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E3 Nevada Net Energy Metering Impacts Evaluation, July 2014

Executive Summary

Nevada Net Energy Metering Impacts Evaluation

Prepared for:

State of Nevada Public Utilities Commission

July 2014

Energy+Environmental Economics

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1 Executive Summary

1.1 Net Metering Program Overview

This study was commissioned by the Public Utilities Commission of Nevada (PUCN) in response to Nevada Assembly Bill (AB) 428[1] to forecast the costs and benefits of renewable generation systems that qualify for the state's net energy metering (NEM) program. Energy + Environmental Economics (E3), hereafter referred to as "we", completed the study under direction of the PUCN and with input from a stakeholder advisory group composed of experts from the solar industry, ratepayer advocates, and electric utility representatives. This work was completed under PUCN Docket No. 13-07010.[2]

NEM is an electricity tariff designed to encourage installation of customer-sited renewable generation. Under the NEM tariff, a customer can self-generate electricity, reducing purchases from the utility, and sell excess electricity back to the utility at retail rates. Customers with solar photovoltaic (PV), solar thermal electric, wind, biomass, geothermal electric, or hydroelectric distributed generation (DG) installations are eligible for Nevada's NEM tariff.

[1] Assembly Bill No. 428 – Committee on Commerce and Labor, available at: http://www.leg.state.nv.us/Session/77th2013/Bills/AB/AB428_EN.pdf
[2] Docket can be found at: http://pucweb1.state.nv.us/PUC2/DktDetail.aspx

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A number of complimentary programs in Nevada also serve to encourage DG installations in the state. Some DG systems receive financial incentives through NV Energy's RenewableGenerations program. Generation from these incentivized systems can be counted towards Nevada's renewable portfolio standard (RPS), which requires NV Energy (Nevada's two electric utilities, Nevada Power Company and Sierra Pacific Power Company, jointly) to produce 25% of its generation from eligible renewable resources by 2025. Lastly, the Federal Investment Tax Credit (ITC) works to incentivize DG installations by offsetting 30% of eligible installed system capital costs through the end of 2016 (when it drops to 10%).

As of December 2013, over 3,300 individual systems were enrolled in NV Energy's NEM program, totaling over 60 Megawatts (MW) of installed capacity, with 50 MW coming from distributed PV. These systems produce about 93 Gigawatt-hours (GWh) of energy annually. Forecasts of new installations from 2014 to 2016 provided by NV Energy anticipate significant growth (234 MW) in new NEM capacity through 2016.

1.2 Scope of Analysis and Results

In this study, we investigate the future (2014 onward) impact of existing NEM systems and forecasted installations through 2016. We evaluate Nevada's NEM program through three analyses: a cost-benefit analysis, a review of NEM's macroeconomic impacts, and a demographic comparison of NEM participants and non-participants in the state.

1.2.1 COSTS AND BENEFITS OF NEM

We evaluate the cost-effectiveness of NEM generation from five different perspectives to provide a comprehensive assessment of the costs and benefits of the NEM program. These tests are typically applied when assessing the cost-effectiveness of distributed resources and reflect the industry standard used in all 50 states.[3] The core questions the cost-effectiveness assessment answer are the following:

1) Is renewable self-generation cost-effective for the customers who install systems? (Participant Cost Test or "PCT")
2) What is the cost impact on non-participating utility customers? (Ratepayer Impact Measure or "RIM")
3) Recognizing that some utility bills may go down and others may go up, does the NEM program reduce utility bills overall? (Program Administrator Cost Test or "PACT")
4) Does NEM generation reduce the overall cost of energy for Nevada? (Total Resource Cost Test or "TRC")
5) Does NEM generation provide net societal benefits considering the cost and externalities such as the health impacts from NEM? (Societal Cost Test or "SCT")

[3] The 'cost tests' are defined in the California Standard Practice Manual used nationwide which is available for download at: http://www.cpuc.ca.gov/NR/rdonlyres/004ABF9D-027C-4BE1-9AE1-CE56ADF8DADC/0/CPUC_STANDARD_PRACTICE_MANUAL.pdf**.** The cost tests described in the manual are used throughout the United States.

