



**U.S. Department of Energy SunShot Rooftop Solar Challenge I**

**City University of New York  
On behalf of  
New York City**

**Net Metering and Interconnection Working Group  
Final Report**

June 2013

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## Introduction

The City University of New York (CUNY), on behalf of New York City (NYC), created Action Area Working Groups in 2012 to improve the NYC solar market as part of the U.S. Department of Energy SunShot 'Rooftop Solar Challenge I' program. The Net Metering and Interconnection (NMI) Working Group team is led by Con Edison and the New York Power Authority (NYPA), and is supported by the NYC Solar Ombudsmen, the NYC Solar Coordinator, the University Director of Sustainability and additional Sustainable CUNY staff.

While New York City has no direct control over net metering policy in New York State (NYS), as it is established either through state regulatory or legislative channels, the NMI Working Group took on the task of determining how well net metering has been working as a policy to support solar PV adoption in New York State. To that end, CUNY and the WG members developed a survey to gauge industry understanding, functionality, and sustainability of NYS net metering and interconnection standards.

[NY CLS Public Service Law 66j & 66i](#)

[NY State Net Metering Standard](#)

[NY Standard Interconnection Standard \(SIR\) \(Updated April, 2013\)](#)

The group surveyed a wide range of stakeholders to explore and identify possible improvements and changes to the Net Metering and Interconnection standards in order to support a more robust solar market. This report describes the survey methodology, a quantitative summary of survey responses, and a qualitative assessment of recommendations that arose from answers and comments received from survey participants.

## Survey Background

This report presents selected results from the 2012 Net Metering and Interconnection Survey for New York State, conducted by the City University of New York (CUNY). The development, deployment, and analysis of survey results are part of CUNY's work plan under the U.S. Department of Energy's Rooftop Solar Challenge I. The goal of the survey was to gain an understanding from various stakeholder perspectives of how well net metering in NYS today serves to support the state's solar market, and to develop recommendations for improving net metering going forward.

## Survey Objective

The objective of the Net Metering and Interconnection Survey was to collect data on the understanding, functionality, fairness, and sustainability of the NY State Net Metering and the NY State Interconnections Standards for solar PV, and to determine if policy, regulatory and industry changes were necessary. In order to achieve the desired results, the survey design and deployment was designed to meet the following goals:

- Capture a broad sample of solar PV stakeholders
- Collect data from respondents across NYS
- Capture data from both residential and commercial solar developers
- Keep survey anonymous so that recipients could answer freely

The survey itself had the following goals:

- Determine areas of stakeholder consensus (or non-consensus)
- Prioritize practical considerations (i.e. legislative, regulatory, administrative, educational)
- Determine impact of change on all sectors, cost, ability to support deployment, size of current barrier
- List best practices and describe options for recommendations and implementation

## Survey Methodology

In mid-2012, CUNY and the NMI Working Group members collaborated on survey questions, design, and participants. The survey was released in fall of 2012. The survey recipients were asked to complete an electronic survey and all results were calculated anonymously and reviewed by the NMI Working Group. The survey was comprised of a total of twenty-one questions, with an additional section for voluntary general comments, and contact information. The survey was divided in three sections:

- NY Net Metering Standards (10 questions)
- NY Interconnection Standards (7 questions)
- General (4 questions)

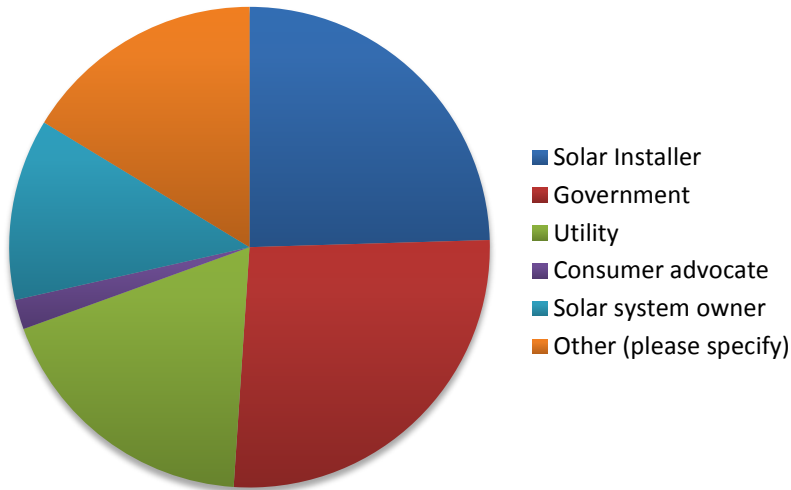
The data collection was conducted over a 3-month period. To encourage survey participation, recipients who had yet to return the survey were sent weekly email reminders.

