and data) should be referenced.

Comment [KR41]: Repeating this unsubstantiated assertion yet again suggests bias

Comment [KR42]: See comments above, re: Option 2.

Comment [K43]: I'm not sure this is true. SunRun presented that they build their financing programs around state net metering programs all the time. Maybe I'm misunderstanding the point.

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according to the utility rate schedule. All solar generation receives a VOS credit, which is not subsidized by other customers, and the REC credit, which is a transparent incentive.

From a utility rate recovery perspective, REC credit costs will be funded through Consumers' and DTE's monthly renewable energy surcharge. With the amount of funds already collected and the dramatic cost decrease of wind energy, increasing renewable energy costs to fund solar programs may not result in an increased renewable energy surcharge for Consumers or DTE.

Comment [K44]: This is a very important takeaway and I believe it should be highlighted in the Executive Summary and Conclusions.

It would be helpful to discuss and document the "regulatory liability" balance that both utilities project to accumulate by 2029 and directly compare to the projected incremental cost of the three program expansion options proposed in this report.

To address customers and installer concerns with lotteries and to help eliminate large sudden capacity build-out, the sub-group discussed a capacity block system. This system would eliminate lotteries by allowing for program participation in capacity blocks. When a particular capacity block is filled, the price is reduced for the next block until that too becomes filled. This continues until all the slated capacity is realized. The declining block pricing provides for market response and helps to extend the program over time instead of fluctuating builds. It also provides some certainty to potential project owners and installers as they will know how much capacity is left in the program and how quickly each block is filling. This allotment method would present challenges to the utility as interest levels in any given block would be unknown. A customer may be interested in an early block based on the payment provided, but be placed in a subsequent block due to application timing which may not provide the necessary economics for the customer. Frequent customer updates as to program participation levels would be necessary to assuage this concern. Additionally, setting the initial block prices will be difficult. Considering current solar project installed costs, Staff used an initial 15 cent per kWh total credit level in its program design. Too high of a price will cause a flood of applications, while too low of a price will not garner participation. It may be necessary to implement a mechanism that adjusts prices within blocks to mitigate these issues.

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The annual REC costs average approximately $1 million dollars per year for the Net Metering and REC Credit, Option 1. Without knowing the actual value of solar credit for Options 2 and 3, calculating the REC credit necessary for the program is speculative. However, Staff estimates average annual program REC costs of $2 million and $6 million for 10 and 4 cent per kWh VOS credits, respectively.

Comment [DJ545]: This statement is confusing. I suggest writing a separate sentence for each option (I think the order is reversed in this sentence).

Also – citing DTE's 4 cent VOS credit here may result in an unrealistic estimate of program costs. Care should be taken not to cite to this number for the purposes of Staff's cost estimates unless there is a reasonable basis to believe it is accurate.

Due to faster than expected declines in the costs of renewable energy, both DTE and Consumers have collected more customer surcharges than they project will be necessary to implement their renewable energy plans. Between both utilities together, the present day value of this projected 2029 "regulatory liability balance" is somewhere in the neighborhood of $50 million. Therefore, it appears that under any set of assumptions, the three solar expansion program options in this report could easily be funded out of this regulatory liability balance without the need to increase current customer surcharges.

Comment [K46]: This is a very important point to make in the report. The Commission needs to know that these changes could be implemented without any change to customer surcharges.

The Commission's Partial Order issued on June 19th in the Consumers Case (U-17301) rejected the Company's proposal to adjust the transfer price. This means there is even more funding available in Consumers regulatory liability balance. Douglas estimates somewhere in the neighborhood of $30 million in present day value for Consumers alone.

Hybrid Approach

Given the time and process requirements to establish a value of solar methodology and value of solar calculations for the utilities, Staff also recommends consideration of a hybrid approach in which Option 1 is used for one or more years with a view to transitioning into a permanent design informed by VOS analysis.

Community Solar

Traditionally, only homeowners in ideal locations, with properly oriented building structures could take advantage of solar energy. This prompted the concept of community solar programs, also called "shared solar"- or "solar gardens~~.~~." Through a properly designed community solar program, a much broader segment of the population ~~is able to~~can participate in a solar project. Renters, lower

income individuals, people prohibited from installing solar due to associations or codes, people who do not want to maintain an installation, and people who have shading issues due to foliage, nearby buildings or improperly oriented roof space can be part of a community solar program and receive bill credits for the proportional generation of their share of the installation without the project being located on their premises.

Community solar programs can use a variety of different models. Cherryland Electric Cooperative and Traverse City Light & Power jointly are the first electric providers in Michigan to offer a community solar program through the Solar Up North (SUN) Alliance Program. The framework for this program comes from the energy optimization standard of Act 295 as opposed to net metering or the renewable energy standard. Cherryland Electric Cooperative members and Traverse City Light & Power customers can purchase solar shares for a one time investment of $470.00 each. The participants receive a $75.00 Energy Optimization rebate per panel. The electric providers use the wholesale electric market prices to determine the amount of monthly bill credit to provide to the participants. It is estimated that the credit will be an average of $2.00 per month. This amount will be based on the total monthly array output and will vary based on solar production for the month. The SUN Alliance Program has attracted customer participation and is continuing to grow.

Home Works Tri-County Electric Cooperative has followed Cherryland's lead and recently installed the second Community Solar Garden in Michigan.[41] The project is 20.9 kW and consists of all American made components. The project has left room for expansion up to 124.5 kW. Members can sign a 20 year lease for $425 after a $200 Energy Optimization Rebate and a $75 Touchstone Energy Rebate. The member will receive a bill credit equal to the prior year's wholesale rate (currently $0.082 per kWh).

[41] http://www.homeworks.org/content/were-growing-community-solar-garden

On September 3, 2013, the Ann Arbor City Council released a resolution that City Staff will work with DTE Electric to develop a community solar project by March 2014. The City is currently waiting for release of this report to continue its efforts. Additionally, East Lansing has posted a survey on its website garnering community interest in community solar based on information that Lansing Board of Water and Light might release a request for proposal to develop a community solar project.[42] It is evident that there is considerable interest in the State for community solar programs.

Comment [BK47]: I believe the results of this survey are now available and indicate that nearly 90% of respondents would be interested in a community solar project. If this is available it would be very useful information for this report. Please check with John Kinch at Michigan Energy Options.

Throughout the process, both DTE and Consumers expressed interest in building and owning a community solar project. Staff analyzed various community solar models that could be readily implemented by Consumers and DTE. Three options were investigated: 1) Company-owned panel lease model, 2)Private party third party model, and 3) Crowd funded third party model.

Staff analyzed various options of utility ownership and customer participation. Options similar to DTE 's existing GreenCurrents[43] and Consumers' Green Generation[44] programs in which the customers pays a premium for green energy (in this case solar) were analyzed. Staff determined that customers would most likely want a program that is different from the traditional green pricing premium program, provide a more tangible asset, and could potentially provide for an economic return in addition to the environmental stewardship associated with the GreenCurrents and Green Generation Programs. This discussion led to consideration of a panel sale or panel lease option. Regulatory accounting and the utilities' long term depreciation and rate of return schedules complicate these options. Staff analyzed a panel lease model that would allow the costs of the installation to be spread over the life of the asset on an escalating scale that follows a reverse depreciation curve.

[42] http://www.cityofeastlansing.com/CommunitySolar/
[43] http://www.dteenergy.com/greenCurrents/
[44] https://www.consumersenergy.com/content.aspx?ID=1458

Utility Lease Model

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The panel lease model is not without its own challenges for utilities. In order for this to appeal to the utility by earning a return on its capital investment, it must be considered an operating lease and not a capital lease. Consideration under an operating lease means that the contract with customers must follow four guidelines as prescribed in the Uniform System of Accounts, Subject to the Federal Power Act, Part 101, General Instructions, Sec. 19.[45]

Under the utility lease model, c~~C~~ustomers would sign a lease with the utility with no upfront payments. The customer pays for the energy supply component of the pro-rata lease on a volumetric basis that escalates every year. In addition to the energy supply solar premium payment, the customer would pay for the distribution component associated with the generation from the panel that is leased. In doing so the customer is replacing power supply charges on their firm service tariff with the solar payment. The expectation is that the solar payment, based on a fixed escalating schedule, would reach parity with retail energy prices before the end of the lease agreement.

In this model, the company is made whole for all of its administration costs, operating and maintenance, taxes, and return on and return of capital investment. The customer would be able to hedge against future energy price risk by receiving the solar payment schedule upfront and hopefully realize a net bill savings at the end the lease agreement.

Third-Party and Customer-Owned Community Solar Development

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The group, as a whole, was very interested in a third party model of ownership. Similar to the structure developed in Section 33 of PA 295, 50% company-owned and 50% developer/customer owned community solar limits would allow for a price competitive atmosphere where program innovation and

[45] http://www.ecfr.gov/cgi-bin/text-idx?rgn=div5&node=18:1.0.1.3.34

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best practices would thrive. This policy would have to be carefully constructed to allow flexibility in situations where no third parties feel that the economic atmosphere is ripe for participation which could stunt utility progress should they be held to this stipulation. The third party/customer owned community solar program implementation could be accomplished in a number of ways with two concepts coming to the forefront for initial ease and expedited program development: third party lease of panels and crowd funded customer project.

Comment [K48]: This is an important point. There should be balance and diversity in the ownership models for community solar.

A third party model similar to that developed in Minnesota by Xcel Energy[46] would allow for developers to build a community solar project and sign-up customers. The developer would be responsible for all customer interaction and all development and maintenance of the facility. In exchange, the developer would receive a REC payment from the utility and/or a small up front or on-going fee from the customers. The utility would purchase the RECs and the energy from the developer and credit the customer's bill with VOS.

A relatively new enabling option for community solar has arisen with the December 2013 passage of PA 264[47] allowing for crowd-funding in Michigan. Businesses can now sell equity shares without registering with the Securities and Exchange Commission (SEC). This eliminates a costly and complicated barrier allowing for groups of non-accredited investors to purchase shares of a Community Solar project up to $10,000 each with a total project cost of less than $1 million.[48] This option opens to individuals models and projects similar to the third party model mentioned above which may provide better economics to customer owners. Even with the legislation allowing for such an option, the crowd-funded model provides legal complexities that may hinder participation to all but the most legally-savvy participants.

[46] https://www.xcelenergy.com/Save_Money_&_Energy/Residential/Renewable_Energy_Programs/Solar_Gardens_-_MN
[47] http://www.legislature.mi.gov/documents/2013-2014/publicact/pdf/2013-PA-0264.pdf
[48] This cap is raised to $2 million if audited financial statements are provided to the SEC.

Both of these third party style model options raise issues with utilities. The concepts take sales away from utilities by allowing an independent power producer to substitute energy traditionally supplied by the companies with solar energy similar to Public Utilities Regulatory Power Act of 1978 (PURPA)[49] contracts. Utilities are still required to provide the energy and capacity should the distributed solar installation fail for some reason, which comes at a cost that must be borne by and spread over all customers.

Conclusion

The SWG met the Commission's directive to discuss and determine possibilities for improving customer programs and a means for incorporating community solar. Three customer solar program and community solar options were discussed and investigated, any of which could be implemented upon utility request and Commission approval. Each of these program expansions would operate more cost effectively than the utilities' existing programs and could likely be implemented without any change in current customer surcharges. Community solar programs could be established on a pilot program basis. There are many program variations and the SWG was not able to review and analyze all of them. Staff encourages the SWG participants to continue to monitor solar program activities.

Comment [BK49]: I feel this is one of the most important takeaways from the whole working group exercise.

Utilities, customers, environmental groups and policy makers will ultimately need to consider the policy benefits of encouraging customers to install distributed customer solar projects. The SWG heard from presenters pointing out that solar currently costs approximately three times more than other types of renewable energy like wind where some large, utility scale projects have achieved levelized costs under $50 per MWh (5 cents per kWh). Presenters also pointed out that there are many benefits of solar such as cleaner air, distributed energy benefits to the grid, generation during periods of

Comment [K50]: Does this statement reflect current solar pricing or is it outdated?

[49] http://energy.gov/oe/services/electricity-policy-coordination-and-implementation/other-regulatory-efforts/public

high electric use, economic development and increased diversity in Michigan's renewable portfolio. The Commission has determined that Act 295 requires resource diversity and has expressed a preference for solar programs that are "long term, consistent and that foster steady growth."

Comment [BK51]: This is the reason for the ongoing solar discussions and I believe it is worth mentioning in the conclusion.

A properly designed VOS tariff would assure that the utility and non-participating customers are indifferent from a cost perspective. Care should be given to balancing the benefits with impacts on all customers, especially low-income customers. When these incentives or subsidies are collected through a power supply recover rate, regulated customers are at a disadvantage relative to customers of retail choice suppliers and municipally regulated or self-regulated utilities, who do not have the same requirement to subsidize energy priced above the market.

Recommendation: The parties demonstrated a strong facility with the principles of solar valuation as well as strong opinions about how valuation should be conducted. Given the importance of reasonable and common valuation of the solar resource in correctly setting incentive levels and in designing effective rates and programs, Staff recommends that the Commission order the initiation of a generic proceeding, led by Staff, designed to develop a Value of Solar methodology for use in Michigan. Staff also recommends that DTE and Consumers file amended renewable energy plans to expand and improve their customer-owned solar programs, including means for incorporating community solar into the programs.

~~If Consumers and DTE decide to move forward with additional solar programs including community solar,~~Staff recommends that programs be put in place in time to allow Michigan customers to utilize the 30% federal tax credit. The Net Metering and REC Credit program for small solar projects could serve as a bridge to implementing a VOS credit by building on a program already established. The VOS calculation is highly complex and should be determined after thorough review such as in a contested case process.

Comment [K52]: I think there needs to be a stronger "recommendation" coming out of this report. The Commission is looking to the SWG report to help inform its decision on the Consumers program as well as point the way forward for future program changes in Michigan. In light of this expectation, I do not think it is appropriate for the SWG report to simply defer the question of whether solar programs should be expanded entirely to the discretion of the utilities.