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The overall policy and incentive structure used in Nevada to encourage renewable self-generation has recently changed, and is anticipated to change further through 2016. Therefore, we report cost-effectiveness results separately for systems installed through 2013, systems installed in 2014 and 2015, and 2016-vintage systems. The forecasted cost-effectiveness of systems in 2016 incorporates all of the programmatic changes currently planned for NEM-eligible systems and reflects the likely impact before any additional policy changes. The most important policy changes over the analysis timeframe that are incorporated into this report are the following:

- In 2014, the RenewableGenerations incentive program is being redesigned with significantly lower incentive levels and open, on-going availability. This new design replaces the prior lottery-based system, under which utility incentives were only available to those that won the lottery. The new design also includes more stringent performance requirements for wind systems and replaces the old capacity-based incentive with a performance-based incentive (PBI) for wind and large PV systems.
- Effective starting in 2014, NV Energy has adjusted the NEM tariff such that compensation for exports to the grid no longer include a payment for public purpose charges. This reduces the compensation for NEM systems somewhat. NEM generation that displaces on-site load still benefits from reduced public purpose charges.

- In 2016, the credits towards the Nevada RPS for solar generation will no longer be counted with a multiplier on production. All eligible generation will be counted towards the RPS on an equal basis. Prior to 2016, utility-sited solar generation is awarded a 2.4 multiplier towards RPS compliance, and distributed solar generation is awarded a 2.45 multiplier.

We collaborated with the PUCN with input from the stakeholder advisory group to define a "base case" set of input assumptions. The data used in the study is primarily sourced from NV Energy's most recent integrated resource plans, general rate cases, and RenewableGenerations incentive program reports. We also analyze some sensitivity cases in which we alter various key assumptions. In both the base and reference cases, all other state policies (in particular, Nevada's RPS) remain intact.[4]

1.2.2 BASE CASE RESULTS

In the Base Case we find the following results for each of the five perspectives of cost-effectiveness.

1. **Is renewable self-generation cost-effective for the customers who install systems? (Participant Cost Test or "PCT")**

Prior to 2014, the RenewableGenerations incentive levels were relatively high, and renewable self-generation was cost-effective for the average Nevada NEM

[4] This study does not incorporate any effects of Senate Bill (SB) 123. The impacts of excluding SB 123 are addressed in Section 2.3.4.

customer. In 2014, with the reduction in utility incentives, self-generation looks moderately more expensive than conventional utility service for the average Nevadan unless installed renewable generation costs drop faster than we forecast. This result is driven by lower state incentives, and also new incentive program performance requirements for wind, and removal of the public purpose charge credit for exports. Of course, competition and industry cost improvements of renewable self-generation suppliers may reduce prices faster than our forecast. As shown in Table 1, on average, the NEM participants at the end of 2016 are expected to pay on a lifecycle basis about $0.02/Kilowatt-hour (kWh) more for energy they self-generate than if they would have purchased from the utility, which adds up to a net present value (NPV) of -$135 million dollars over the 25-year lifetime of the systems.

Table 1: Base Case Results of NEM Generator Participant Cost-Effectiveness; Participant Cost Test (PCT)

Benefit (cost) to customers who participate in NEM	Installs through 2013	Installs in 2014-2015	Installs in 2016	All installs through 2016
Lifecycle NPV ($MM 2014)	$23	($115)	($43)	($135)
Levelized ($2014/kWh)	$0.02	($0.03)	($0.04)	($0.02)

2. **Does renewable self-generation impact the other NV Energy ratepayers? (Ratepayer Impact Measure or "RIM")**

Prior to 2014, there was a significant cost shift from NEM customers to non-participating customers, primarily because the funding of the RenewableGenerations incentive was relatively large and impacted the bills of all customers.

In 2014 and 2015, we anticipate a benefit to non-participants because a) the utility incentive is relatively low, and b) the RPS policy places a large value on distributed solar generation installed during this time period. The 2.45 multiplier on RPS credits from solar self-generation installed prior to 2016, combined with unlimited banking of RPS credits and current RPS over procurement means that the utility will avoid purchasing 2.45 kWh of central station renewables on behalf of all customers for every kWh of NEM generation from 2004 through 2015 vintage NEM systems.

