STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

At a session of the Public Service Commission held in the City of Albany on February 4, 1998

COMMISSIONERS PRESENT:

John F. O'Mara, Chairman
Maureen O. Helmer
Thomas J. Dunleavy

CASE 97-E-1951 - Long Island Lighting Company
CASE 97-E-1966 - New York State Electric & Gas Corporation
CASE 97-E-1967 - Niagara Mohawk Power Corporation
CASE 97-E-1968 - Consolidated Edison Company of New York, Inc.
CASE 97-E-1969 - Rochester Gas & Electric Corporation
CASE 97-E-1975 - Orange and Rockland Utilities, Inc.
CASE 97-E-2003 - Central Hudson Gas & Electric Corporation

Tariff Filings To Implement Net Energy Billing Arrangements With Residential Customers Operating Photovoltaic Generating Facilities With a Capacity of 10 kW or Less

ORDER ON NET METERING OF RESIDENTIAL PHOTOVOLTAIC GENERATION

(Issued and Effective February 11, 1998)

BY THE COMMISSION:

BACKGROUND

Pursuant to Laws of 1997 ch. 399, effective August 13, 1997, the Public Service Law (PSL) was amended to add §66-j, providing for net energy metering of residential solar electric generation. Under the statute, residential customer-generators may install a photovoltaic (PV) system sized at not more than

10 kW, and interconnect the PV system with the local electric utility's grid. The seven major New York electric utilities have filed proposed net metering tariffs implementing §66-j.[1]

At times when a PV system's production is insufficient to meet the residential customer's demand, §66-j provides that the utility will supply that demand at tariffed residential rates. At times when the PV system's output exceeds the residence's demand, the exceedence will be credited against the residential customer's next bill for service, again at the tariffed residential rate. If, over an annual period, the customer-generator's credits exceed its usage, the utility shall issue payment at avoided cost to the customer-generator for the value of any remaining credit for the excess electricity produced during the annualized period.[2]

The statute permits adoption of interconnection and safety standards. Those standards may include installation of equipment necessary to automatically isolate the PV system from the utility system upon voltage or frequency deviations, installation of a manual lockable disconnect switch provided by the customer, and installation of a dedicated transformer. The amount of the transformer cost recoverable from a customer-generator, however, is limited to a maximum of $350, and the utility may "impose no other charge or fee, including back-up and demand charges, for the provision of net energy metering."[3] The statute also allows utilities to develop model contracts and file

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[1]The utilities filing tariffs were: Central Hudson Gas & Electric Corporation (Central Hudson); Consolidated Edison Company of New York, Inc. (Con Edison); Long Island Lighting Company (LILCO); New York State Electric & Gas Corporation (NYSEG); Niagara Mohawk Power Corporation (Niagara Mohawk); Orange and Rockland Utilities, Inc. (O&R); and, Rochester Gas & Electric Corporation (RG&E).

[2]PSL §66-j(4)(c).

[3]PSL §66-j(3)(b) and (5).

tariff schedules establishing the reasonable rates, terms, and conditions for net metering of PV generation.

Total PV system production is capped under the statute at .1% of each utility's electric demand, as measured during the 1996 calendar year. Space underneath the cap is available to residential customers on a first-come, first-serve basis. Utilities, however, may voluntarily make net energy metering available above the cap, and the cap may be increased as of January 1, 2005 if it is determined that additional net energy metering is in the public interest.[1]

The utilities' filings sound some common themes, but diverge on a variety of issues. The utilities, with a few exceptions, concur on a list of uniform PV system interconnection standards. Utility model contracts with customer-generators, however, range from voluminous, for Niagara Mohawk and NYSEG, to non-existent, for Con Edison, which would implement the program via tariff without a contract. In the various contracts and tariffs, some utilities would accomplish net metering through installation of two meters, one measuring PV output and one measuring residential consumption, instead of one meter capable of making both measurements by running forward and in reverse. Various utilities also propose requirements for liability insurance in amounts between $500,000 - $1,000,000, indemnification, deeding and recording of easements, and testing and inspection of PV systems.

A number of the utilities insist that, to avoid preemption, the net metering statute must be implemented in conformance with federal law. Some of those utilities also assert that PV systems are defined as qualifying facilities (QFs) under federal law. Con Edison and Niagara Mohawk, however, suggest that federal requirements would be satisfied if other customers fund the alleged revenue loss incurred in the difference between PV generation credited at the residential rate

[1]PSL §66-j(3)(a).

instead of priced at avoided cost, and any interconnection costs not paid by the customer-generator.

NRDC, CPB, and other parties filed extensive comments on the utility filings.[1] These parties argue that many of the utility requirements are burdensome and unnecessary. They conclude that major modifications are needed to effectively implement §66-j and achieve its goals.