The survey collected data from a representative sample of organizations engaged in the NY solar industry. The survey was sent out to 127 individuals from a broad range of sectors:

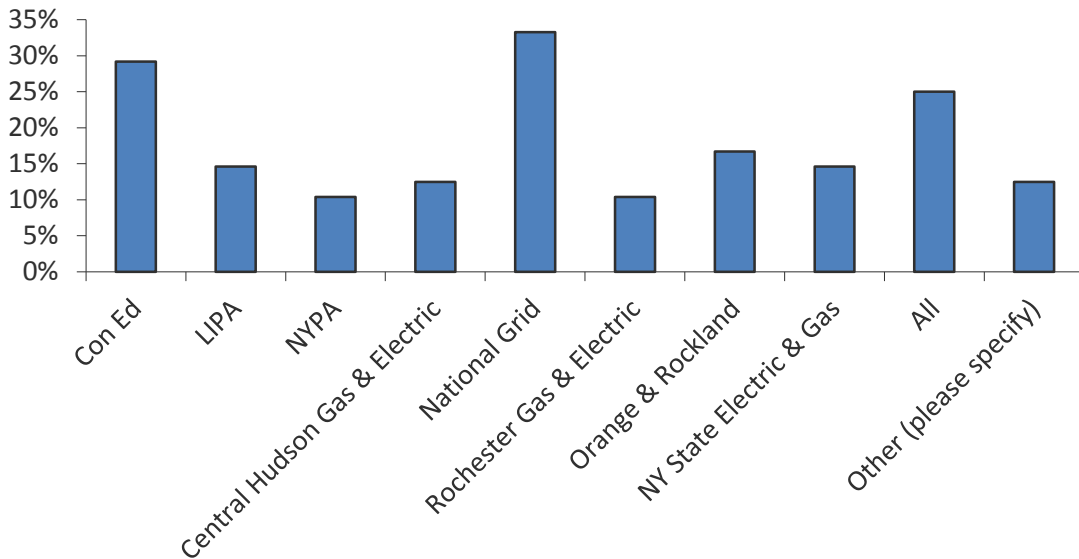
- Solar PV Installers
- Solar Developers
- Solar Product Manufacturers
- Solar System Owners
- Energy Policy advisors
- Government Agencies
- Utilities (Con Edison, LIPA, NYPA, Central Hudson Gas & Electric, National Grid, Rochester Gas & Electric, Orange and Rockland, NY State Electric & Gas)
- Consumer Advocates
- Environmental Advocates
- Consultants

At the close of the survey, the response rate was 27%. As seen in the figure below, the responses received came from a wide variety of stakeholders.

**Which of the following categories best describes you?**



The survey participants were also spread out within a wide range of utility territories, thus ensuring a good coverage of New York State geography:



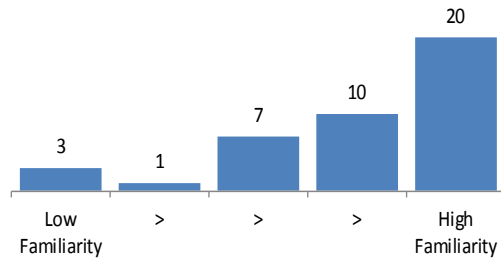
## Key findings: Quantitative

This section of the report outlines some of the key quantitative findings to specific questions of the survey. On each question, many respondents also included in-depth written comments, feedback, and suggestions for changing net metering structure or implementation. The following section of the report will summarize those qualitative answers.

### NY State Net Metering Questions

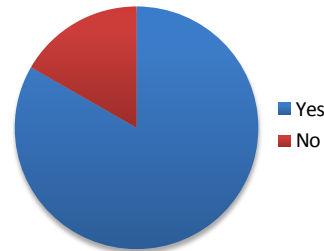
1. Please rank your familiarity with the NY State Net Metering standards.

Answer Options	Low Familiarity	>	>	>	High Familiarity	Rating Average	Response Count	
	3	1	7	10	20	4.05	41	
Please elaborate								20
							<i>answered question</i>	41
							<i>skipped question</i>	9



2. Are changes required to improve NY State Net Metering standards?

Answer Options	Response Percent	Response Count
Yes	83.3%	30
No	16.7%	6
Please elaborate		
		27
<i>answered question</i>		36
<i>skipped question</i>		14



3. The NY State Net Metering standard is sustainable over the long-term.

Answer Options	Strongly Disagree	>	>	>	Strongly Agree	Rating Average	Response Count	
	4	11	15	4	4	2.82	38	
Please elaborate								18
							<i>answered question</i>	38
							<i>skipped question</i>	12

4. The solar net-metering law is easy to understand.

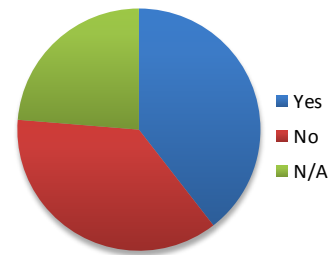
Answer Options	Strongly Disagree				Strongly Agree	Rating Average	Response Count	
	4	8	14	9	3	2.97	38	
Please elaborate							14	
							<i>answered question</i>	<b>38</b>
							<i>skipped question</i>	<b>12</b>

6. The implementation of solar net metering by NY State utilities is understood by customers.

Answer Options	Strongly Disagree	>	>	>	Strongly Agree	Rating Average	Response Count	
	8	10	14	6	1	2.54	39	
Please elaborate							17	
							<i>answered question</i>	<b>39</b>
							<i>skipped question</i>	<b>11</b>

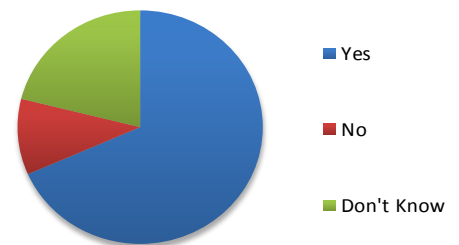
7. Is solar net metering easy to implement/manage for you/your company/organization?