In 2016, the RPS multiplier will have expired and the RenewableGenerations incentives will be low, so we expect that non-participants are very nearly neutral and will experience neither a large benefit nor a cost due to new NEM installations.

Overall, we do not estimate a substantial cost shift to non-participants due to NEM going forward given the current and proposed reforms to the program. We estimate a total NPV benefit of 2004-2016 NEM systems to non-participating

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ratepayers of $36 million during the systems' lifetimes. Whether NEM systems are a net cost or net benefit to non-participants is sensitive to some key input assumptions, as demonstrated by the sensitivity results (Section 1.2.3), but in either case should be relatively small.

Table 2 presents the expected impacts to non-participants for each vintage of NEM generation. Overall, the planned reforms significantly reduce costs to non-participants while reducing the financial proposition to those that would install self-generation.

Table 2: Base Case Results of NEM Generator Non-Participating Ratepayer Cost-Effectiveness; Ratepayer Impact Measure (RIM)

Benefit (cost) to non-participating ratepayers	Installs through 2013	Installs in 2014-2015	Installs in 2016	All installs through 2016
Lifecycle NPV ($MM 2014)	($141)	$168	$6	$36
Levelized ($2014/kWh)	($0.14)	$0.05	$0.01	$0.01

3. **Overall, do the bills NV Energy collects from all customers (both participants and non-participants) increase or decrease due to NEM systems? (Program Administrator Cost Test or "PACT")**

Prior to 2014, NEM caused bills to increase slightly overall because utility incentives exceeded the utility costs avoided by the NEM generation. For future vintages, when incentives are lower, the total bills NV Energy collects will decrease substantially due to the self-generation. In total, we estimate that bills will decrease by NPV $716 million for all systems installed through 2016 over their 25-year life. Of course, as discussed previously, all of the bill savings accrue to those who install self-generation and these savings do not include the costs of the systems themselves since this perspective is only focused on the change in utility bills.

Table 3 presents the results on the aggregate change in total bills attributable to each vintage of system and the levelized bill savings from each kWh of NEM generation. The results show a benefit (cost) to customers as a whole thanks to an aggregate reduction (increase) in their electric bills. From a utility-perspective, this result shows that the utility will need to collect less (more) revenue from customers (typically called the 'revenue requirement') overall as more customers generate their own electricity to earn their target rate of return. The levelized bill savings per kWh are driven significantly by the value of the renewable energy credit from incentivized systems that can be used to displace central station renewables. In particular, the savings are significant on systems installed prior to 2016 that receive a 2.45 multiplier.

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Table 3: Base Case Results of NEM Generator Program Administrator (Utility) Cost-Effectiveness; Program Administrator Cost Test (PACT)

Reduction (increase) in aggregate customer bills	Installs through 2013	Installs in 2014-2015	Installs in 2016	All installs through 2016
Lifecycle NPV ($MM 2014)	($28)	$581	$160	$716
Levelized ($2014/kWh)	($0.03)	$0.17	$0.13	$0.13

4. Is self-generation a cost-effective resource for Nevada? (Total Resource Cost Test or "TRC")

Overall, NEM generation moderately increases total energy costs, primarily because large-scale, utility-sited renewable generation is a lower cost resource. Since RenewableGenerations-incentivized systems count towards the Nevada 25% RPS, they displace the need for NV Energy to purchase additional wholesale renewable generation in approximately the 2020 timeframe when the banked renewable credits would be exercised. Therefore, this result is driven by the cost difference between smaller self-generation systems when installed and the cost of central station renewable generation in 2020 compared to the additional benefits of distributed NEM generation.

Table 4, below, summarizes the results of the overall costs to Nevada for each vintage of NEM installation. Prior to 2014, the relatively higher cost of NEM generation systems is the primary driver of a net cost to Nevada for early systems. For the systems installed from 2014-2015, the forecasted cost declines of NEM systems coupled with the multiplier that displaces 2.45 kWh of central station in 2020 for every kWh generated by a NEM system reduces costs for Nevada. When the RPS multiplier is removed for 2016 NEM vintages, we find that NEM will again be a net cost to the state. Our forecasts predict that the cost advantage of utility-scale renewable systems outweighs the additional loss and transmission benefits of small distributed NEM systems.