We began the working group process with everyone expressing a desire that this process lead to real changes and real action. I believe that this is what the Commission expects and that the report establishes a clear basis for this recommendation.

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Staff would like to thank each of the SWG and sub-group participants for their efforts to make the SWG successful. The many informative presentations and thoughtful discussions helped to highlight key elements of possible future solar programs. While there were participants with differing viewpoints of the importance of expanding customer owned solar projects and community solar opportunities, all members approached the work of the SWG in good faith. Additionally, Staff thanks Consumers and DTE for providing data at several points during the SWG process.

Distributed generation systems, including solar, result in a paradigm shift for regulated utilities and will change cost recovery mechanisms going forward to maintain a financially healthy utility that can provide reliable and economical energy, capacity and services to its customers in the future. Advanced metering, smart grids, and dynamic pricing all help to facilitate this transition and foster an understanding by all customers and policy makers that a stable utility is necessary for reliable electric service which in turn drives business growth, job creation and positive economic activity.

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Page 26: [1] Comment [DJ516]	Douglas Jester 5LE	6/20/2014 2:23:00 PM

This statement and the subsequent discussion should not be in the same paragraph as the preceding material relating to externalities. These are logically separate subjects. Incentives for the purpose of promoting the use of solar in Michigan don't really belong in the value of solar calculation or a tariff; they should be an add-on for the purpose of meeting the objectives of the programs if and as necessary. I suggest that the material beginning with the statement quoted above be removed from the value of solar discussion and placed in program design several pages later.

GLREA Comments on
MPSC Solar Working Group Draft Staff Report

The Great Lakes Renewable Energy Assoc. (GLREA) appreciated the opportunity to participate in the MPSC collaborative to explore how policies and programs can be improved to encourage the expansion of the use of solar energy and the further development of the solar industry in Michigan. Solar energy provides many benefits to utilities, utility customers, and society and these should be taken into account when developing state and utility policies and programs.

The results from the collaborative process should expand solar choices for customers. Net metering is a relatively simple and useful policy that should be continued as an option for utility customers. It can be improved by expanding eligibility for "true net metering" to photovoltaic systems up to and including 550 kW. Virtual net metering should be enacted into law so that the net metering concept can be applied to community solar projects. Any concerns about non-participants subsidizing the participants in net metering (which may or may not be justified) can be alleviated first by utilizing surplus renewable surcharge funds to cover this extremely small program relative to the utilities total business. Net metering program size is limited in Act 295 to 0.5% of the utilities peak load each year and is currently well below that. The renewable surcharge can easily cover this relatively minor expense. Eventually, if the net metering load reaches the limits set by Act 295, utilizing the "value of solar" methodology could be implemented.

The Minnesota Department of Energy Resources describes the Value Of Solar (VOS) as "…the value of distributed solar to the utility, its customers, and society." This definition should guide development of state policies and programs in Michigan. For example, the University of Michigan Dow Fellow students recommended that the avoided environmental cost for Michigan should be at least $0.023/kWh. Avoided environmental cost while not a direct cost to utilities is a direct cost to society and should be included in state policy related to VOS.

While work group discussions on the VOS were helpful, the MPSC staff report acknowledges that there was not consensus in many areas. The MPSC staff report recommends that the Commission fund a study to thoroughly examine all aspects of solar generation and its benefits and costs. GLREA supports this recommendation and believes it can help resolve some differences between the various stakeholders.

Solar installers talked to the Solar Work Group about the problems with "boom-and-bust" programs and the lottery system that is now being used in the utility pilot solar programs. The Commission has expressed a strong desire for long-term, sustainable solar programs that avoid "boom-and-bust" cycles. We will soon enter an indefinite "bust" cycle unless immediate steps are taken to extend and expand the programs.

After considering the input from working group participants, MPSC Staff identified three program options that would allow for greater market confidence, the elimination of boom-and-bust cycles and more responsiveness to the falling price of solar systems. These three options could enable DTE and Consumers to expand their customer-owned solar programs by at least 50 MW at a lower cost per MW than the companies' current programs. With the amount of funds already collected by each utility and the dramatic cost decrease of wind and solar energy, these expanded programs could likely be implemented without any increase in the renewable energy surcharges on customers' bills.

Discussions with the SWG identified several additional program features that could further lower solar program costs. Programs should replace the existing lottery system with a capacity-based step-down structure. Michigan solar program participants will benefit if the program is in place soon to allow use of the 30% federal tax credit. Allowing third-party leasing options in all future solar programs would enable lower cost development and make solar energy more widely available.

Community Solar was specifically targeted for discussion in the Case U-17302 order creating the Solar Working Group, "to discuss and determine possibilities for improving the Company's customer SolarCurrents program including means for incorporating community solar into the program." In their report, "Staff determined that customers would most likely want a program that is different from the traditional green pricing premium program, provide a more tangible asset, and could potentially provide for an economic return." This means Community Solar, where the customer's investment pays back and serves as a hedge to rising electricity costs. We at GLREA have found a very strong interest from Michigan electric customers in being able to invest in a Community Solar project.

There is a brief discussion at the end of the staff report on Community Solar where various models for Community Solar are analyzed and barriers identified. Thus far, the Michigan public utilities have been forthcoming mostly with reasons why Community Solar program implementation may be difficult.

Given the facts that:

- Community Solar is growing at a tremendous rate across the country (over 1000% in the last 2 years),
- the U.S. Department of Energy believes this growth will continue and is strongly supporting Community Solar,
- numerous states have passed, or are planning legislation mandating that public utilities offer Community Solar programs,
- Community Solar offers access to solar energy investment to the more than 70% of electric customers that cannot invest in solar at their own homes and businesses,
- Michigan municipal utilities and rural co-ops are moving forward with Community Solar options for their customers,
- Existing Community Solar programs in Michigan have been wildly popular and have sold out their capacity quickly,
- Community Solar programs create local jobs and local investment, and

- Community Solar is completely voluntary, those who choose to invest may do so,

GLREA calls for an end to merely identifying barriers to Community Solar and challenges the public utilities and the MPSC to find workable solutions to implementing Community Solar programs for Michigan electric customers. Community Solar pilot programs offered by the public utilities would be a good place to start. In the longer term, GLREA encourages the MPSC and public utilities to work together to create the correct regulatory environment where Community Solar options are available to all electric customers in Michigan.

June 20, 2014

Dear MPSC:
Grand Valley State University & the Michigan Alternative & Renewable Energy Center, support this document and the finding within it. Thank you for allowing me to participate and we look forward to a continuing process.

Kim Walton
Program Director
GVSU/MAREC
waltonk@gvsu.edu

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- Community Solar offers access to solar energy investment to the more than 70% of electric customers that cannot invest in solar at their own homes and businesses,
- Michigan municipal utilities and rural co-ops are moving forward with Community Solar options for their customers,
- Existing Community Solar programs in Michigan have been wildly popular and have sold out their capacity quickly,
- Community Solar programs create local jobs and local investment, and
- Community Solar is completely voluntary, those who choose to invest may do so,

GLREA calls for an end to merely identifying barriers to Community Solar and challenges the public utilities and the MPSC to find workable solutions to implementing Community Solar programs for Michigan electric customers. Community Solar pilot programs offered by the public utilities would be a good place to start. In the longer term, GLREA encourages the MPSC and public utilities to work together to create the correct regulatory environment where Community Solar options are available to all electric customers in Michigan.

June 20, 2014

Hispanics In Energy

BIOMASS COAL GAS HYDRO OIL NUCLEAR PETROLEUM SOLAR WIND

June 19, 2014

Ms. Julie Baldwin, Manager
Michigan Public Service Commission

Dear Ms. Baldwin,

On behalf of Hispanics In Energy (HIE), we thank you for allowing our organization to provide a consumer perspective to the discussion before the Solar Working Group. HIE has found time and again that issues relating to costs and regulatory issues, including solar and net metering policies, fail to account for the impact upon customers, particularly those who are moderate to low income. We have found that the conversation is often two sided – just that of the solar industry and that of the utility industry. We have weighed-in on various state proceedings because we are often asked by commissioners, staff, and other consumer advocates to do so because they want a more robust voice included in the discussion.

To underscore the consumer perspective, I'd like to emphasize the following points as you and your team finalize the Solar Working Group report.

- The draft report acknowledges that there is a subsidy. However, HIE wishes to emphasize the point that fixed costs and distribution costs must be paid by everyone, and equitably. There is no question that solar rooftop users use the grid to buy and "sell". Without actually paying these costs separate from generation, it means that the utility and the commission will shift the payment of these non-recouped costs to other users.
- Along with the prior bullet, Michigan's rate design which encompasses unbundled rates based on cost of service needs to ensure that there is no cost shifting from generation to distribution and vice versa. Any design should ensure that there is no cost shift between the two separate components. Such a design is also likely to ensure a smaller subsidy, and at the very least apportion the subsidy appropriately within the generation and/or distribution categories (rather than between the two).
- Recognize that adopting a rate which includes a subsidy is very difficult to undo. An approach that is "let it go forward and we will see" should not be the approach. Other states have struggled with "putting the genie back in the bottle" and it also adds to confusion for customers. HIE would recommend a thorough study prior to adoption of a new rate or tariff that increases the subsidy.
- Any expansion of existing or creation of new programs should include a discussion on consumer protections. This concept was not included in the report. While I recognize the MPSC is not the consumer advocate, a discussion of consumer education and consumer protections must be included. Prior experience with other programs, like gas customer choice, reiterate this need.
- Keep in mind that policy discussions should recognize the cost shift between household income classes. Because the majority of solar adopters have higher credit scores and above average incomes, subsidies to these adopters unfairly shift costs to lower income non adopters. Because many Hispanics and African Americans

households in Michigan face higher poverty rates and lower household income, these policies disproportionately affect these households. Moreover, policies adopted by Michigan lawmakers to support low income households might be negated with these cost shifts. Keep in mind that pocket change for one household might be a meal or the difference of whether or not a bill can be paid for a household on a low fixed income.

HIE fully supports an all of the above resource approach, including the utilization of distributed generation. We thank the staff and the Commission for opening the discussion on solar gardens and opportunities for ways to promote them. The more we can move away from "utility versus solar industry" and develop neutral policies -- as we have done with energy optimization in Michigan, the consumer will be able to benefit further. In fact, the solar work group process may have benefitted further by separating out the issue of the value of solar from the Commission ordered task of investigating solar gardens. Perhaps as the draft reports indicates, a more robust study is needed.

In closing, thank you so much for the work that you do on behalf of state government and the citizens of Michigan.

Sincerely,

M. Martinez

Monica Martinez
President

HOMELAND SOLAR
Energy Solutions
Municipal • Commercial • Residential
homeland builders of MICHIGAN

June 17, 2016

Mr. Jessie Harlow
Ms. Julie Baldwin
Mr. Kevin Krouse
Michigan Public Service Commission
4300 W Saginaw St
Lansing, MI 48917

Re: Comments to Draft MPSC Staff Solar Working Group Report

Dear Sirs and Madam,

The following are my comments to the Draft Solar Group Report ('Report').

I first want to thank you and Mr. Proudfoot for organizing and conducting this workgroup regarding the future of solar energy in Michigan.

The Michigan Public Service Commission (MPSC) has a very important mission of not only overseeing the utility companies in Michigan but also to develop public policy to strengthen and evolve our energy infrastructure as new developments and technology occur. The MPSC must make sure that the publicly regulated utilities in Michigan are properly compensated for providing energy to the people of Michigan, but equally important, the MPSC must look after the interests of consumers, both residential and business that purchase energy and provide guidance as to how the energy infrastructure in Michigan should evolve over time.

So with these preliminary comments I will now respond to the Draft Report. My comments are broken down into four subject areas: Executive Summary and Conclusions, Style of the Report, Perception of Bias and Developing Public Policy.

Executive Summary and Conclusions

If the purpose of the Solar Workgroup Process is to provide meaningful input to MPSC Staff so they can make recommendations to the Public Service Commissioners, then the Report needs to contain more explicit recommendations that will lead to action.

Homeland Solar is a relatively new solar company in Michigan. Based upon our conversations with business, local units of government and homeowners, there is a very strong interest in solar in Michigan. As the national press highlights how solar energy and the accompanied economic benefits are expanding rapidly in other states, the people we talk to often ask why hasn't Michigan State Government been more supportive of solar. We point to PA 295 that supports renewable energy but we also have to explain that PA 295 does not provide a specific carve-out for solar. So from our perspective although there is great interest in solar in Michigan, the challenge is to make the financial numbers work. Our interest in the Solar Workgroup was to share our 'on-the-ground' experience' to the MPSC Staff so as the Final Report is crafted you have a better understanding on how critical it is for this Report to lead to action that will support the expansion of the solar in Michigan.

The Commission has gone on record expressing a strong desire for long-term, sustainable solar programs that avoid "boom-and-bust" cycles that characterizes the history of solar in Michigan since PA 295 was enacted. This cycle has been our experience. We know there is great interest in solar. But without a state tax credit (similar to the Federal Investment Tax Credit) that other states have enacted, the support that Consumers Energy and DTE provide through their solar programs is critical. But because of the demand for solar and the relatively small size of these programs, unless action is taken to immediately expand these programs, we will soon enter an indefinite "bust" cycle because the programs of Consumers Energy and DTE are now or near the end of their planned lives.

This is therefore the exact right time to consider the next phase of utility solar programs. This Report needs to reach a strong conclusion that supporting the solar industry in Michigan is vital to this State and make a set of explicit recommendations to improve and expand the utility solar programs in order to meet the goals of the Commission and the purpose of Public Act 295.

In order to strengthen the Report and to highlight a sense of urgency for the Commissioners to take action, here are some of the key conclusions drawn directly from the body of the Report that we think should be included in the Executive Summary and Conclusion sections:

- The MPSC Staff convened the Solar Workgroup with the explicit goal of receiving input on how solar programs could be developed that are open and accessible to all participants, that do not require the limitation of participants, are sustainable, and do not rely on subsidies from non-participating customers.