Answer Options	Response Percent	Response Count
Yes	39.5%	15
No	36.8%	14
N/A	23.7%	9
Please elaborate		17
		<i>answered question</i>
		<b>38</b>
		<i>skipped question</i>
		<b>12</b>



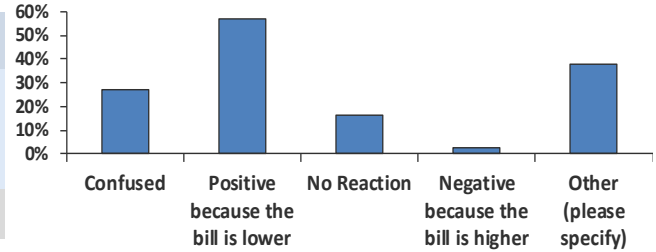
8. Is the method for calculating the value of the solar net metering credit for electric supply appropriate? (The electric supply credit for solar net metered customers is equal to the charge for using electrical supply, and includes both the energy supply cost as well as associated charges like regulatory fees)

Answer Options	Response Percent	Response Count
Yes	68.4%	26
No	10.5%	4
Don't Know	21.1%	8
Please elaborate		14
		<i>answered question</i>
		<b>38</b>
		<i>skipped question</i>
		<b>12</b>



9. Which best fits your customers' or constituents' responses to the impact of net metering when they review their utility bill? Check all that apply.

Answer Options	Response Percent	Response Count
Confused	27.0%	10
Positive because the bill is lower	56.8%	21
No Reaction	16.2%	6
Negative because the bill is higher	2.7%	1
Other (please specify)	37.8%	14
<i>answered question</i>		<b>37</b>
<i>skipped question</i>		<b>13</b>



10. Are net metering laws as set forth by the NY State Legislature fair?

Answer Options	Strongly Disagree	>	>	>	Strongly Agree	Rating Average	Response Count
	2	5	16	8	4	3.20	35
Please elaborate							16
<i>answered question</i>							<b>35</b>
<i>skipped question</i>							<b>15</b>

## NY State Interconnection Survey Questions

1. Please rank your familiarity with the NY State Interconnection Standards.

Answer Options	Low Familiarity	>	>	>	High Familiarity	Rating Average	Response Count
	6	6	6	8	8	3.18	34
Please elaborate							12
<i>answered question</i>							<b>34</b>
<i>skipped question</i>							<b>16</b>

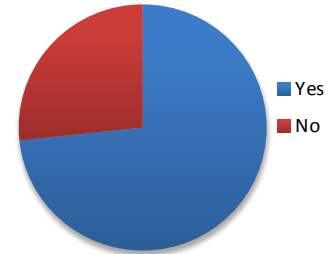
2. Interconnection policies for solar Distributed Generation, as set forth in the NY PSC's Standard Interconnection Requirements (SIR) document, are fair.

Answer Options	Strongly Disagree	>	>	>	Strongly Agree	Rating Average	Response Count
	1	4	11	14	2	3.38	32
Please elaborate							12
<i>answered question</i>							<b>32</b>
<i>skipped question</i>							<b>18</b>



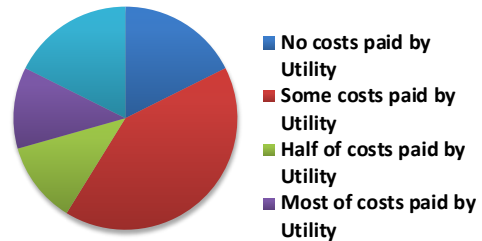
3. Do you think the utilities' implementation of the PSC's SIR is fair?

Answer Options	Response Percent	Response Count
Yes	73.3%	22
No	26.7%	8
Please elaborate		17
<i>answered question</i>		<b>30</b>
<i>skipped question</i>		<b>20</b>



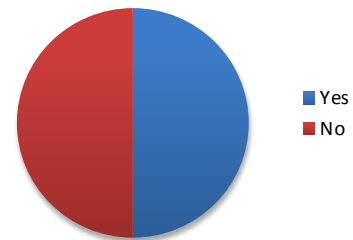
4. Utilities realize labor and materials costs (engineering, meter, installation) to safely allow interconnection of solar PV to the grid. How much of those costs should be paid by the utility vs. paid by the owner of the solar PV system?