Table 4: Base Case Results of NEM Generator Total Resource (State) Cost-Effectiveness; Total Resource Cost (TRC) Test

Benefit (cost) to the state of Nevada	Installs through 2013 Lifecycle NPV $MM	Installs in 2014-2015 Lifecycle NPV $MM	Installs in 2016 Lifeycle NPV $MM	All installs through 2016 Lifecycle NPV $MM
Lifecycle NPV ($MM 2014)	($119)	$52	($36)	($100)
Levelized ($2014/kWh)	($0.12)	$0.02	($0.03)	($0.02)

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5. How does this conclusion change if we consider non-monetized benefits of renewables? (Societal Cost Test or "SCT")

Inclusion of a societal perspective, which includes externalities and non-monetized health benefits of reduced air emissions from self-generation, does not significantly change the results of our findings for the costs and benefits of NEM for Nevada overall. The primary reason is that Nevada has a 25% RPS, and if less NEM is installed then more utility-sited renewable generation will be installed (and vice-versa) to meet the standard. Therefore, there is no substantial net emissions reduction or additional health benefits attributable to NEM systems.

In fact, given the 2.45 multiplier on NEM systems installed now we find that NEM systems *increase* emission levels and produce a net health cost in the long-run. Because customers install NEM systems when it is in their own interest, NEM capacity is installed before NV Energy would otherwise need to build utility-scale renewables for RPS compliance. This results in a net emissions reduction in the early years of the analysis. However, renewable generation from NEM PV systems installed prior to 2016 receives the 2.45 RPS multiplier and reduces the total installed renewable generation by 2025. In addition, installing NEM generation reduces the RPS requirement because the 25% RPS is linked to the total retail sales which are reduced by NEM. Consequently, generating 1 kWh of NEM generation prior to 2016 will displace about 2.7 kWh (2.45 multiplier plus 0.25 RPS requirement) of future utility-sited renewable generation. This will result in less renewable generation and more emissions overall.

Table 5, below, summarizes the results from a societal perspective for each vintage of installed NEM generation. The main driver of differences in the NPVs of Table 4 and Table 5 is the difference in rates used to discount the cost streams. As is standard utility practice, we use a lower societal discount rate (we assume 3% real) for the societal perspective and the utility cost of borrowing (we assume 4.7% real) for the TRC. It is conventional for societal cost-effectiveness analyses to put more emphasis on future time periods and future generations.

Table 5: Base Case Results of NEM Societal (State) Cost-Effectiveness; Societal Cost Test (SCT)

Benefit (cost) to the state of Nevada, including externalities	Installs through 2013	Installs in 2014-2015	Installs in 2016	All installs through 2016
Lifecycle NPV ($MM 2014)	($133)	$90	($36)	($75)
Levelized ($2014/kWh)	($0.11)	$0.02	($0.02)	($0.01)

1.2.3 SENSITIVITY RESULTS

In addition to the base case, we evaluate NEM cost-effectiveness under five alternative assumptions on key drivers to investigate their impact on the analysis results. Of these five sensitivities, two impact the utility value of NEM generation and three impact NEM customer bill savings. We also outline additional sensitivities that can be performed using the publicly available spreadsheet models.

1.2.3.1 Sensitivity 1: Distribution Avoided Costs

In the first sensitivity, we consider the cost-effectiveness of NEM assuming that NEM generation would allow the utility to avoid building distribution upgrades to serve customer loads. This benefit is not included in the base case because NV Energy distribution engineers do not consider the intermittent output of NEM systems reliable enough to avoid the need for distribution system upgrades. In reality, some portion of distributed generation could probably reliably defer some distribution upgrades, though distribution planning processes would need to be modified to actually capture the distribution value. Therefore, including the distribution component of avoided costs provides a high estimate of net metered systems' benefit to the grid. Table 6 shows the results of each affected cost test is shown with the inclusion of distribution benefits. Including distribution benefits increases net benefits under each of the other cost tests. There are greater benefits to non-participants if the utility could capture distribution benefits, the overall bill savings would be larger in Nevada. Finally, based on our assessment, NEM generation could become a net benefit to the state of Nevada with the inclusion of distribution benefits.