- After considering the input from workgroup participants, Staff determined that at least three different program options exist that would eliminate the boom-and-bust cycles, help create a market that is more responsive to the falling price of solar materials, labor and balance of system costs and promote greater market confidence to solar companies like Homeland Solar. These three options could enable DTE and Consumers to expand their customer-owned solar programs by at least 50 MW at a lower cost per MW than the companies' current programs.

- One option builds on the utilities' existing net metering program and could be implemented quickly because the net metering program is already successfully established. Over the longer term, program options that build in "value-of-solar" payments or other tariffed-based approaches could be developed.

- With the amount of funds already collected by each utility and the dramatic cost decrease of wind and solar energy, these expanded programs could likely be implemented without any increase in the renewable energy surcharges on customers' bills.

Homeland Solar strongly supports two other recommendations that should also be included in the Executive Summary and Conclusion sections.

- That Consumers Energy and DTE should replace the existing 'lottery system' with more sustainable and long-term enrollment options (such as a capacity-based step-down structure) to avoid boom-and-bust cycles that would help drive down development costs.

- That new solar programs need to be established as soon as possible so participants will also be able to take advantage of the 30% Federal Investment Tax Credit, which expires in 2016.

Style of the Report

I am also concerned that the Draft Report reads as if the testimony by Consumer Energy and DTE was fact rather than a point of view. This is particularly important with respect to the utility arguments about alleged 'subsidies' and value-of-solar calculations. Where there are significant differences of opinion, the MPSC Staff should attempt to analyze the data and reach your own conclusions and then make recommendations instead of simply reporting the alternative viewpoints. Without this critical analysis, the Final Report may frankly legitimize arguments that lack solid support.

One example of this concern is how far out of step DTE's positions on solar "value" is with other utilities and independent experts across the United States. For example, DTE argues that solar has a "value" of only 3.9 cents/kWh. (p. 25). This is way out of line with what Xcel Energy calculated in Minnesota (13.5 cents/kWh - p. 11), what Austin Energy calculated in Texas (between 10.7-12.8 cents/kWh - p. 8), and what the independent researchers at the National Renewable Energy Lab (NREL) calculated for Michigan (13.8 cents/kWh - p. 24). DTE did not provide substantive data to support its argument that Michigan-built solar is worth only 28% of the value of Minnesota-built solar or that independent NREL researchers somehow overestimated Michigan's solar value by 350%. By reporting DTE's number without acknowledging how far out of line it is with these other value-of-solar calculations by very credible organizations, the Draft Report lends unwarranted validity to DTE's position.

Perception of Bias

The Draft Report did not properly contain some of the relevant information that was discussed in the Workgroup. The Report needs to include relevant information from both the solar proponents and from the utilities**.** There are a number of passages in the Report where the utility perspective and information from their presentations is included while the solar advocates presentations and viewpoints on the same issues, was not. The Report should include key information and parts of *all* presentations to inform the Commissioner's, otherwise this creates an impression of bias for the reader. There was very compelling information presented by Environmental Law and Policy Center, 5 Lakes Energy, and SunRun that should be included in appropriate places in the Report. And similar to the utility presentations, this information should be evaluated and appropriately qualified by MPSC Staff, based on the body of evidence that supports it.

Developing Public Policy

As stated earlier, it is very important that the Final Report reflects the critical stage that Michigan is in regarding the development of our solar energy market. This Report must serve as a guiding document for the Commissioners to use for taking immediate action to further support the development of solar energy in Michigan.

Michigan is falling behind on solar energy development as compared to other states. States like California, New Jersey and New York are moving ahead with supportive policies to expand their solar industries and markets. These States have seen significant benefits from an expanded solar economic sector including a large growth in job creation (sales, installation and engineering

services), homeowners and business have seen major savings in electricity cost which can then be utilized in other strategic ways and the environment has benefitted from less reliance on coal generated power.

The Final Report needs to emphasize the following to further develop Michigan's solar public policy:

- The MPS Commission has repeatedly ruled that Michigan law requires a diversified electricity grid that includes distributed generation.

- The demand for solar from residents and business has consistently outpaced the available solar program capacity.

- Utilities continue to argue that solar is too expensive, ignoring the reality that all their previous predictions have been incorrect and solar photovoltaic prices continue to decrease dramatically and the many economic and environmental benefits associated with the expansion of solar.

This context is very important because it can help the Commissioners, the Legislature and the Governor weigh the costs and benefits of taking action or not taking action. It is very important that Michigan utilities work with the Public Service Commission and their residential and business customers to build a stronger more resilient electricity grid that includes very cost effective solar energy, creates jobs and supports a clean environment.

Conclusion

The Solar Workgroup Process was a very civil experience where all the key stakeholders participated. With this Report, the Michigan Public Service Commission has the perfect opportunity to develop a document that will provide a blueprint for developing solar energy in Michigan that learns from the experience of other States and takes into consideration all the key perspectives on how to build this energy sector without causing any undue harm to the utilities or to solar installers.

I respectfully request that you give proper consideration to incorporating my suggestions as you write the Final Report. I thank you for the opportunity for doing this.

Very truly yours,

John Freeman
Outreach & Projects Coordinator
Homeland Solar

MICHIGAN energy options

www.michiganenergyoptions.org

Ms. Julie Baldwin
Mr. Jesse Harlow
Michigan Public Service Commission

June 19, 2014

Dear Julie and Jesse:

First, I'd like to complement you and your fellow MPSC staff on your professionalism and the quality of the workshops that have led to this report.

I would underscore your assertion in the draft report that there is high demand for solar within Michigan communities. Attached is a Community Solar Survey, posted by the City of East Lansing on their website from May 21 to June 13, 2014, and I ask that you consider including it with your final report.

Nearly 600 residents took the survey and the response was overwhelmingly positive toward community solar with nearly 90% saying they would be interested in having a community solar project in our community--and importantly, investing in it. Respondents said they would primarily invest in community solar for the community and environmental benefits, not a financial return on their investment. That said, their expectations for financial ROI align with the current realities of payback in our present solar development scheme. In short, residents desire solar and find the price point affordable, which, to my mind, suggests a healthy market opportunity for many stakeholders, including the utilities.

Regarding utilities and new large arrays coming online in Michigan, the Lansing Board of Water & Light, the largest municipal electric utility in the state, is today offering an RFP for 5MW of solar development in their service territory. Currently, there is less than 100kW of solar in their footprint. Their offering represents a transformative change for solar in our state.

And BWL is not alone. In the last year, electric co-operative utilities such as Cherryland, Tri-County Homeworks and Great Lakes Energy have approved large solar projects in their service territories—in response to their members' desires and the fact that solar was a cost-effective choice for them. The City of Eaton Rapids municipal electric utility now has a 500kW solar array located on a former landfill.

The Traverse City region is exploring more large solar; and Marquette, where Michigan Energy Options has its Upper Peninsula Office, is interested in developing new solar.

A recent Michigan Land Use Institute survey on solar returned similar results to ours in East Lansing. I am willing to wager that future surveys in different communities across our state will reflect a similar pent-up demand among residents and business owners for more solar options. A nascent movement is afoot. I encourage you to capture this groundswell in your final report.

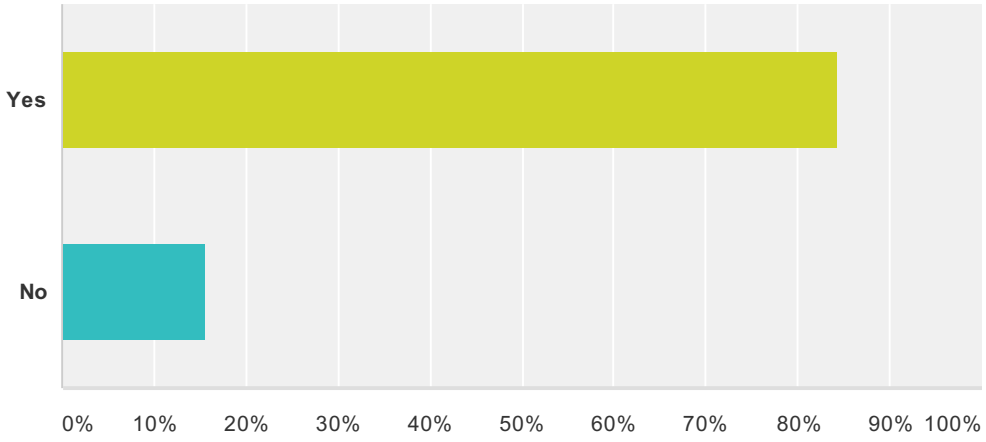
Thank you for your work and your consideration.

Sincerely,

John A. Kinch, PhD
Executive Director
Michigan Energy Options
jkinch@michiganenergyoptions.org

Q1 Are you an East Lansing resident?

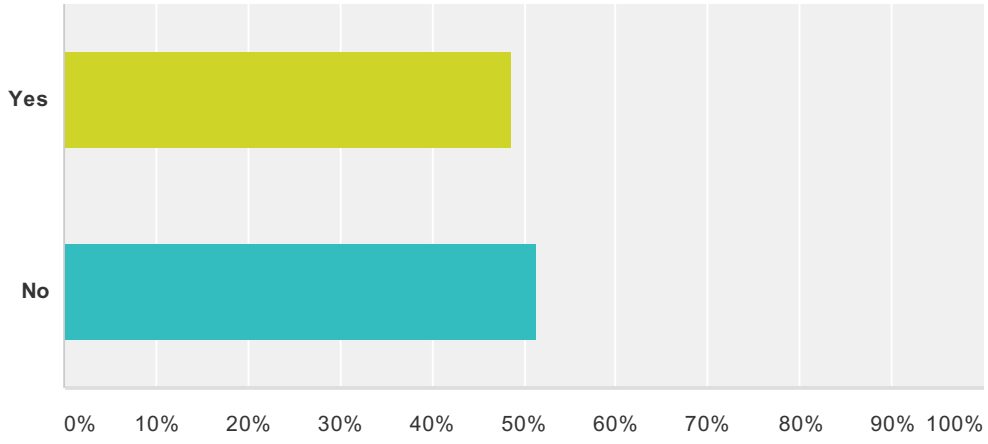
Answered: 580 Skipped: 10



Answer Choices	Responses	
Yes	**84.31%**	489
No	**15.69%**	91
Total		**580**

Q2 Have you heard of "community solar" projects?

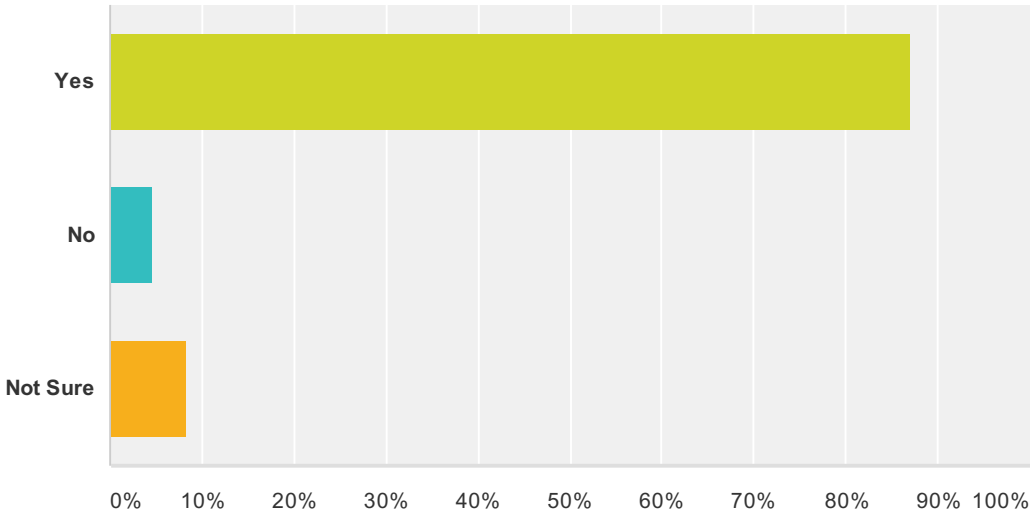
Answered: 589 Skipped: 1



Answer Choices	Responses	
Yes	**48.56%**	286
No	**51.44%**	303
Total		**589**

Q3 A common definition of community solar is a solar-electric system that—through a voluntary program—is owned by multiple community members. Typically, community solar projects are larger than systems you would put on a home and these projects are often located in areas that the public can access. Would you support the City of East Lansing exploring the possibility of a community solar project that would be funded through voluntary financial investments by residents?