Answer Options	Response Percent	Response Count
No costs paid by Utility	17.6%	6
Some costs paid by Utility	41.2%	14
Half of costs paid by Utility	11.8%	4
Most of costs paid by Utility	11.8%	4
All costs paid by Utility	17.6%	6
Please elaborate		19
<i>answered question</i>		<b>34</b>
<i>skipped question</i>		<b>16</b>



5. Is it appropriate to charge larger net metered resources (greater than 25kW) more of their actual interconnection costs?

Answer Options	Response Percent	Response Count
Yes	50.0%	16
No	50.0%	16
Please elaborate		17
<i>answered question</i>		<b>32</b>
<i>skipped question</i>		<b>18</b>



6. The current NY State Interconnection Standards are sustainable in the long-term.

Answer Options	Strongly Disagree	>	>	>	Strongly Agree	Rating Average	Response Count
	0	8	15	5	3	3.10	31
Please elaborate							12
<i>answered question</i>							<b>31</b>
<i>skipped question</i>							<b>19</b>

## Key Findings: Qualitative

### Approach

Although the quantitative analysis above is interesting, and demonstrates a range of stakeholder types and familiarity with net metering regulations and policy, it was the comments and written feedback to the survey that provided the most direction and specific insight into possible changes to net metering in NYS. CUNY and the NMI Working Group reviewed all comments and sorted the responses into categories in order to parse out a better understanding of the state of net metering and where survey participants put the highest priority for change and improvement.

After a comprehensive review of the 276 comments received, the NMI Working Group sorted comments into the following response categories:

- Net Meter Required Minimums<sup>1</sup>
- Comprehension of Net Metering Regulations and Billing
- Cost and Benefits of Net Metering for Solar and Non-solar Customers
- Interconnection Requirements
- Remote Net Metering<sup>2</sup>
- Virtual Net Metering<sup>3</sup>

In each of these categories, the NMI working group went through the responses individually and determined where recommendations or solutions to current issues would fall in the below “matrix”. This matrix was developed to assist the working group and readers in distilling complex and sometimes contentious issues into one digestible report.

<b>Response Category</b>	<b>Issue(s) Raised</b>	<b>Stakeholder Consensus</b>	<b>Practical Considerations</b>	<b>High/Low Impact</b>	<b>Best Practices/ Possible Next Steps</b>
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<sup>1</sup> “Net Meter Required Minimums” are commonly called “caps” in NYS. The NYS Public Service Commission sets these levels to determine the minimum amount of net-metered systems allowed in each utility’s service territory.

<sup>2</sup> “Remote Net Metering” for the purposes of this report refers to the current tariff in NYS, where non-residential customers are allowed to virtually net meter if all meters are under the same name and ownership.

<sup>3</sup> “Virtual Net Metering” for the purposes of this report refers to the broader concept of allowing net metered credits to be given to loads that are not physically attached to the solar PV system.

These headings are described in more detail here:

**“Response Category”** reflects which response category the comment or issue falls into.

**“Issues Raised in Survey”** reflects a specific comment, suggestion, or problem that was brought up by a survey participant.

**“Stakeholder Consensus”** identifies where a broad range of stakeholders do, or don’t, agree on a certain issue. Stakeholders include: utilities, state/city agencies, policy advisors, solar and non-solar ratepayers, installers/developers, and advocates. Areas where stakeholder consensus is low will require significant discussion and/or compromise in order to move any recommendations forward. Typically the lowest level of consensus on issues is seen between utilities and developers/advocates, but the text with each matrix will note in more detail.

**“Practical Considerations”** describes the logistical next steps that need to take place in order for a suggestion or recommendation to move forward. Many of NYS net metering protocols are tied to legislative or regulatory action, for example, but could also include finding funding for studies, making administrative changes, or conducting outreach and education.

**“High/Low Impact”** describes, as a result of the working group collaboration, a best estimate at which measures will have a large impact on solar PV in NYS. This could be a consideration of cost, size of a current barrier, or a recommendation’s ability to support more PV deployment.

**“Best Practices/Possible Next Steps”** indicates, where possible, if there are other resources that can serve as best practices or short-term next steps that could be taken in response to survey comments.

## System-Wide Net Metering Required Minimums (RMs)

In New York State, the Public Service Commission (PSC) establishes minimum net metering limits for each regulated utility's service territory. These limits are generally set as a percentage of each utility's peak load from a particular year, and represent the minimum amount of installed capacity the utilities are required to provide for their customers. As of June 2013, these minimums were set at 1% of 2005 peak demand. However, as of July 1, 2013, the NY PSC issued an order directing regulated New York State utilities to raise the required minimum (RM) net metering limit to [3% of the 2005 peak](#) demand for solar PV. This topic was the subject of a significant portion of the comments received on the survey; it is fair to say that there is a wide range of opinion between stakeholder groups on how these minimums should be set and what the primary purpose of the minimums should be. For instance, some members of the solar advocacy and industry community are of the opinion that the RM should be raised to at a larger percentage of the 2005 peak demand in order to accommodate the growth in solar anticipated by the NY Sun Initiative. The utilities adhere to an approach that views the RMs as a regulatory tool to manage rate impacts of net-metered PV.