Table 6: Results with Distribution Avoided Costs

	Primary Question What is the…	Installs through 2013 Lifecycle NPV $MM	Installs in 2014-2015 Lifecycle NPV $MM	Installs in 2016 Lifecycle NPV $MM	All installs through 2016 Lifecycle NPV $MM
RIM	benefit (cost) to non-participating ratepayers?	($118)	$246	$35	$166
PACT	reduction (increase) in aggregate customer bills?	($4)	$659	$189	$847
TRC	benefit (cost) to the state of Nevada?	($95)	$131	($8)	$31
SCT	benefit (cost) to the state of Nevada, including externalities?	($105)	$184	($1)	$82

1.2.3.2 Sensitivity 2: Retail Rate Design

Retail rates also play an important role in NEM cost-effectiveness. We performed a second sensitivity analysis comparing several different potential rate designs. NV Energy created these hypothetical rates for our analysis: each rate scenario represents shifting an additional component of the utility revenue requirement from the rates' variable charges ($/kWh) to fixed monthly charges ($/month). The "Rule 9 Compliance" rate design collects more revenue in fixed charges than the current design, and the "Rule 9 Compliance + Primary Distribution Cost Recovery" rate design collects an even larger portion of revenue in fixed charges. Table 7

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below shows the results of the RIM and PCT after each potential rate design change. These results are displayed for all NEM installations through 2016. As each successive rate change moves more charges from the variable portion of the rate to the fixed portion, NEM participant benefits decrease and non-participating ratepayer benefits increase. This is because NEM participants are compensated for energy exports at the level of the variable rate; lower variable rates reduce the cost shift from participants to non-participants.

Table 7: Sensitivity Results of Non-Participant Impacts for Alternative Rate Designs, All NEM Installations Through 2016

	PCT What is the benefit (cost) to customers who participate in NEM?	RIM What is the benefit (cost) to non-participating ratepayers?
	Lifecycle NPV ($MM)	Lifecycle NPV ($MM)
Base Case: Existing Rate Structures	($135)	$36
Sensitivity: Rule 9 Compliance	($148)	$48
Sensitivity: Rule 9 Compliance + Primary Distribution Cost Recovery	($195)	$95

1.2.3.3 Sensitivity 3: Retail Rate Escalation

We also performed a sensitivity analysis on NV Energy's retail rate escalation through the end of the study period (2041). NV Energy's integrated resource plan

(IRP) provides a base retail rate escalation, but it is extended only through 2020. In our base case, we use NV Energy's IRP gas forecast to extend the retail rate escalation from 2020 to 2041, resulting in a real annual rate increase of 1.4% beyond 2020. In Table 8, we compare two additional retail rate escalations, one higher and one lower than the base assumption. Effectively, the retail rate is the price that the utility is purchasing NEM generation on behalf of customers so the higher the retail rate the more costly NEM generation is for non-participants, and the better the proposition is for NEM generation owners. We find that the higher retail rate escalation would create a moderate cost burden on non-participants (rather than a moderate benefit). The lower retail rate escalation results in the reverse outcome, less economic benefits to participants, and greater net benefits to non-participants.

Table 8: Sensitivity Results of Retail Rate Escalation, All NEM Installations Through 2016

	PCT What is the benefit (cost) to customers who participate in NEM?	RIM What is the benefit (cost) to non-participating ratepayers?
	Lifecycle NPV ($MM)	Lifecycle NPV ($MM)
Base Case: IRP forecast extended beyond 2020 at 1.4% real	($135)	$36
High rate escalation: 1.4% real in all years	($98)	($2)
Low rate escalation: IRP forecast extended beyond 2020 at 0.5% real	($168)	$68

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1.2.3.4 Sensitivity 4: Demand Charge Reduction

The base case analysis assumes that intermittency of NEM generation and poor coincidence of generation and customer load prevents customers from reducing their monthly peak demand. We therefore assume no demand charge savings on customer bills due to NEM in the base case. We performed a sensitivity in which NEM customers on rates that include demand charges could reduce demand in all of the relevant hours by 10%. We believe that this is a high estimate, so we use this to set an upper bound on the potential impact of demand charge reduction.

As shown in Table 9, NEM demand charge reductions shift about $17 million NPV from NEM participants to non-participating ratepayers. The inclusion of a demand charge has no impact on the other three cost tests.