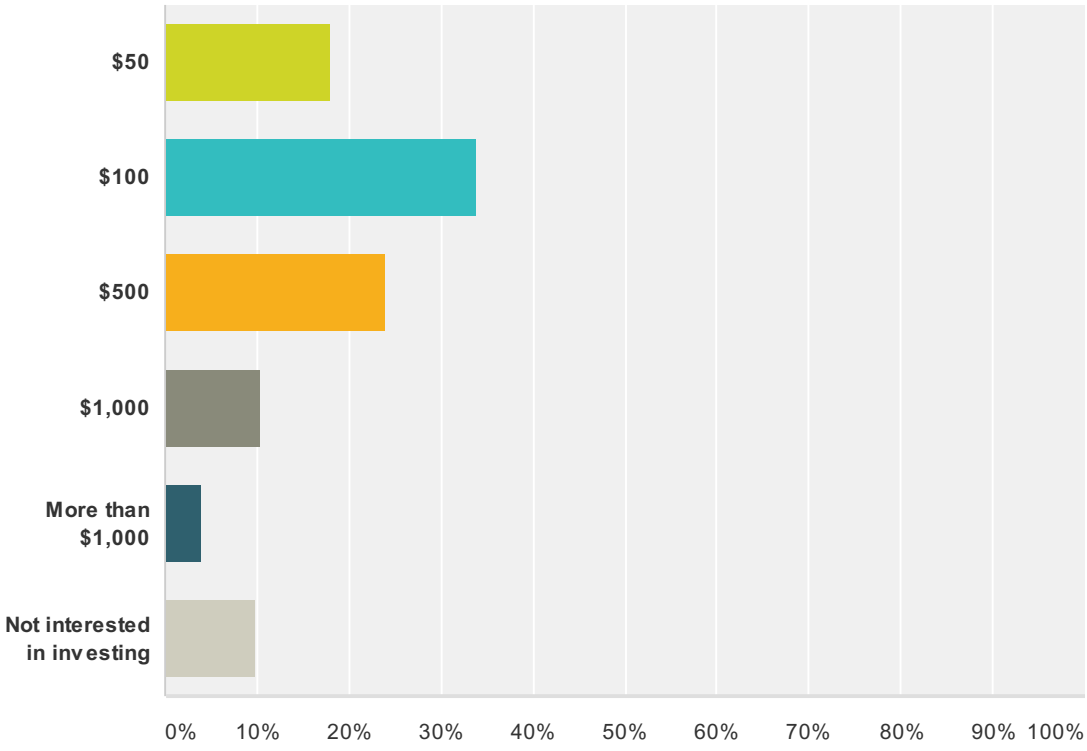
Answered: 584 Skipped: 6



Answer Choices	Responses	
Yes	**86.99%**	508
No	**4.62%**	27
Not Sure	**8.39%**	49
Total		**584**

Q4 Community solar allows relatively modest financial investments by residents so this renewable energy can offset energy sourced from fossil fuels. If you were interested in buying into a community solar project, how much would you be willing to invest?

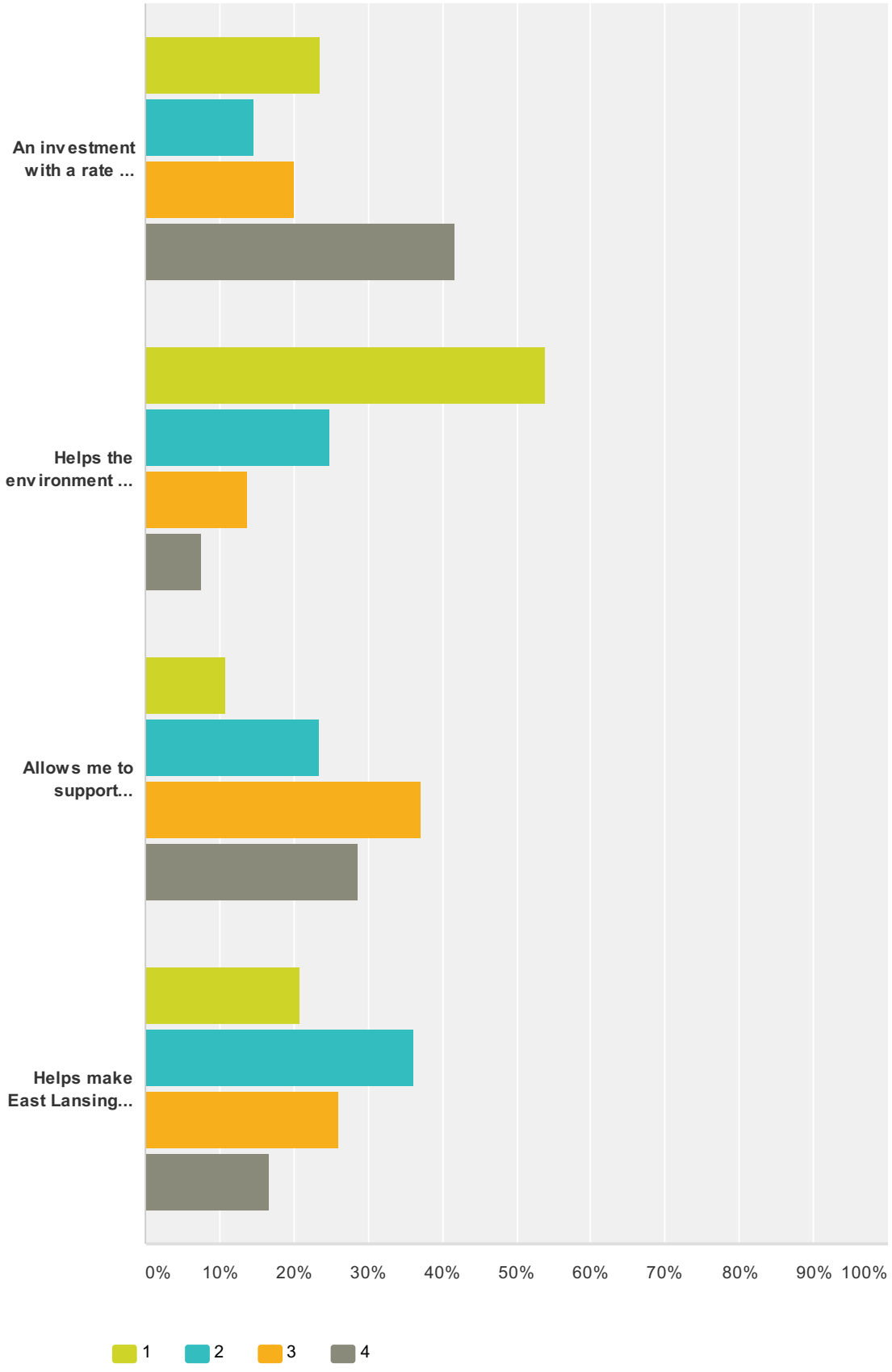
Answered: 581 Skipped: 9



Answer Choices	Responses	
$50	**17.90%**	104
$100	**33.73%**	196
$500	**24.10%**	140
$1,000	**10.50%**	61
More than $1,000	**3.96%**	23
Not interested in investing	**9.81%**	57
Total		**581**

Q5 What would motivate you to invest in a community solar project? Choose all that apply and rate them in order of importance to you (1 = first priority; 4 = least), or type "Not Interested" in the comment field labeled "Other."

Answered: 568 Skipped: 22

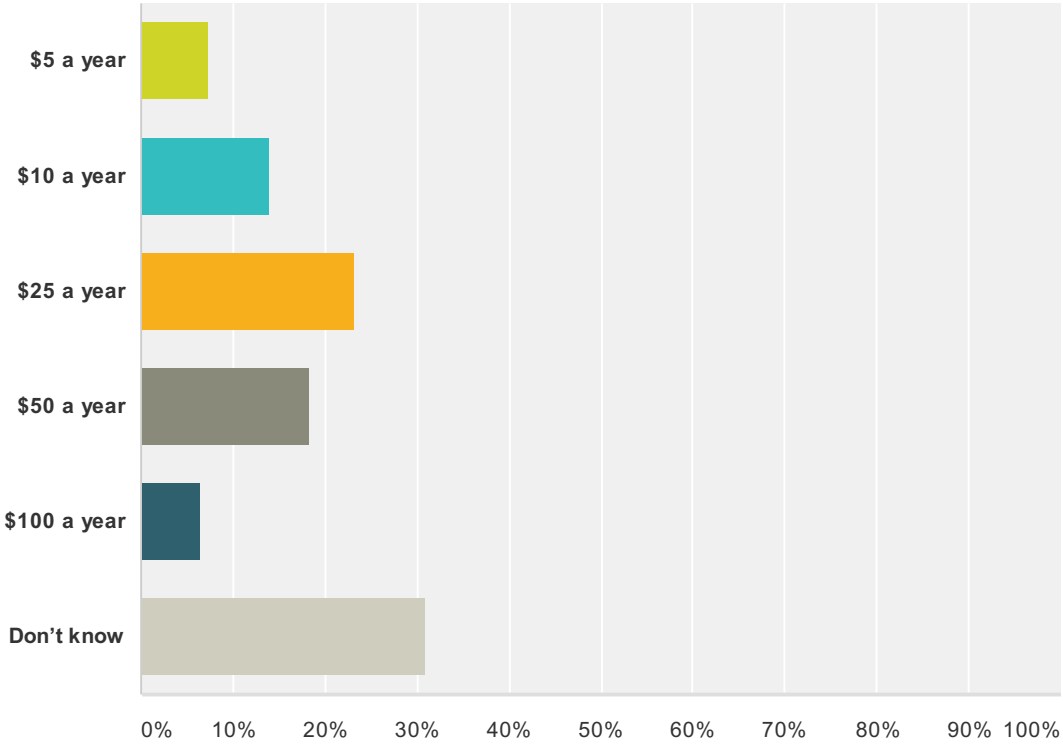


	1	2	3	4	Total
An investment with a rate of return	**23.59%** 121	**14.62%** 75	**20.08%** 103	**41.72%** 214	513
Helps the environment by reducing pollution and greenhouse gases	**53.94%** 260	**24.90%** 120	**13.69%** 66	**7.47%** 36	482

Allows me to support renewable energy without locating it at my home	**10.91%** 55	**23.41%** 118	**37.10%** 187	**28.57%** 144	504
Helps make East Lansing more sustainable and green as a community	**20.96%** 114	**36.21%** 197	**26.10%** 142	**16.73%** 91	544

Q6 Your return on your investment may come as a modest dividend each year. How much would you expect to get for your one-time investment if you invested $500?

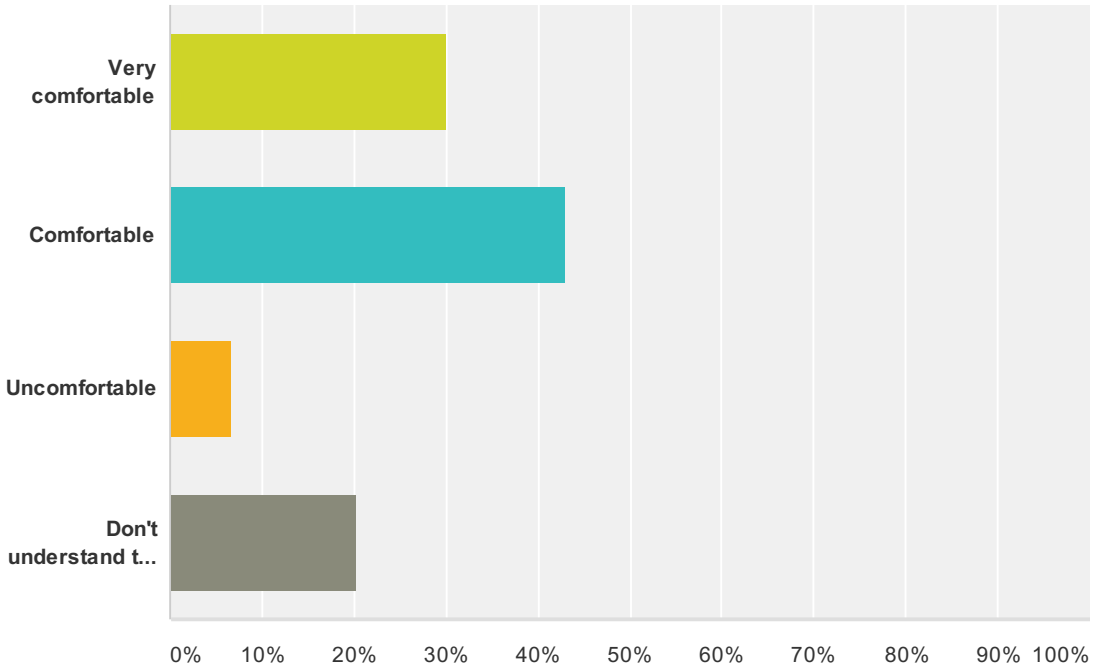
Answered: 578 Skipped: 12



Answer Choices	Responses	
$5 a year	**7.27%**	42
$10 a year	**14.01%**	81
$25 a year	**23.18%**	134
$50 a year	**18.34%**	106
$100 a year	**6.40%**	37
Don't know	**30.80%**	178
Total		**578**

Q7 Investors in community solar projects often have investment agreements for as long as 20 years. That said, investors can sell or give their share to others, among other ways to release themselves from the contract. How comfortable would you be in making such a commitment?