An area where there is stronger stakeholder consensus was the desire for an increased transparency to the RM ceiling. All stakeholders seemed to agree that a clear and understandable program for tracking how net metered PV is approaching the RM in any utility territory would help developers, utilities, and the PSC. In conjunction with this idea, it could serve NYS well to coordinate comparison of current RMs, current and near-term installed PV, and RPS goals.

System-Wide Net Metering Required Minimums					
Response Category	Issue(s) Raised	Stakeholder Consensus	Practical Considerations	High/Low Impact	Best Practices/Possible Next Steps
<b>Required Minimum</b>	<ul style="list-style-type: none"> <li>• RMs are too low</li> <li>• RMs should not be raised unless incrementally needed</li> </ul>	Low	Can be raised via legislative/regulatory process. Utilities have the right (in the law) to raise the RMs on their own without legislative or administrative action. For example of recent order raising a utility's required minimum, see recent raise in Central Hudson RM in Appendix 1 for link-PSC Case Number 12-E-0343	Depends on utility territory	On 6/13/13, the NY State PSC ordered its utilities, Niagara Mohawk Power Corporation d/b/a National Grid; Consolidated Edison Company of New York Inc.; New York State Electric & Gas Corporation; Rochester Gas and Electric Corporation; and Orange and Rockland Utilities, Inc. to raise the Required Minimum from 1% of 2005 peak to 3% of the 2005 peak demand. See Appendix 1 for link-PSC Case Number 12-E-0490 <ul style="list-style-type: none"> <li>• Compare RMs to how much has been installed, and then to RPS goals</li> <li>• Transparent system to determine where deployment is occurring</li> </ul>
<b>Determination of Required Minimum</b>	<p>It is unclear how RMs are determined</p> <p>1% of 2005 peak load is arbitrary modest number</p> <p>On 7/1/13, PSC orders Utilities to raise minimum to 3%</p> <p>Serves as regulatory control mechanism</p>		Can be raised via legislative/regulatory process. Utilities have the right (in the law) to raise the RMs on their own without legislative or administrative action. For example of recent order raising a utility's required minimum, see recent raise in Central Hudson RM in Appendix 1 for link-PSC Case Number 12-E-0343	Depends on utility territory and will change as penetration increases	Revisit methodology of RM determination
<b>Transparency of Required Minimum Status</b>	Don't know until after RM has been reached if it needs to be raised	High	Quarterly reports are now required from utilities on net-metered installs. These could be made more	Depends on utility territory	Centralized website with updated information from utility reports Work with NYSERDA to track the expected trajectory of installations for each utility territory.

## Clarity of Net Metering Law and Clarity of Billing

Another topic that came up frequently in the survey comments was the desire for simplification and clarification of the NM state law (NM Rule PBS/4/66-j), and for how NM credits will be calculated and shown on a customer’s Utility bill. Several respondents expressed the opinion that simpler, more easily explainable credit rollovers would support solar developers as they explain net metering to potential customers, and would also reduce the burden of utility customer service responses to questions from net metered billing customers. This issue will likely become a higher priority as the percentage of solar onto the grid increases. There was significant consensus between utilities, developers and ratepayers that this issue is a high priority. However, it could be a challenge to provide a simpler plain language version of the Rule PBS/4/66-j that remains consistent with the law and tariffs and avoids misinterpretation. Another possible solution is generation of succinct outreach materials that explain and simplify billing, including the end-of-year-buyouts. Utilities have requested funds from the PSC to support automation of their net-metered billing practices.

Clarity of Net Metering Law (PBS/4/66-j), and Clarity of Net Metering Billing					
Response Category	Issue(s) Raised	Stakeholder Consensus	Practical Considerations	High/Low Impact	Best Practices/Possible Next Steps
<b>New York State Laws (NM Rule PBS/4/66-j)</b>	NM Rule is complicated and difficult to understand for most customers	Low	Administrative solution could be found for plain language version, but would need careful crafting to ensure consistency with laws and tariffs to avoid misinterpretation	Low	Outreach guide or FAQ document could provide a simplified translation of rule
					Germany demonstrates that NM could be simpler and streamlined
					Current “Clean-up” Legislation to clarify and simplify the language of the law and makes it clearly consistent with PSC decisions. See Appendix 1 for Link
<b>Customer understanding of Net Metered Bills</b>	It is unclear how credits are calculated	High	Outreach and Administrative actions	High	Generate outreach guide and FAQs
	It is unclear where credits are noted on bill				
	How is net-metered customer educated re retail competition for electricity? Lack of clarity on interaction between NM and competitive supply				
<b>Utility Billing Resources for Net Metering Customers</b>	Additional time commitments needed for NM customer’s bills	High	Outreach and Administrative actions	High	Utilities and PSC continue to assess utility service level efficiency ,and implementation automation which continue to lower ratepayer impact
	Some utilities bound by manual calculations due to legacy billing systems		Resources needed to support additional staffing and automation		
			Automation for reduced business costs		
			Regulatory direction may be required. See Appendix 1 for Link to Con Ed summary of submission to NY PSC.		