Table 9: Sensitivity Results of Demand Charge Reduction, All NEM Installations Through 2016

	PCT What is the benefit (cost) to customers who participate in NEM?	RIM What is the benefit (cost) to non-participating ratepayers?
	Lifecycle NPV ($MM)	Lifecycle NPV ($MM)
Base Case: No Demand Charge Reduction	($135)	$36
Sensitivity: 10% Demand Charge Reduction	($119)	$19

1.2.3.5 Sensitivity 5: Large-Scale, Utility-Sited PV PPA Price

Because this analysis is partly driven by a comparison of the cost-effectiveness of NEM displacing utility-sited solar assets, the assumed cost of utility-sited renewables is a key driver of results. In the base case, we estimate the cost of utility-sited renewables as $100/Megawatt-hour (MWh) ($2014) for systems installed in 2020 based on a forecast using publicly-available data on solar power purchase agreements (PPAs). This price assumes that the federal investment tax credit steps down to 10% in 2017. Because there is usually a delay in the public availability of actual utility cost data, and this is a long run forecast, the actual price of utility-sited renewables is uncertain. Therefore, we performed two utility-scale solar PPA price sensitivities: one low estimate of $80/MWh; and one high estimate of $120/MWh.

Table 10 shows the results of each of the four cost tests influenced by utility-scale solar PV PPA price. The cost of utility-sited renewables does not impact the benefits to NEM participants. A significant conclusion from the results is that the solar PPA price can drive the sign of many of the cost-effectiveness results. With a low utility-scale solar PPA price of $80/MWh, the costs of NEM generation are relatively higher in comparison which makes all of the affected cost tests of NEM generation worse. With a higher utility-scale solar PPA price of $120/MWh, the opposite is true, and NEM generation is relatively better choice. We find that this range of utility-scale solar PPA price uncertainty changes the answer on the overall economic proposition of NEM generation for Nevada.

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The impact of the solar PPA price is largest for existing and 2014-2015 vintage systems due to the RPS multiplier. Still, the base case cost-effectiveness of non-participating ratepayers and the state of Nevada are close enough to zero that the solar PPA price influences the sign of these cost tests.

Table 10: PPA Price Sensitivity Cost-Effectiveness Results (lifecycle NPV $MM 2014)

		Lifecycle NPV ($MM)			
	PPA Price ($/MWh)	Installs through 2013	Installs in 2014-2015	Installs in 2016	All installs through 2016
RIM	$80	($189)	($13)	($24)	($222)
	$120	($94)	$349	$37	$295
PACT	$80	($75)	$400	$130	$458
	$120	$20	$762	$191	$976
TRC	$80	($166)	($128)	($66)	($358)
	$120	($71)	$233	($6)	$160
SCT	$80	($190)	($136)	($75)	($397)
	$120	($75)	$316	$3	$248

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1.2.3.6 Other Sensitivities

In addition to the sensitivities included in this report, a number of other key input assumptions have a significant impact on the results of this analysis. We have created three publicly-available spreadsheet tools to allow stakeholders to modify these other assumptions and view the cost test results of the additional sensitivities they create. The public models also provide transparency into the inputs, calculations, and methodology used in this analysis. The models can be downloaded from the PUCN website.[5]

The assumptions that can be modified in the public models include:

- the forecast of utility rates through analysis horizon (2014 to 2041)
- the forecast of energy costs through the analysis horizon
- the number of systems installed from 2014 through 2016
- the installed costs of NEM generators
- the useful lifetime of NEM installations
- discount rates

1.2.4 MACROECONOMIC IMPACTS

The impact of NEM and other renewable energy on jobs and the economy of Nevada is an important issue for policy makers as they consider policies that promote electricity generation from renewable resources. Accurately estimating all of the macroeconomic impacts of NEM would require complex, expensive models that lack transparency. We conduct a literature review and leverage existing studies on the macroeconomic impacts of renewable and greenhouse

[5] http://puc.nv.gov/Utilities/Electric/

gas (GHG) policies to make inferences about the lifetime macroeconomic impacts of NEM systems installed in Nevada through 2016.