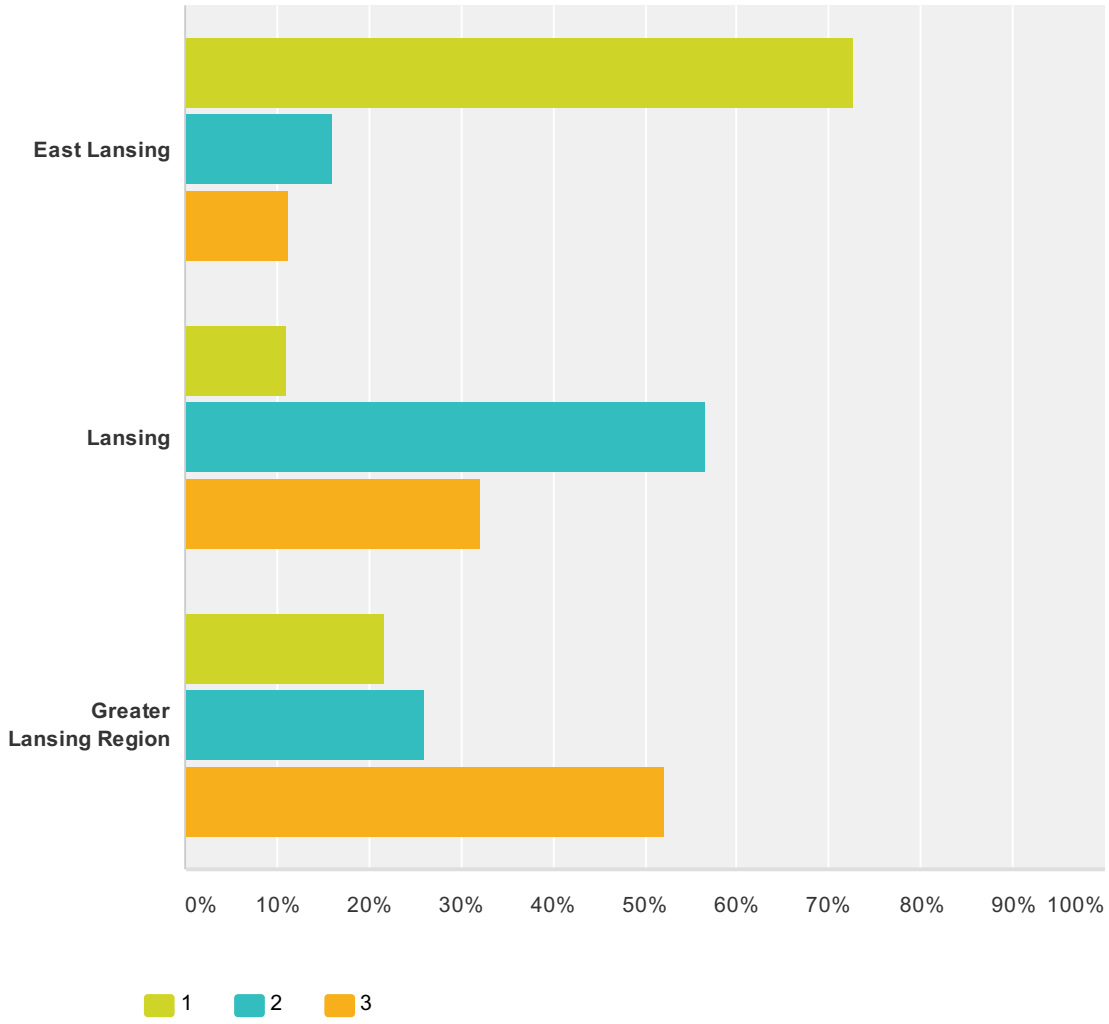
Answered: 579 Skipped: 11



Answer Choices	Responses	
Very comfortable	**30.05%**	174
Comfortable	**43.01%**	249
Uncomfortable	**6.74%**	39
Don't understand this enough to make an informed decision	**20.21%**	117
Total		**579**

Q8 Rate where you would most like to see a Community Solar project located (1 = first preference; 3 = least). Or type "Doesn't Matter" or "None" in the comment field labeled "Other."

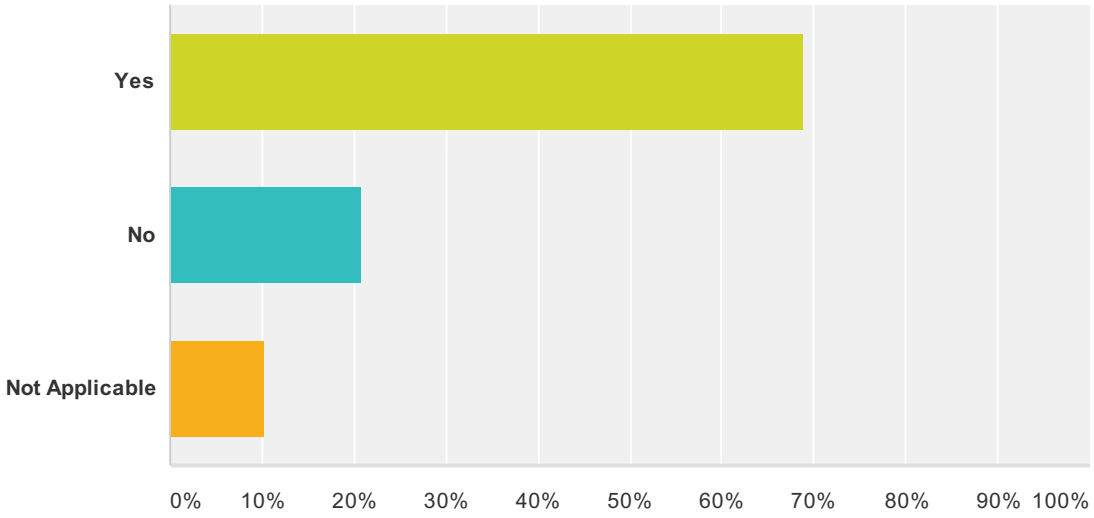
Answered: 479 Skipped: 111



	1	2	3	Total
East Lansing	**72.75%** 331	**16.04%** 73	**11.21%** 51	455
Lansing	**11.14%** 46	**56.66%** 234	**32.20%** 133	413
Greater Lansing Region	**21.75%** 97	**26.01%** 116	**52.24%** 233	446

Q9 Would you invest in a Community Solar project even if it were not located in your first preference location?

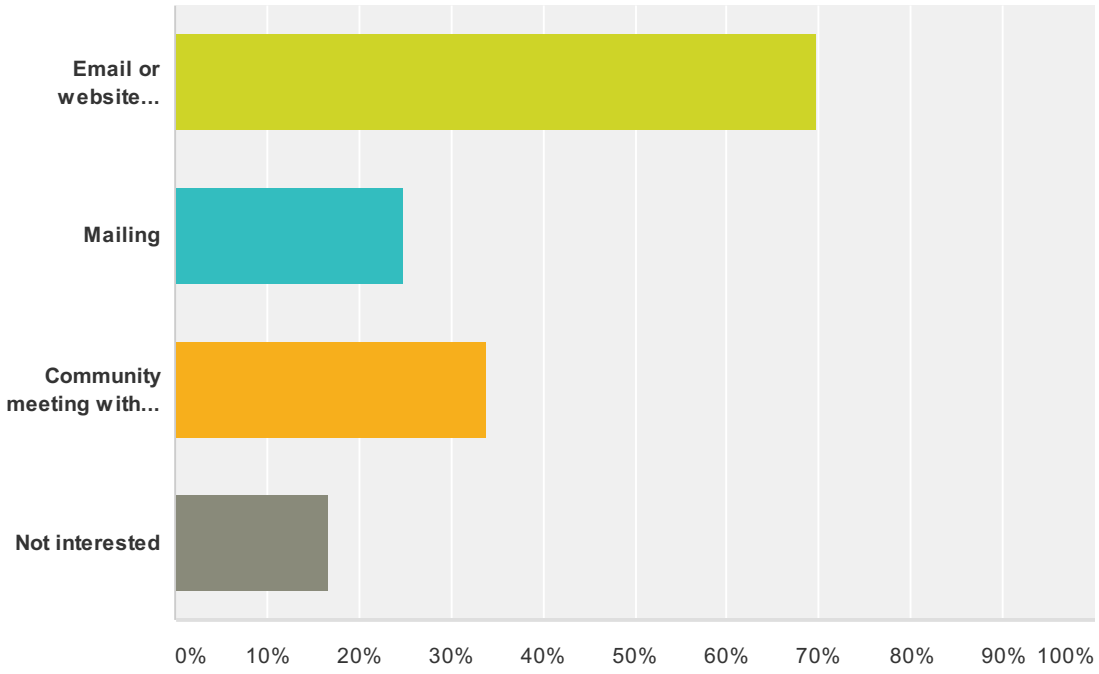
Answered: 578 Skipped: 12



Answer Choices	Responses	
Yes	**68.86%**	398
No	**20.93%**	121
Not Applicable	**10.21%**	59
Total		**578**

Q10 Are you interested in learning more about community solar? If so choose all the ways in which you would like to be engaged.

Answered: 560 Skipped: 30



Answer Choices	Responses	
Email or website information from the City of East Lansing	**69.64%**	390
Mailing	**24.82%**	139
Community meeting with City officials and energy experts	**33.75%**	189
Not interested	**16.61%**	93
Total Respondents: 560		

Q11 OPTIONAL: The results of your survey are anonymous and will only be used as aggregated data. If you would like to receive more information about East Lansing community solar projects, please provide contact information:

Answered: 201 Skipped: 389

June 20, 2014

Michigan Environmental Council Comments on
MPSC Solar Working Group Draft Staff Report

Generally speaking, this draft report does a fine job highlighting the information presented as well as the discussions that took place during the duration of the Solar Working group meetings. However, as expressed during the very first introductory meeting, the majority of participants hoped that the workshop process would result in more clear, actionable steps to expand solar programs in the state, and the report fell short of clear recommendations. For instance, since both DTE and Consumers' pilot solar programs are now essentially closed, we will need a long-term sustainable program that will avoid "boom and bust" cycles, that corresponded to the limited openings for the programs. If we don't immediately take steps to expand the programs, we will again fall into a continual "bust" cycle inevitably harming solar business growth in Michigan.

Of the three program options the report recommended, DTE and Consumers have the ability to expand their customer-owned solar programs by at least 50 MW at a lower cost per MW than the companies' current programs. Due to the amount of funds already collected by each utility, the programs could be expanded without any increase on the renewable energy surcharges on customers' bills.

Secondly, the report should qualify utility posits of view instead of presenting as fact. While MEC participated on some of the sub-working group meetings around computing the value of solar, no complete conclusions were reached on a fair equation, based on a difference of data. For example, Austin Energy calculated the value of solar at 10.7-12.8 cents/kWh and researched for the National Renewable Energy Laboratory calculated to 13.8 cents/kWh; DTE presented an extreme argument saying Michigan solar is worth only 28% of the value of Minnesota-built solar. The report reflects an unwarranted preference towards DTE's position, though that isn't reflective of what was discussed and supported through the stakeholder sub working group meetings. In order to more accurately reflect the true value of solar, we support the MPSC's recommendation to fund a study to thoroughly examine all aspects of solar generation and its costs and benefits.

Third, the report should include more information from the solar advocate's presentations. Some of the most useful presentations in my opinion were those from the Environmental Law and Policy Center, 5 Lakes Energy, and Sun Run. Much of the data

and materials from those presentations weren't adequately reflected in the draft report, while materials from the utilities were disproportionally over-represented.

Lastly, and most importantly, it is important to keep the big picture in mind. Michigan has been falling behind in the solar energy development, while other states have been supporting policies which expand the solar market. In turn, solar businesses are turning to other states, and Michigan is losing economic opportunities. Further investments in solar will make our utilities stronger in the future, promote grid reliability, curb impacts of climate change, and promote clean energy jobs and economic growth in our state. We appreciate participating on the work group, and look forward to the MPSC staff incorporating these comments. We hope the final report that leads to actionable outcomes and ultimately the sustainable expansion of Michigan's solar industry.

Sincerely,

Sarah Mullkoff
Energy Program Director
Michigan Environmental Council

June 20, 2014

To: Solar Working Group Michigan Public Service Commission Staff members
From: Anne Woiwode, Sierra Club

Re: Comments on MPSC Solar Working Group DRAFT Staff Report

First, we wish to thank the Commission for directing the convening of the Solar Working Group, and the PSC staff for your time, expertise and responsiveness to the discussions and input. Also, many thanks to all the participants for a robust and far ranging discussion and collection of information that will provide a solid base for action going forward to implement improvements in the DTE SolarCurrents and Consumers Energy EARP programs, and lay the groundwork for community solar.

Sierra Club's comments follow:

1) There is much extremely valuable information included in the Draft Report and the staff deserves kudos for working under a tight timeline to get this pulled together. The discussion of the three customer solar program options was particularly useful in explaining how each program might work, and comparing and contrasting aspects of each. This kind of side by side comparison of the community solar options was also valuable.

2) We believe, however, that the final report will be most valuable to the Commission members if it states the considered opinion of the expert staff on how to proceed to implement the improvements in the SolarCurrents and EARP programs, as well as community solar. This is particularly true because the current programs are on the verge of expiring, and delaying recommendations will cause a potential gap in the programs. The Draft Report does a fair job of articulating the range of options presented, discussed and developed in the Solar Working Group process. However, there are points in the report where staff implies that either a consensus was needed to make a recommendation (page 17, last sentence); or that the decision to proceed rests with the utilities alone (page 42, third full paragraph, first line). This has the effect of muting any conclusions from the PSC staff based on your expertise. While a consensus or voluntary commitments from the utilities are preferred, these should not prevent staff from making specific recommendations in the final report.

3) One of the key strengths of the SWG process is that talented, expert staff at the PSC have engaged in every step of the process. However, the expertise of the staff seems not to have been used in assessing the accuracy of all the claims presented in the Draft Report. This, unfortunately, seems to leave the report with a "two-handed" approach – "on the one hand, and on the other hand" – as opposed to an assessment of what is accurate and what isn't. Obviously there are limits to the staff's time, but in moving this to the final report which will go to the Commission members, there is a critical need to sort through and address unfounded assertions so they don't muddy the waters. This objective assessment for all materials and comments made during the process should result both in tagging those items that are

inaccurate or misrepresent the facts, and in bringing into the report materials presented which are not included now that flesh out the facts. When the final report goes to the Commissioners, they will need to be able to rely on the accuracy and completeness of the information presented.

4) A specific concern remains, however, about the argument raised by the utilities, EEI and the Hispanics in Energy presentation that there is or would be an unfair burden on customers who are not participating in the solar programs currently or as potentially envisioned in the future. This set of concerns deserves to be put into context if it is to continue to be included in the report as if it is a statement of fact. Michigan today has some of the highest electric rates in our region, and the PSC should be addressing that problem systematically across all the utilities, not using this program as the whipping boy for this argument. Michigan's residential electric rates are higher than those in 38 other states, and the average retail rate for residential customers in Michigan rose 7% per year from 2005 to 2013. Michigan's residential rates are 80% higher than industrial rates, significantly more than the Midwest average of a 67% gap. Dealing with the disproportionate burden borne by particularly the poor and disadvantaged residential electric users is an important issue for the MPSC to address, and Sierra Club is a strong advocate for Michigan reversing this trend of burdening the poor with excessive utility rates. However, even if the solar programs under discussion were fully implemented, the impact on rates will be miniscule, and actions such as adopting inverse rate structures or requiring the energy optimization programs to first serve the interests of homeowners and renters who are suffering from already high rates would address the fairness issues much more completely. And, the opportunity to mitigate the cost impacts of continuing incentives by using funds already in hand is discussed in several places in the Draft Report. Sierra Club urges the MPSC to address the disproportionate burden of existing rates and future rate increases on Michigan's families that least able to afford increases, but that discussion belongs elsewhere, and not in the context solely of this program.