## **Costs and Benefits of Net Metering**

The comments on this topic generally reflected a very low level of consensus around how to capture the true costs and benefits of net metering. This topic presents the most complicated and nuanced area of net metering, both in New York State and across the country. Respondents noted a range of issues, from needing to capture all externalities (environmental, social, financial) in net metering laws, to considering time-of-use rates and assessing the value of solar at different times of the day or at different levels of peak demand, to how to balance the rate impacts of net metering on all utility customers. This area will require significant study and analysis to reach consensus on appropriate next steps and actions across utility, developer, advocate, and ratepayer concerns. For the purpose of this report, CUNY has listed several studies underway or complete that could be a foundation for examining the costs and benefits of net metering in New York State. These studies include:

[Rocky Mountain Institute Electricity Innovation Lab: A Review of Solar PV Benefit and Cost Studies](#)

[Solar American Board for Codes and Standards: A Generalized Approach to Assessing the Rate Impacts of Net Energy](#)

[Crossborder Energy-Evaluating the Benefits and Costs of Net Energy Metering in California](#)

[California Public Utilities Commission - Net Energy Metering Cost Benefit Evaluation](#)

[Designing Austin Energy's Solar Tariff Using a Distributed PV Value Calculator](#)

Costs and Benefits of Net Metering					
Response Category	Issue(s) Raised	Stakeholder Consensus	Practical Considerations	High or Low Impact	Best Practices/Possible Next Steps
Value of Net Metering to society	Need more consideration for environmental, social and other externalities of solar	Low	Any changes taking additional values and costs into consideration will require legislative and regulatory action	Depends on utility territory	Several recent studies have been completed on this issue (see below). These could be a starting point for a specific evaluation of the costs/benefits of net metering to New York State. See Appendix 1 for links to studies.
	Net metering essential for economic feasibility	Low	Any changes taking additional values and costs into consideration will require legislative and regulatory action	Depends on utility territory	
Value of NM to solar developers and site hosts	NM as an indispensable policy to transform markets for customer-sited renewables	Low	Any changes taking additional values and costs into consideration will require legislative and regulatory action	Depends on utility territory	
	How to consider the long term transformation and evolution of NM to support customer-sited renewables				
	Lack of clarity between NM and TOU rates, dynamic pricing, opportunities and challenges				
	Educate customers to value of load data with TOU				
Value of Net Metering to grid and utility	Supports New York RPS goals	Low	Any changes taking additional values and costs into consideration will require legislative and regulatory action	Depends on utility territory	
	Reducing need for utilities to expand more expensive power				
Cost of net metering to non-solar rate-payers	Net metering as subsidy	Low	Any changes taking additional values and costs into consideration will require legislative and regulatory action	Depends on utility territory	

### NY State Remote Net Metering (RNM)

On June 1, 2011, Governor Andrew Cuomo signed [Assembly Bill 6270](#) into law. This legislation allows New Yorkers to install on-site renewables, including solar PV systems, and utilize Remote Net Metering (RNM). RNM allows non-residential solar customers with installed solar PV at one location to “export” any excess generation to credit another location(s) provided that all meters are in the same account holder’s name. Survey respondents voiced interest in the RNM concept, but raised some concerns about implementation. As this is a new program in NYS, there appears to be a learning curve for developers, end users, and utilities as the first projects get underway.

As this report was being written, some clarity on implementation of RNM in NY was shed by the PSC order in [Case 13-E-0150](#), which resulted from a proposed RNM project at Cornell University. The local utility, New York State Electric and Gas (NYSEG) had asked the applicant to prove a minimum load on the host meter. The PSC order states that while there must be some de minimis load and usage at the site, there are no minimum load requirements at the host meter, and no need for customer to show a "historical" load/usage. This ruling exemplifies a few common points of low stakeholder consensus on how to move forward on net metering issues:

the ability of customers to site PV systems that are designed to meet loads that are remote from the host site, and how the utility supports the distribution system for customers who are supported by the distribution system for their full load but may also receive credits on their distribution bill through a PV system located elsewhere. In addition to responses on RNM policy as a whole, respondents also voiced a desire to see RNM extended to residential customers, and for clarification on interconnection requirements for RNM customers. On an administrative level, outreach and education was suggested as an option to improve customer/developer understanding of RNM.

Remote Net Metering					
Response Category	Issue(s) Raised	Stakeholder Consensus	Practical Considerations	High/Low Impact	Best Practices/Possible Next Steps
<b>Eligibility requirements</b>	Meters must all be in same account holder's name	Low	Must be raised via legislative/regulatory process	High	2013, Cornell University (Cornell) requests issuance of a Declaratory Ruling deciding that it may remote net meter an approximately 1.9 MW photovoltaic (PV) solar generation facility at an existing meter billed by New York State Electric & Gas
	Minimum load requirement at host site				See Appendix 1 for link to PSC ruling Case 13-E-0150
	Customer/public education needed on allowable implementation models				No minimum load requirements at host meter, and no need for customer to show a "historical" load/usage, can show "concrete plans"
	Clarification on utility interconnection options for remote net metered customers				There must be some de minimis load and usage ("light fixture") at the site. "a meter installed at the site where there is no load cannot be a net energy meter and cannot qualify as a host meter in a remote net metering arrangement"
	Extend eligibility to residential accounts				Administrative outreach for clarification Establish protocols to exchange and publish lessons learned during implementation of first projects