The macroeconomic impacts of NEM installed through 2016 in Nevada could potentially be positive or negative. Comparable macroeconomic studies of renewable policies find net negative macroeconomic impacts. These studies indicate that the solar industry does indeed create jobs, but the negative impact of average electricity retail rate increases tends to outweigh the positive impacts. However, because we find that NEM will most likely not increase rates in Nevada, it is plausible that NEM will have a positive macroeconomic impact in Nevada.

Whether the impact is positive or negative, we find that the net macroeconomic impacts will be very small relative to the size of the Nevada economy. The macroeconomic impacts in the studies reviewed were themselves small, and the scopes of most of the studies reviewed were degrees of magnitude greater than the installed NEM capacity forecasted in Nevada through 2016.

1.2.5 DEMOGRAPHIC ANALYSIS

Another important consideration is the demographic makeup of the NEM participant population relative to the demographics of the state. We compare the median income of NEM participants to the state's median income from 2005 to 2013. We assume that the income of each NEM participant was equal to the median income of the participant's census block group (identified using customer addresses). Census block group is the most detailed assessment available of household incomes, with each census group constructed to encompass approximately 4,000 households with similar demographics.

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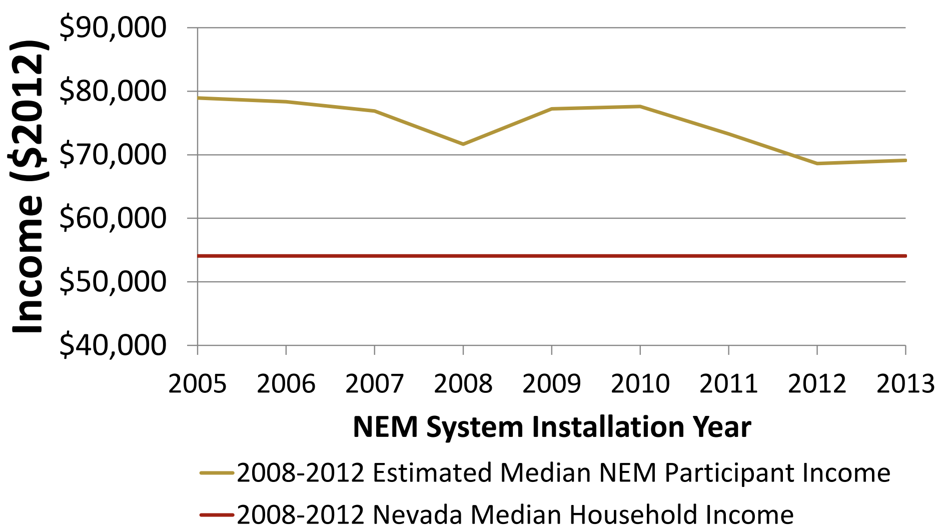
The resulting 2013 median income of NEM participants is $67,418, while the Nevada median income is $54,083. Therefore, the customers who install NEM generation typically have higher incomes than Nevadans overall. Figure 1 displays the temporal trends in 2008-2012 NEM participant census block group median income by installation year against the 2008-2012 Nevada median income.

Figure 1: NEM Participant and Nevada Median Incomes



1.2.6 SUMMARY OF KEY FINDINGS

The following points summarize the key findings of this analysis:

- Nevada has implemented or has planned a number of reforms that affect the NEM generation cost-effectiveness through 2016. In particular, many of these reforms rebalance the costs and benefits between customers who install NEM generation and non-participating customers. By 2016, assuming all of the reforms occur, non-participants will be approximately indifferent to customers that do install NEM generation. A key element of this finding is that the utility is allowed to offset utility-scale renewable purchases for NEM generation.

- While high utility incentives have historically encouraged customers to install NEM systems, with lower incentive levels implemented in 2014, we expect the market for renewable self-generation will need to provide lower prices to customers for Nevada to attain high levels of future NEM adoption.

- Overall, for the state of Nevada, we find that NEM generation is a moderately more costly approach for encouraging renewable generation than utility-scale renewables. However, the difference is small enough that uncertainty in future costs of utility-scale renewable generation changes this answer. We find that NEM generation participants will bear these additional costs rather than non-participating customers.

- The macroeconomic impacts of NEM installed through 2016 in Nevada are likely positive, but will be very small relative to the size of the Nevada economy.

- The customers who install NEM generation typically have higher incomes than the median income in Nevada.

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