5) Lastly, Sierra Club urges the staff to strongly recommend continuity in the programs through at least interim programs that would be adopted through an order of the Commission. The loss of momentum that would occur from a break in the programs is unacceptable, especially when the work of the SWG documented this to be a program that has great merit and which clearly deserves to be continued.

Thank you for the opportunity to comment on this Draft Report, and we look forward to the issuance of the final.

Baldwin, Julie (LARA)

From: Mike Linsea-Solar Winds Power Systems <mglinsea@mei.net>
Sent: Friday, June 20, 2014 12:16 PM
To: Baldwin, Julie (LARA)
Subject: Fw: MPSC Solar Work Group- Solar Winds final comment.

Julie, Sorry, FYI...

From: Mike Linsea-Solar Winds Power Systems
Sent: Friday, June 20, 2014 12:13 PM
To: harlowj@michigan.gov
Cc: krausek@michigan.gov
Subject: MPSC Solar Work Group- Solar Winds final comment.

Hi Jesse and Julie,

Thank you for hosting the forum (Work Group) on Solar deployment in Michigan. I know for the utilities this is an unnatural act to work with Solar concepts, but all you have to do is look around the world to see the direction we need to go. Solar PV has a big role to play in energy distribution to help decentralize a larger part of the energy mix.

Michigan is at a **crucial** crossroad for our energy future. Michiganders have a long way to go, knowing how little the % of our power mix is either Net Metering or utilizing the feed-in tariff's with the utilities.

I talk to a large mix of people wanting solar and needing help in participating in the process. Let me make a short list of customer comments and concerns regarding Utility Solar programs.

1) The lottery was not well thought out/it does not work- people cannot plan ahead as normal people like to do... and businesses.

2) The first offering by Consumers Power EARP program was $0.65/kWh Way too much !! They never asked us?? $0.243 is too small The real sweet spot is $0.32/kWh Residential $0.26/kWh Commercial This will stimulate demand by increasing ROI and banks see it as a real investment.

There should also be a provision for inflation connected to the CPI increases or drops.

3) Give commercial and residential customers options... Length of contract, amount paid for solar production. Longer the contract the more you could pay per kWh.

4) Mark the program much larger- 50 to 60 MW. This is still somewhat small, knowing the task at hand, but it's a good start. We would train and put a lot of workers to work for quite a while, and this would be the workforce that could help modernize Michigan's energy future. Risk Management!! Companies plan for it, so should Michigan and its people.

5) Net Metering and EARP- Allow customers to **exceed** their annual power consumption when sizing a solar system. This annual power production can pay less than retail but allows the customer to save more money to pay for meter fees etc. This will also put more solar power on the grid.

6) The utilities need to: Understand/acknowledge the real value of solar, and its value to the grid during summer AC peaks and how it relieves stress to the grid during peaks. This is a no brainer...

Thank you for having Solar Winds as part of this important issue with the people of Michigan, it has been my pleasure to be part of this prestigious work group.

Sincerely,

Mike Linsea
Solar Winds Power Systems
616-635-7855

The Alliance for Solar Choice
595 Market St, 29th Floor, San Francisco, CA
408-728-7166
info@allianceforsolarchoice.com
http://allianceforsolarchoice.com

June 20, 2014

Julie Baldwin
Michigan Public Service Commission
4300 W. Saginaw Highway
Lansing, MI 48917

RE: Comments on Draft Solar Working Group – Staff Report

The Alliance for Solar Choice ("TASC") respectfully submits the following comments on the Michigan Public Service Commission (the "Commission") *Draft Solar Working Group - Staff Report* (the "Draft Report"). TASC advocates for maintaining successful distributed solar energy policies that expand consumer choice in their energy supply. TASC members represent the majority of the nation's rooftop solar market and include SolarCity, Sungevity, Sunrun, Verengo Solar, Demeter Solar, and Solar Universe. TASC members are responsible for tens of thousands of solar installations serving businesses, residents, schools, churches and government facilities across the United States. TASC member companies have participated in numerous regulatory and stakeholder proceedings in multiple states that have involved policy questions that are similar to the ones being addressed in the Solar Working Group (SWG).

I. Introduction

TASC would like to thank the Commission for establishing the Solar Working Group (SGW) as a forum to seek improvements to investor-owned utility solar programs and to explore means of facilitating community shared solar in Michigan. Sarah Bertram, Director – Public Policy for Sunrun, Inc. participated in the SWG and Ms. Bertram gave a presentation to the SWG discussing the growing popularity and customer interest in solar energy, how third party ownership democratizes solar energy by lowering financial barriers to participation which allows more energy consumers to invest in solar including low income consumers, and the growing backlash by fossil fuel interests in consumer adoption of solar. As the Draft Report recognizes a clear majority of energy consumers want to see more solar energy in general and over one quarter of energy consumers identified investment in on-site solar as an action they may take in the future. TASC member companies are on the forefront of enabling energy consumers to go solar and we appreciate the opportunity to work with the SWG and the Commission to design programs that will meet growing consumer interest in on-site solar.

In these comments, TASC offers a number of recommendations to the Commission regarding key discussions within the Draft Report including: (1) ways to improve current solar programs offered by DTE Electric Company (DTE) and Consumers Energy Company (Consumers) that are established under the state's net metering policy; (2) concerns regarding value of solar tariffs; and (3) the facilitation and benefits of third-party ownership of solar distributed generation (DG) systems.

II. There are Straight-forward Ways to Improve Current Solar Programs In Michigan Which Should be Taken As Soon as Possible.

TASC appreciates discussion by stakeholders within the SWG concerning ways to improve Michigan's current solar programs. As stakeholders discussed, Michigan's current solar programs have been marked by boom-bust cycles that have failed to provide sustained support for growth in solar energy within the state. Part of the reason for these cycles appears to stem from the relatively small size of the current programs, which resulted in subscription of available megawatts (MW) within the programs in a very short span of time. To address this outcome, DTE and Consumers instituted lottery systems to allocate MW to developers.[1] Unfortunately, as explained in the Draft Report, the use of a lottery system to award capacity to developers resulted in inefficient allocation of capacity within the both utility programs placing unnecessary burdens on developers, and negatively impacting potential participants' experience.[2] We support stakeholder calls for the development of robust solar programs with enough capacity to allow for long-term, stable solar program that will avoid the boom-bust cycles seen in Michigan's past solar programs. To that end, we agree with stakeholders that a capacity block system is the best means of achieving this outcome. As discussed in the Draft Report, under capacity block systems, megawatts are allocated to particular MW blocks that have a set incentive level for each block. As each block is filled, incentives decline. Capacity block programs have worked successfully in a number of states including Colorado[3] and California[4] and resulted in stable solar markets characterized by high market confidence and decreasing installed costs. The concerns identified in the Draft Report around design of a capacity block program have been successfully navigated in other states and can be navigated in Michigan. Accordingly, TASC encourages the Commission to require DTE and Consumers to develop capacity block programs for their service territories that utilize all remaining megawatts available under Michigan's current net metering law.

Most importantly, capacity block programs should utilize Michigan's existing net metering program as the foundation for each program. As recognized in the Draft Report, a capacity block program could be instituted quickly because net metering is already successfully established and operating since 2008, additional REC credit funds could be authorized quickly if additional funds are necessary, and establishment of programs quickly would allow for use of the 30% Federal Investment Tax Credit before it expires in 2016.[5] Each of these reasons provides strong support for maintaining net metering as the foundation of future solar programs in Michigan. Moreover, as explained below, the basic concern animating exploration of a value of solar tariff, that net metering results in an unacceptable cost shift to non-participating customers, lacks any factual support and is predicated on utility analysis and conjecture that is far from best practices on solar valuation. TASC sees little benefit to continuing to explore untested VOS frameworks given the success of net metering nationally based on speculative concerns.

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[1] See Draft Report at pg. 22.
[2] See Id.
[3] See Xcel Energy's Solar*Rewards Program, https://www.xcelenergy.com/Save_Money_&_Energy/Residential/Renewable_Energy_Programs/Solar*Rewards_-_CO.
[4] See California Solar Initiative General Market Program, http://www.cpuc.ca.gov/PUC/energy/Solar/CSI_General_Market_Program.htm.
[5] See Draft Report at pgs. 17 and 36.

III. Value of Solar Tariff (VOST) Frameworks are Untested and Raise Serious Concerns Which Have Not Been Fully Explored.

Both *Option 2: Buy All and Credit All* and *Option 3: Buy Net and Credit Net* raise tax, legal and policy issues for DG customers that have not been adequately explored in any venue to date. Taken together, these issues raise serious concerns regarding their viability as a means to support adoption of customer-sited solar energy. First, in sharp contrast to net metering programs, which have been adopted in 43 states and the District of Columbia and have supported the installation of hundreds of thousands of solar energy systems, a VOST has only been in a single place: Austin Energy's service territory since 2012. As the Draft Report notes, however, Minnesota is moving to implement a VOST but no utility has filed a tariff at this date. Thus, it is unclear whether a VOST will support the growth of solar resources with the same level of success, as net metering has to date.

In addition to the untested nature of a VOST, legal analysis performed by Skadden, Arps, Slate, Meagher & Flom LLP, raises serious concerns that implementation of a VOST in Michigan may jeopardize access to federal tax incentives and could result in unforeseen income tax liability for consumers receiving VOST payments.[6] As discussed in more detail in the Skadden Memo, residential solar configurations such as feed-in tariffs and VOST jeopardize access to the 30% Residential Income Section 25D credit as the energy generated by the DG system may not be deemed to be used directly on-site. Further, the Skadden Memo concludes that payments received by a taxpayer under such configurations are likely includable in a taxpayer's reported taxable gross income, regardless of whether they are called "credits" or "payments."[7] The findings of the Skadden Memo are particularly salient given that the Draft Report acknowledges that under Option 2, "[s]olar generation would not be used by the customer "behind-the-meter" as in net metering". Such a framework would directly undermine the ability of a residential energy consumer investing in on-site solar to utilized the Section 25D tax credit. Additionally, Consumers existing solar incentive program is structured as a FiT, which directly raises the tax concerns identified in the Skadden Memo.

While the Internal Revenue Service has not provided definitive guidance on whether any current VOST program would result in these two outcomes, the uncertainty currently hanging over the VOST strongly counsels against adopting it. Market certainty and stability are critically important to developing a robust solar market because the investment community needs to understand the risks involved in providing necessary capital to support customer DG investments and customers considering an investment in solar resources need to understand the financial benefits of their investment with a reasonable level of certainty. VOSTs simply do not provide this certainty because of the concerns noted above. Additionally, the rate for the VOST is subject to change each year. As the Draft Report notes, Austin Energy's initial VOST rate was 12.8 cents per kWh but was unilaterally and without stakeholder review lowered to 10.7 cents per kWh.[8] This whipsaw in compensation undermines market certainty to the detriment of the solar industry and customers who invested in solar to support Austin's renewable energy goals. Additionally, if a VOST were adopted and the IRS determined that a customer under a VOST was not eligible for tax incentives they believed they were owed and/or were subject to unanticipated income tax liability, such a determination would severely impact a customer's

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[6] See Skadden, Arps, Slate, Meagher & Flom LLP. *Memorandum RE: U.S. Federal Tax Consequences for Residential Solar Feed-In Tariffs.* (August 09, 2013) contained in Appendix A. (Skadden Memo).
[7] Skadden Memo at pgs. 2-3.
[8] See "Then There's This: Clouds Over Solar: Is AE throwing shade at sun-powered energy?" The Austin Chronicle, Jan. 14, 2014. Available at: http://www.austinchronicle.com/news/2014-01-10/then-theres-this-clouds-over-solar/

expectations around the economic benefits of their financial investment in on-site DG and therefore undermine continued customer solar adoption. If Michigan is going to attract the significant capital necessary for project development, more stability is needed than a VOST can provide.

Based on the discussions at the SWG, we do not believe there is adequate foundation for the Draft Report to conclude that, [t]he likelihood of [that VOS and REC credits could be deemed taxable income] has been mitigated in the Austin Energy and Minnesota VOS programs by providing on-bill credits and zeroing in on unused credit annually."[9] Simply put, there has been no definitive determination that on-bill crediting or zeroing out unused credits under a VOST will mitigate any of the concerns identified in the Skadden Memo so the statement in the Draft Report is speculative at best.

Additionally, TASC believes that tariffs requiring customers to enter a "buy all/sell all" or "buy all/credit all" contract with their utility (as found in Solar Program Design Option 2) violate federal regulations under the Public Utility Regulatory Policy Act of 1978 (PURPA) because PURPA provides consumers the right to serve onsite load with generators that meet FERC's qualifying facility ("QF") eligibility requirements, which all net metered solar systems in Michigan would satisfy,[10] may constitute a regulatory takings, and may raise serious privacy concerns related to what regulatory oversight of what a citizen does on their private property in the absence of reliability and safety concerns.

Each of the concerns raised above strongly support Michigan staying the course with net metering as the foundation of future solar programs in Michigan.

IV. Discussion of Utility Views on Net Metering Needs to be Better Balanced and Placed in Solid Context That the Necessary Valuation Studies Have Not Been Undertaken to Date.

As noted in the Draft Report, to accurately determine the direction and magnitude of any net metering cross-subsidy, a utility specific study of the costs and benefits of on-site solar needs to be undertaken.[11] To date, no such study has been performed by the Commission for either Consumers or DTE. Accordingly, TASC requests that all references to the value of solar or the cost and benefits of DG be made from objective viewpoints within the Draft Report. We are specifically object to references in the Draft Report, indicating net metering results in a cross-subsidy from non-participating ratepayers as this view has not been confirmed and utility analysis provided to the SWG does not fully or appropriately represent the value of net metering and renewable DG.[12] Accordingly, we request that statements in the Draft Report stating net metering results in such a cost-shift be removed.