## Virtual Net Metering (VNM)

Virtual Net Metering (VNM), sometimes called shared solar or community solar, extends net metering policy by allowing for virtual meter aggregation. VNM can take many forms, from allowing multi-meter property owners to install a single solar system to cover both the common and tenant electricity loads connected to the same electrical service, to allowing customers to receive credits for solar PV that is installed elsewhere and does not directly reduce their load. For the purposes of this report, VNM is being used as a term for a broader set of policy options and is differentiated from comments about the existing remote net metering (RNM) currently allowed in New York State.

This issue is also one that received many comments from survey participants, and one that has a low level of consensus between stakeholders on future actions or next steps. VNM can be an effective tool to open up access to solar for a wide range of end users (e.g., renters, inhabitants of buildings without a good solar resource), but utilities express concerns about billing implementation and the rate impacts of VNM customers receiving a distribution subsidy while



still relying on the distribution system for their full energy needs. Any VNM legislation, regulation, or tariff would need to carefully balance all of these considerations in order to be successful.

Of note, however, is the fact that NYC, having a building stock of predominantly master-metered, multi-residential units, is a prime pilot testing ground for VNM as it would open up solar access to a large population. VNM between customers in a single building would avoid a primary utility concern and could theoretically be done without regulatory or legislative action.

For reference, Appendix 1 contains information on example virtual net metering tariffs that have been enacted across the country.

Virtual/Community Net Metering					
Response Category	Issue(s) Raised	Stakeholder Consensus	Practical Considerations	High/Low Impact	Best Practices/Possible Next Steps
<b>Virtual NM for Multi-family Buildings</b>	Master metered buildings show promise for pilot demonstration	Medium	Administrative	High	Pilot project to show potential for shared solar benefits for residents of multi-family master-metered buildings.
<b>Appropriate Rate Structures</b>	Implementation responsive to utility concerns of billing process	Low	Determined via legislative regulatory process	High	Balance solar access potential with impacts on distribution system and rates by VNM customers
	Customers being subsidized for distribution system but not supporting				Refer to other VNM tariffs. See Appendix 1 for links.

## Interconnection Requirements

This survey also included several questions regarding the [NYS Standard Interconnection Requirements \(SIR\)](#). All utilities regulated by the NY PSC are required to follow the NY SIR which includes all requirements and the application process for new distributed generators 2 MW or less that are connected in parallel with utility distribution systems. These questions specifically focused on utility procedures for processing interconnection applications. The NYS SIR was updated in [April 2013](#), so all comments on the survey refer to the 2012 edition.

The survey comments ranged from issues specific to the SIR requirements as regulated by the PSC to comments on the utilities' implementation of the interconnection process. Key points raised in the comments revolved around transparency of engineering fees and requirements for large-scale PV systems, clarity of interconnection procedures, and availability of utility resources to help with PV project questions. As more large-scale PV projects are installed in NYS as a result of the NY-Sun Initiative, which funds systems above 50kW, interconnection of large PV projects will become a more central issue. At the time of this report, CUNY and Con Edison are collaborating on mapping out interconnection risk factors of buildings with potential for large-scale PV in order to provide a first layer of transparency to developers.

A possible model that was cited was California's "[Rule 21](#)", which provides transparency for interconnection technical issues and cost.

Interconnection Requirements					
Response	Issue(s) Raised	Stakeholder	Practical Considerations	High/Low	Best Practices/Possible Next Steps
<b>Engineering/ Upgrade Grid Costs</b>	Interconnection costs for large systems are often unknown until utility can do engineering review	Low	Determined via legislative/regulatory process	High	See Appendix 1 for link to California Public Utilities Commission Rule 21 (R.11-09-011)
	Interconnection should not compromise grid/public safety/reliability				CUNY, NYC, and Con Edison will partner to map areas of Con Edison's network grid where interconnection of large-scale systems could face technical issues, and to study mitigation strategies.
	Transparency on engineering fees				
	Cap on Interconnection costs				
	Strong public policy to interconnect solar where it is cheapest				
<b>Lack of understanding of interconnection process</b>	Designated resource available in each territory	High	Administrative, Education, Outreach	High	DG Ombudsman at each utility to handle issues via discussion/collaboration and consensus building with political/legislative/regulatory attorneys, organizations, installers, and advocates with the goal of avoiding decisions being made in a vacuum

## Conclusion

When NYS first enabled net metering in 1997, only residential PV systems under 10kW were allowed to participate.<sup>4</sup> In the 16 years since then, the policy has been significantly expanded and become more nuanced to support a growing solar market. While NYS has the third largest population in the country, in 2012 it was only the tenth largest solar market in terms of installed capacity.

The wide variety of engaged NYS solar stakeholders provide a thoughtful knowledge base to scope out how net metering can be further improved in a strategic way to continue the growth of solar PV. As the effects of climate change, and the need for distributed, resilient energy infrastructure, become more evident, it will be crucial for these groups to work together to create policies (net metering or otherwise) that can make NYS a leader in clean energy.

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<sup>4</sup> Database of State Incentives for Renewables & Efficiency; June 2013.  
[http://www.dsireusa.org/incentives/incentive.cfm?Incentive\\_Code=NY05R](http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NY05R).

## Appendix I:

### Survey Response Category Links

#### System-Wide Net Metering Requirements:

NYS PSC raises Central Hudson Required Minimum from 1% of 2005 peak load to 3% of 2005 peak load in Central Hudson Gas & Electric Corporation's (Central Hudson) service territory:

- [Petition of Hudson Valley Clean Energy, Inc. to Increase Central Hudson Gas & Electric Corporation's Net Metering Limit](#)
- [NY Public Service Commission Notification-PSC Case Number 12-E-0343](#)

NY State PSC ordered its utilities to raise the Required Minimum from 1% of 2005 peak to 3% of the 2005 peak demand CASE 12-E-0485-CASE 12-E-0490 6/13/13

- [New York State Public Service Commission-PSC Case Number 12-E-0490](#)
- [New York Public Service Commission Order Raising Net Metering Limits](#)

#### **Clarity Net Metering Law and Billing**

2013 "Clean-up" Legislation in NYS [Assembly](#) and NYS [Senate](#) (not passed)

[Con Edison filing summary to NY PSC to automate Net Metered Billing \(Off-System Billing Project\):](#) Bottom of page 47; Off-system Billing Project

#### **Costs and Benefits of Net Metering:**

Recent National Net Metering Studies:

- [Rocky Mountain Institute Electricity Innovation Lab: A Review of Solar PV Benefit and Cost Studies](#)
- [Solar American Board for Codes and Standards: A Generalized Approach to Assessing the Rate Impacts of Net Energy](#)
- [Crossborder Energy-Evaluating the Benefits and Costs of Net Energy Metering in California](#)
- [California Public Utilities Commission - Net Energy Metering Cost Benefit Evaluation](#)
- [Designing Austin Energy's Solar Tariff Using a Distributed PV Value Calculator](#)

### Remote Net Metering

NY State Public Service Commission- PSC Case 13-E-0150  
 Petition of Cornell University for a Declaratory Ruling Concerning New York State Electric and Gas Corporation's Remote Net Metering Tariff:

- [NY State Public Service Commission- PSC Case Number 13-E-0150](#)
- [NY State Public Service Commission Case 13-E-0150-Declaratory Ruling on Minimum Load Requirements for Remote Net Metering](#)

### Virtual Net Metering

#### **Colorado:VNM for IOU Customers, Solar Gardens**

[State of Colorado, House Bill 10-1342](#)

[Solar Gardens-List of Active Legislation for Virtual/Community Net Metering](#)

[Solar Gardens Community Power](#)

[DSIRE Solar-Colorado Meter Aggregation Allowed for IOU Customers](#)

#### **Vermont:VNM for All Customers**

[Vermont Public Service Board-Net Metering](#)

[Evaluation of Net Metering in Vermont Conducted Pursuant to Act 125 of 2012](#)

[Vermont Public Service Board; Order Establishing Billing Standards and Procedures for Net Metering Customer](#)

[Vermont Public Service Board Billing Standards for Net Metered Customers](#)

[DSIRE Solar-Maine-Meter Aggregation](#)

**California- VNM for Multi-Tenant properties, local governments:**

[CSI Multifamily Affordable Solar Housing \(MASH\) Program](#)

[IREC-California PUC expands Virtual Net Metering to all multi-tenant buildings](#)

[California Public Utilities-Virtual Net Metering](#)

[DSIRE Solar-California Net Metering](#)

**Connecticut: VNM Municipal Customers only**

[The Connecticut Light and Power Company Virtual Net Meter Rider](#)

[DSIRE Solar Connecticut](#)

[CT Energy Info-Net Metering](#)

**Maine: VNM for All Customers**

[DSIRE Solar Maine-Meter Aggregation](#)

**Illinois: VNM Utility Choice to offer**

[DSIRE Solar Illinois-Meter Aggregation](#)

**Maryland: VNM For agricultural customers, non-profit orgs, and municipal governments or their affiliates**

[Report on the Status of Net Energy Metering In the State of Maryland](#)

[DSIRE Solar Maryland-Meter Aggregation](#)

**Massachusetts: Neighborhood Net Metering**

[Net Metering Laws in Connecticut and Massachusetts](#)

[Mass.Gov Energy and Environmental Affairs-Net Metering](#)

[Mass.Gov Energy and Environment Affairs-Net Metering FAQs](#)

[DSIRE Solar Massachusetts- Neighborhood Net Metering](#)

**Rhode Island: For local and state governments**

[DSIRE Solar Rhode Island-Meter Aggregation](#)

**Interconnection Requirements**

- [California Rule 21-California Public Utilities Commission](#)