From a contextual standpoint, the Draft Report itself highlights how out of step DTE's positions are in comparison with other utilities and independent experts. DTE asserts that Michigan solar has a "value" of $0.039/kWh[13]. This parsimonious accounting of the value of solar is blatantly out of line with the

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[9] Michigan Public Service Commission. *Solar Working Group – Staff Report.* pg. 37.
[10] See, e.g. 18 CFR § 292.304(d) gives qualifying facilities ("QFs") the option either: "(1) to provide energy as the *QF determines such energy to be available for such purchases*, in which case the rates for such purchases shall be based on the purchasing utility's avoided costs calculated at the time of delivery; or (2) to provide energy or capacity pursuant to a legally enforceable obligation for the delivery of energy or capacity over a specified term" (emphasis added).
[11] See Draft Report at pg. 25.
[12] See Draft Report at pgs. 14, 25 and 36.
[13] See Draft Report at pg. 14.

Austin Energy calculation of the value of solar ($0.107 to $0.128/kWh)[14], the Xcel Energy calculation of solar value in Minnesota ($0.135/kWh)[15], and what the independent research laboratory at the National Renewable Energy Lab calculated for the solar value in Michigan ($0.138/kWh)[16] all of which used much more reasonable methodologies for calculating the value of solar. DTE provides no logic or reasoning behind why their chosen methodology for calculating for the value of solar results in approximately one-third the value that the methodologies used in the other reports discussed in the Draft Report provide. The results of DTE's analysis – a value of solar that is just a fraction of what credible sources have calculated – do call into question whether DTE's analysis can be relied on to inform program design in Michigan going forward.

In sum, there is an absence of data presented within the Draft Report to support the argument that net metering or any of the existing solar programs are having measurable effects on other ratepayers in Michigan.

V. Allowing Third Party Ownership of On-Site Solar Within Utility Solar Programs Will Accelerate Customer Adoption of Solar

Currently, only customer-owned DG systems are eligible for incentives under DTE's SolarCurrents program and Consumers' Experimental Advanced Renewable Program. However, Michigan currently allows third-party ownership[17] and we believe achievement of the overarching goals of the Draft Report to encourage DG, increase the use of clean energy, provide customers control over energy supply and continue to increase consumer knowledge of renewable energy[18] would be greatly accelerated by allowing customers who prefer to finance solar systems through a third party ownership model to qualify for the investor-owned utility solar incentive programs. Providing customers with this financing choice is now standard practice for incentive programs across the country; TASC can see no reason why Michigan utilities should not be required to adopt this standard.

As highlighted in Ms. Bertram's presentation to the Solar Working Group (SWG) in April 2014[19], third-party ownership expands financing options available to customers interested in investing in solar PV by enabling customers to use a power purchase agreement or a lease to finance an on-site PV system. In this regard, third-party ownership presents an important financial option for customers who wish to install on-site solar but are unable to make the high upfront investment. Third party ownership also allows customers to take full advantage of available state and federal incentives, which are often difficult for many customer classes to fully monetize, such as non-profits organizations and government entities. Third party ownership can also alleviate the host customer from the unnecessary burden of operations and maintenance costs associated with DG systems, which often transfer to the developer under this financing mechanism. In this respect, third-party ownership frameworks align the incentives of the developer to keep the DG system operating at premium efficiency in order to receive payment from their customer with ratepayers who are supporting the installation of DG systems in Michigan and seek to see as much renewable energy production as possible from their support. Taken together, these

[14] See Draft Report at pg. 8.
[15] See Draft Report at pg. 11.
[16] See Draft Report at pg. 24.
[17] See 2008 Public Act 286; PSC Order Docket U-15787
[18] See Draft Report at pg. 29.
[19] Bertram, Sarah. *Tomorrow's Energy. Today*. (June 19, 2014)(Available at: http://www.michigan.gov/documents/mpsc/14-0429_Michigan_PSC_solar_working_group1_454793_7.pdf)

benefits of third-party ownership expand the universe of customers who can invest in solar energy resources by addressing barriers faced by many customer classes, including low-income energy consumers. TASC appreciates the Draft Report's recognition of such with the statement "Allowing the third party leasing option to be included in all future solar program may be a way to make solar projects available to customers of lower income levels."[20] This statement is directly supported by research showing that third-party ownership in California has allowed "less affluent, younger, and less educated" energy consumers to go solar.[21]

VI. Conclusion

TASC appreciates the opportunity to provide comments on the *Draft Solar Working Group - Staff Report*. We encourage the Commission to move forward with adopting robust solar programs that address the program design issues that have stymied customer-investment in solar energy to date in Michigan. As recognized in the Draft Report, net metering offers a solid, tested foundation for these programs which will allow programs to move forward in time to take advantage of state and federal tax credits before they expire to the benefit of Michigan's energy consumers and ratepayers who support these programs. Moreover, clarification that third-party owned systems will be able to participate in future programs will greatly accelerate customer investment in on-site solar by addressing financial and other barriers many customers face.

Respectfully submitted,

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[20] Michigan Public Service Commission. *Solar Working Group – Staff Report.* pg. 30.
[21] See, Drury, E.; Miller, M.; Macal, C.; Graziano, D.; Heimiller, D.; Ozik, J.; and Perry IV, T. (2012). "The Transformation of Southern California's Residential Photovoltaics Market through Third-Party Ownership." *Energy Policy*. Volume 42, March 2012.

Appendix A

M E M O R A N D U M

August 9, 2013

TO: The Alliance For Solar Choice (TASC)

FROM: Sean Shimamoto, Partner, Skadden, Arps, Slate, Meagher & Flom LLP
Emily Lam, Partner, Skadden, Arps, Slate, Meagher & Flom LLP

RE: U.S. Federal Income Tax Consequences for Residential Solar Feed-In Tariffs

This memorandum summarizes certain U.S. federal income tax consequences regarding feed-in tariffs, value of solar tariffs, and other comparable in front of the meter solar configurations. Specifically, this memorandum will address (i) whether a residential solar system that would otherwise qualify for the Residential Energy Efficient Property credit under Section 25D[1] would so qualify under a feed-in tariff, and (ii) whether payments received by a taxpayer pursuant to a feed-in tariff constitute gross income of such taxpayer.[2]

* * *

Internal Revenue Service Circular 230 requires us to advise you that, unless otherwise expressly indicated, any U.S. federal tax advice contained in the analysis set forth below was not intended or written to be used, and cannot be used, for the purpose of (i) avoiding tax-related penalties under the Internal Revenue Code or (ii) promoting, marketing, or recommending to another party any tax-related matters addressed herein.

Background

Several states, municipalities, and investor-owned utilities have enacted various forms of feed-in tariff arrangements or Value of Solar Tariffs (collectively, "FITs") for

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[1] Unless otherwise indicated, all Section references herein are to the Internal Revenue Code of 1986, as amended (the "Code").

[2] This memorandum analyzes the general framework of feed-in tariffs, value of solar tariffs, and other in front of the meter configurations under current law. The precise rules governing these configurations vary by program, which differences could change the U.S. federal income tax consequences discussed herein. However, the following analysis is generally applicable to all buy all/sell all arrangements as described further below in the "Background" section.

residential solar systems. These programs generally work as follows: utilities purchase all of the electricity generated by a residential solar system either under a long term power purchase contract or a tariff that changes values based on regulatory reviews. The homeowner sells all of the electricity generated by the residential solar system in exchange for a kWh rate. Legal title to the electricity passes prior to any ability of the homeowner to consume the electricity. The arrangement is thus a "sell all" situation in which the full amount of electricity generated by the residential solar system is sold to the utility.

In a separate transaction, the utility sells electricity to the homeowner for the homeowner's personal consumption. FITs are commonly referred to as "in front of the meter" transactions. Although FITs may differ in their specific terms, the above description provides the common framework of all FITs contemplated in the following analysis.

Discussion

Section 25D Credit

Individual taxpayers may be eligible for a tax incentive under Section 25D known as the Residential Energy Efficient Property credit (the "Section 25D credit"), for expenditures for qualified energy efficient residential property, which includes qualified solar electric property ("QSEP").[3] For expenditures on QSEP during the tax year, taxpayers are allowed a personal tax credit in the amount of 30% of such expenditure.[4] A QSEP expenditure is an expenditure for property that uses solar energy to generate electricity "***for use in a dwelling unit***."[5] The dwelling unit must be located in the U.S. and must be used as a residence by the taxpayer.[6] Moreover, if less than 80% of the use of the property is for nonbusiness purposes in the dwelling unit,[7] only that portion of the expenditures which is properly allocable to use for nonbusiness purposes shall be taken into account.[8]

Because under FITs all of the electricity generated by the residential solar system is sold to the utility, that electricity is not used by the taxpayer/homeowner in its personal residence as expressly required to qualify for the Section 25D credit.

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[3] Section 25D(a).

[4] Section 25D(a)(1).

[5] Section 25D(d)(2) (emphasis added). *See also* Section 3.03 of Notice 2009-41, 2009-19 I.R.B. 933, released on May 11, 2009, by the Internal Revenue Service (a taxpayer claiming a Section 25D credit with respect to an expenditure is responsible for determining whether the expenditure appropriately relates to a qualifying dwelling unit).

[6] Section 25D(d)(2).

[7] A nonbusiness use in a dwelling unit would not include, for example, use for a home office. Treas. Reg. § 1.23-3(g).

[8] Section 25D(e)(7).

Further, as noted above, if the taxpayer is not directly using at least 80% of the electricity generated by the solar electric property for nonbusiness purposes, then the Section 25D credit is not available for that portion of business use. Under FITs, 100% of the electricity generated is sold to the utility, and thus 100% of the use of the residential solar system is for business use. Therefore, even if a residential solar system were otherwise eligible for a Section 25D credit, because all of the electricity generated is sold, none of it is used by the taxpayer for nonbusiness purposes, and thus none of the expenditures qualify for the Section 25D credit.

Gross Income

In addition to the loss of the Section 25D credit, the payments received by a taxpayer for the sale of electricity under FITs appear to fall squarely within the definition of taxable gross income. Section 61 provides that gross income means "all income from whatever source derived." In the landmark case *Commissioner v. Glenshaw Glass*, the United States Supreme Court interpreted the concept of gross income broadly, "in recognition of the intention of Congress to tax all gains except those specifically exempted," to include "instances of undeniable accessions to wealth, clearly realized, and over which the taxpayers have complete dominion."[9]

The terms of FITs provide for the sale by the taxpayer to the utility of all electricity generated by the taxpayer's residential solar system. In exchange, the utility compensates the taxpayer with either cash or a credit on the taxpayer's utility bill. Although the taxpayer may also purchase electricity from the utility, under FITs, the two transactions are separate and distinct. The proceeds from the taxpayer's sale of electricity to the utility therefore likely constitute gross income.

This conclusion is supported by Senate bill S.1225, introduced by Sen. Mark Udall, on June 26, 2013, which would add a new Section 139E to the Code to provide an income exclusion for "any gain from the sale or exchange to the electrical grid" of electricity generated by property with respect to which QSEP expenditures are eligible for a Section 25D credit, "but only to the extent such gain does not exceed the value of the electricity used at such residence during such taxable year." The proposed bill creates a clear negative inference that absent the income exclusion proposed in a new Section 139E, gain from the sale of electricity in this context constitutes gross income.

Conclusion

Under current law, residential FITs jeopardize the Section 25D credit because electricity generated by such residential solar systems is sold to the utility, rather than used in a personal residence of the taxpayer. Further, payments received by a taxpayer under FITs are likely includable in taxable gross income.

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[9] 348 U.S. 426, 431 (1955).

Appendix C

Solar Program Designs

The example solar program designs below show billing data for a residential customer with a 5 kW solar PV project. Monthly usage of 650 kWh is assumed to represent the average residential customer in Michigan. A 14% solar capacity factor is assumed which yields 511 kWh per month on average from a 5 kW solar PV project. All three example program options are 50 MW; however, some portion of the 50 MW, with the exception of the net metering option, could be filled with community solar projects. If the entire 50 MW program is subscribed, based on a 14% solar capacity factor, the program's annual generation would be 61,320 MWh per year. This amount of solar generation represents approximately 0.18% of Consumers' and 0.14% of DTE's annual retail sales based on 2012 retail sales data.

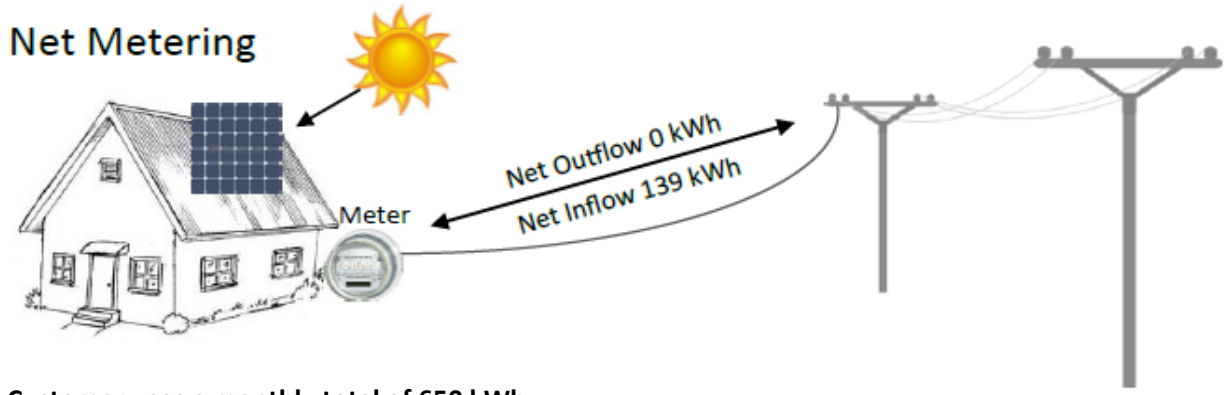
Option 1: Category 1 Net Metering and REC Payment

Under this program, the participating customer would enroll in Michigan's existing net metering program. For this example, the net metering credit is assumed to be $0.125 per kWh and the REC payment is $0.025 per kWh. While the current net metering credit is under the breakeven $0.15 per kWh solar project rate Staff assumed for program design purposes, utility rates may increase as indicated in **Figure 17**, and the REC payment could be reduced or dropped in the future.

Assumptions for Option 1:

- Program Size - 50 MW (For calculation purposes all 3 program options were sized at 50 MW. Staff is not suggesting an increase in the Category 1 net metering program size.)
- Estimated Participants @ 5 kW per project -10,000 projects
- Participating Customer Class - Any, but mostly likely residential
- Maximum Project Size- 20 kW, limited to 100% of the customer's annual usage in kWh
- Customer Interconnection Costs Limited to $100 interconnection/net metering application fee

- Net Metering Credit – Currently estimated at approximately 12.5 cents/kWh (Does not reflect PSCR factor or other applicable surcharges.) Credits carry forward indefinitely.
- REC Payment – Initially $0.025/kWh ($8 per REC, Solar receives 3.14 RECs per MWh) The utility may issue a check to the customer if REC payments reach a pre-determined level. The REC payment for new participants will decrease when each 5 – 10 MW block of capacity fills.



Customer uses a monthly total of 650 kWh
5 kW Solar Generation 511 kWh

Bill Analysis-Residential Customer

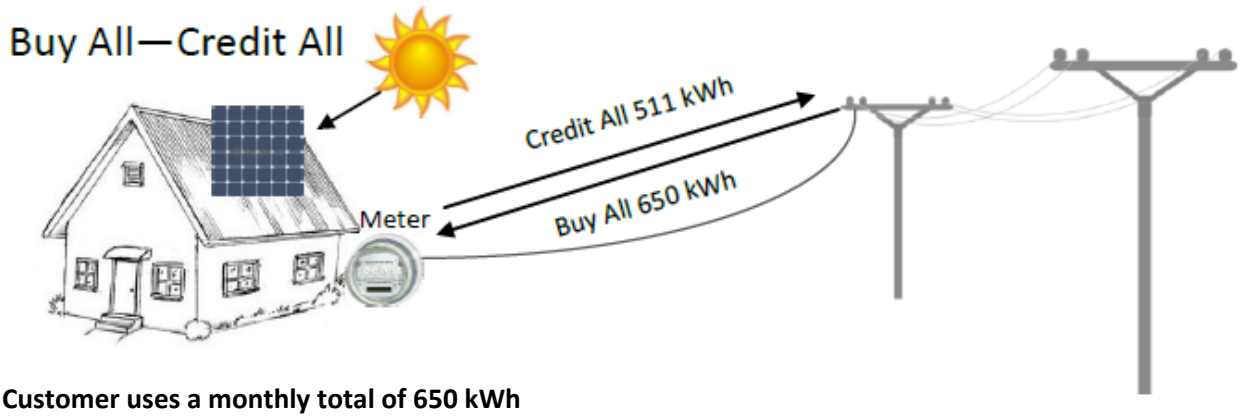
	Example Residential Rates	Bill Without Net Metering or REC Payment	Bill With Net Metering and REC Payment
Customer Charge	$6	$6	$6
Energy Charge	7.5 ¢/kWh	650 kWh * $0.075/kWh = $48.75	(650 kWh – 511 kWh)*$0.075/kWh = $10.43
Distribution Charge	5 ¢ /kWh	650 kW * $0.05/kWh =$32.50	(650 kwh – 511 kWh)*$0.05/kWh = $6.95
Total		$87.25	$23.38
REC Payment	$8/REC or $0.025/kWh		$0.025/kWh * 511 kWh = $12.78
Bill With REC Payment			$10.60
Bill Savings/Solar KWh			($87.25–$10.60)/511 kWh = $0.15 per kWh
Example is simplified and does not reflect power supply cost recovery factor or surcharges.			

Option 2: Buy All and Credit All

Under this program framework, the participating customer would pay the utility for all monthly kWh usage based on the customer's rate schedule. Solar generation would not be used by the customer "behind-the-meter" as in net metering. All solar generation would be metered and credited at the VOS rate plus a REC payment on the customer's bill. In this example, the VOS Credit is equal to $0.10 per kWh and REC payment is equal to $0.05 per kWh to bring the total credit to $0.15 per kWh.

Assumptions for Option 2:

- Program Size -50 MW comprised of five 10 MW capacity blocks
- Maximum Project Size
  - Small Projects: 20 kW, limited to the customer's annual usage in kWh
  - Large Projects: 20 – 500 kW (includes Community Solar Program capacity)
- Estimated Participants
  - Small Projects: >125 Projects
  - Large Projects: >15 – 375 Projects
- Participating Customer Class - Any
- Customer Interconnection Costs
  - Limited to $75 interconnection fee for projects less than 20 kW
  - See the MPSC's Electric Interconnection and Net Metering Standards for larger project interconnection costs.
- VOS Credit- $0.10/kWh assumed for the example bill shown below.
- REC Payment – Initially $0.05/kWh ($16 per REC, Solar receives 3.14 RECs per MWh). The REC payment for new participants will decrease when each 5 – 10 MW block of capacity fills.



Customer uses a monthly total of 650 kWh
5 kW Solar Generation 511 kWh

Bill Analysis – Residential Customer

	Example Residential Rates	**Bill Without Value of Solar or REC Payment**	**Bill With Value of Solar or REC Payment**
Customer Charge	$6	$6	$6
Energy Charge	7.5 ¢/kWh	650 kWh * $0.075/kWh = $48.75	650 kWh * $0.075/kWh = $48.75
Distribution Charge	5 ¢ /kWh	650 kW * $0.05/kWh =$32.50	650 kW * $0.05/kWh = $32.50
Total		$87.25	$87.25
Value of Solar Credit	$0.10/kWh		511 kWh * $0.10/kWh = $51.10
REC Payment	$16/REC or $0.05/kWh		$0.05/kWh * 511 kWh = $25.55
Bill With REC Payment			$10.60
Bill Savings/Solar KWh			($87.25–$10.60)/511 kWh = $0.15 per kWh
Example is simplified and does not reflect power supply cost recovery factor or surcharges.			

Option 3: Buy Net – Credit Net

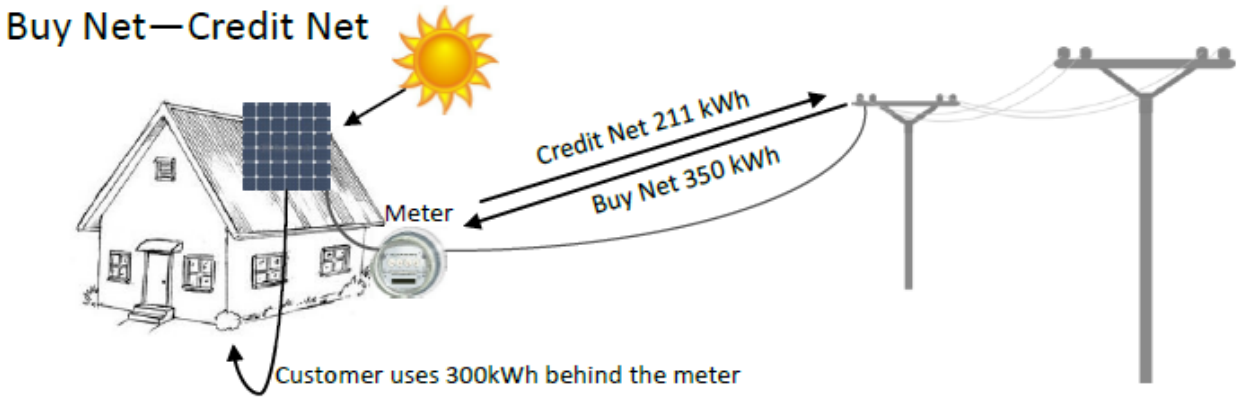
This program option uses elements from both the Category 1 Net Metering and REC Payment and the Buy All – Credit All programs previously discussed. Under this program, the customer uses their solar generation "behind-the-meter" similar to net metering. However, any solar generation sent to the distribution system is credited at VOS and total solar generation receives the REC payment amounts. All kWh delivered by the utility to the customer are purchased by the customer at full retail rate. This program is essentially the Act 295 modified net metering program with the net metering credit set to VOS and the REC payment amounts instead of the generation portion of the retail rate or LMP. For this example, since a VOS has not been established through a contested case, Staff is using a VOS credit equal to $0.10 per kWh. The approximate residential credit for "behind-the-meter" usage is equal to $0.125 per kWh. Determining the appropriate REC payment resulting in an average per kWh credit of $0.15 per kWh is more complicated in this example because "behind-the-meter" usage results in a $0.125 per kWh credit and the VOS credit for kWh sent to the distribution system is $0.10 per kWh. A REC payment of $0.035 per kWh or $11 per REC is used. However, the REC payment can be used to make up the difference between the VOS credit and an average total credit of $0.15 per kWh when the VOS credit is determined.

Assumptions for Option 3:

- Program Size -50 MW comprised of 5 capacity blocks
- Maximum Project Size
    - Small Projects: 20 kW, limited to the customer's annual usage in kWh
    - Large Projects: 20 – 500 kW (includes Community Solar Program capacity)
- Estimated Participants
    - Small Projects: >125 Projects
    - Large Projects: >15 – 375 Projects
- Participating Customer Class - Any
- Customer Interconnection Costs
    - Limited to $75 interconnection fee for projects less than 20 kW

- See the MPSC's Electric Interconnection and Net Metering Standards for interconnection costs.

- VOS Credit- $0.10/kWh assumed for the example bill shown below.
- REC Payment – Initially $0.035/kWh ($11 per REC, Solar receives 3.14 RECs per MWh, which applies to all solar generation). The REC payment for new participants will decrease when each 5 – 10 MW block of capacity fills.



Customer uses a monthly total of 650 kWh
Customer purchases 350 kWh from the utility
5 kW Solar Generation 511 kWh
300 kWh are used "behind-the-meter"
211 kWh are sent to the utility's distribution system

Bill Analysis – Residential Customer

	Example Residential Rates	Bill Without Value of Solar or REC Payment	Bill With Value of Solar or REC Payment
Customer Charge	$6	$6	$6
Energy Charge	7.5 ¢/kWh	650 kWh * $0.075/kWh = $48.75	350 kWh * $0.075/kWh = $26.25
Distribution Charge	5 ¢ /kWh	650 kW * $0.05/kWh =$32.50	350 kW * $0.05/kWh = $17.50
Total		$87.25	$49.75
Value of Solar Credit	$0.10/kWh		211 kWh * $0.10/kWh = $21.10
REC Payment	$11/REC or $0.035/kWh		$0.035/kWh * 511 kWh = $18.05
Bill With REC Payment			$10.60
Bill Savings/Solar KWh			($87.25–$10.60)/511 kWh = $0.15 per kWh
Example is simplified and does not reflect power supply cost recovery factor or surcharges.			

Discussion of Options

The Net Metering and REC Payment, Option 1, could be implemented quickly because the net metering program is already successfully established. To enable the REC payment element of the

program, the utility may file a Renewable Energy Plan amendment requesting approval to implement the REC payment and collect any necessary funding by increasing the monthly renewable energy surcharge, if needed. Michigan solar program participants will benefit if the program is in place to allow use of the 30% federal tax credit. Until a distributed solar cost/benefit study is completed, the extent of net metering ratepayer cross-subsidization is unknown.

Program Options 2 and 3 incorporate both a VOS and REC payment. For purposes of illustration, the VOS has been assumed to be $0.10 per kwh, but the actual VOS would need to be determined through a Commission proceeding, based on either the Minnesota approach or the dynamic rates approach recommended by 5 Lakes Energy. It is likely that a Commission proceeding to establish a VOS credit amount and an amended renewable energy plan proceeding would be needed for full implementation of these programs. Option 1, Net Metering and REC Payment, does not provide a credit with a stable and known amount that potential customers could use to obtain lower cost financing. Options 2 and 3 could be structured to provide a known credit amount similar to the Minnesota VOS program, if that is one of the desired goals. The VOS and REC credits could be deemed taxable income. The likelihood of this has been mitigated in the Austin Energy and Minnesota VOS programs by providing on-bill credits and zeroing out unused credits annually. Options 2 and 3 are structured so that community solar could be incorporated. Under Option 2, the customer pays for all on-site usage according to the utility rate schedule. All solar generation receives a VOS credit, which is not subsidized by other customers, and the REC Payment, which could be considered a transparent incentive.

From a utility rate recovery perspective, REC payments will be funded through Consumers' and DTE's monthly renewable energy surcharge. With the amount of funds already collected and the dramatic cost decrease of wind energy, increasing renewable energy costs to fund solar programs may not result in an increased renewable energy surcharge for Consumers or DTE.

To address customers and installer concerns with lotteries and to help eliminate large sudden capacity build-out, the sub-group discussed a capacity block system. This system would eliminate lotteries by allowing for program participation in capacity blocks. When a particular capacity block is filled, the price is reduced for the next block until that too becomes filled. This continues until all the slated capacity is realized. The declining block pricing provides for market response and helps to extend the program over time instead of fluctuating builds. It also provides some certainty to potential project owners and installers as they will know how much capacity is left in the program and how quickly each block is filling. This allotment method would present challenges to the utility as interest levels in any given block would be unknown. A customer may be interested in an early block based on the payment provided, but be placed in a subsequent block due to application timing which may not provide the necessary economics for the customer. Frequent customer updates as to program participation levels would be necessary to assuage this concern. Additionally, setting the initial block prices will be difficult. Considering current solar project installed costs, Staff used an initial $0.15 per kWh total credit level in its program design. Too high of a price will cause a flood of applications, while too low of a price will not garner participation. It may be necessary to implement a mechanism that adjusts prices within blocks to mitigate these issues.

The annual REC payments average approximately $1 million dollars per year for the Net Metering and REC Payment, Option 1. Without knowing the actual value of solar credit for Options 2 and 3, calculating the REC payment necessary for the program is speculative. However, Staff estimates average annual program REC costs of $2 million and $6 million for $0.10 and $0.04 per kWh VOS credits, respectively.