DISCUSSION

The positions of the parties to these proceedings diverge significantly on proper implementation of net metering under PSL §66-j. The utility claims to compensation for alleged revenue losses incurred in implementing the net metering program are opposed. Parties disagree on accomplishing net metering through use of two separate meters to measure individually residential consumption and PV system output, or use of one meter to take both measurements by running forward and in reverse. Other disputes center on whether particular tariff and contract provisions are unduly burdensome to customer-generators. While supplemental filings are needed to adequately resolve some of these questions, utilities shall begin to offer net metering on the terms and conditions discussed below.

Cost Recovery

PSL §66-j does not provide for utility recovery of costs incurred in implementing net metering (other than $350 for installation of a transformer). As a result, the ratemaking treatment of implementation costs under state law is no different than for any other cost item.[2] The utility settlement agreements, adopted in the ongoing rate and restructuring

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[1]The parties are listed with abbreviations, and the utility filings and comments are analyzed, in Appendix A.

[2]Notwithstanding the utility claims of preemption under federal law, administrative agencies assume the lawfulness of state statutes.

proceeding instituted in compliance with Opinion No. 96-12,[1] are therefore the proper vehicles for addressing net metering cost recovery.

Consequently, utilities will not be guaranteed cost recovery here. Moreover, contrary to Con Edison's assertion, PV system net metering is not an environmental program within the ambit of the System Benefit Charge (SBC) described in Opinion No. 96-12. The scope of the SBC is limited to programs that would not be adequately addressed in a competitive marketplace, and so might disappear if not funded through the SBC mechanism. Since net metering is required by statute, it is not a candidate for SBC funding.[2] Utility requests to fund alleged revenue losses attributable to net metering out of the SBC are therefore denied.

Utilities, however, may seek cost recovery under their rate and restructuring agreements. Before recovery could be had, a utility must first show that all or a portion of the costs it has incurred in implementing net metering fit within the terms and conditions of the applicable rate and restructuring agreement, other than the SBC.

Pointing to the difference between avoided cost and retail rates, however, would be insufficient to demonstrate that there has been a cognizable revenue loss. Net metering results in a reduction of usage at a residence that is conceptually similar to other declines in consumption due to changes in lifestyle, purchases of energy efficient appliances, pursuing energy conservation, and the like. Just as the utilities are not permitted to automatically recover lost revenues attributable to reduced consumption, they are not entitled to recover lost net metering revenues. If a utility can instead demonstrate it has incurred a net metering cost attributable to factors other than

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[1]Case 94-E-0952, Opinion and Order Regarding Competitive Opportunities For Electric Service, Opinion No. 96-12 (Issued May 20, 1996).

[2]Case 94-E-0952, Opinion and Order Concerning System Benefit Charge Issues, Opinion No. 98-3 (Issued January 30, 1998).

lost consumption, it may attempt to justify recovery under the applicable rate and restructuring agreement.

Implementation Issues

Installation of net metering raises a number of issues of state-wide or broad application, including use of two meters instead of a single meter, net metering at TOU residences or in conjunction with retail wheeling, and the utilities' uniform interconnection standards. Two of those standards, on installation of a dedicated transformer and connection to utilities' secondary network systems, raise particularly serious concerns. While net metering shall commence upon the utilities' filing of revised tariffs, on some of these issues supplemental filings are requested and further proceedings will be conducted.

1. The Single Meter and TOU Issues

a. The Statutory Requirement

Under §66-j(1)(b), net energy metering is accomplished by using "a non-demand, non-time differentiated meter that measures the reverse flow of electricity to register the difference between the electricity supplied by an electric corporation and the electricity provided to the corporation by a customer-generator." While the definition is phrased in the singular, it does not specify that a single meter must be used.[1] As a result, the statute need not be read as requiring a single meter in all instances.

Therefore, §66-j is interpreted as requiring that the measurement of the electricity generated by the PV system be accomplished through a non-demand, non-time differentiated meter that may be separate from or identical to the meter used to measure the customer's utility-supplied consumption. To the

[1]The version of the statute enacted by the Legislature in 1996, but subsequently vetoed, did define the meter as a "single" meter. See N.Y. Assembly Bill 9570-B (Senate 6829-A), Governor's Veto Message #92 (October 18, 1996).

extent the statute establishes a preference for use of a single meter, that preference can be accommodated by according the customer the option of installing one or two meters. Utilities should provide customers with sufficient information to make an informed choice.

b. The Two-Meter Option

The utilities differ substantially on the two-meter issue. The proposals range from O&R, which would use a single meter in all instances, to NYSEG, which would install two meters in all instances. Taking a different approach, Con Edison would, under most circumstances, install a single meter, but would reserve the right to install a second meter where necessary. NYSEG, and the other two-meter utilities, take the position that running a standard residential meter in reverse is inherently inaccurate, and will engender endless and unresolvable billing disputes.

PSL §67 restricts electric utilities to furnishing only those meter types that we have approved. In addition, §67(c) allows a consumer to request that we direct a utility inspection of a meter, albeit "that repeated inspections and tests shall not be mandatory." These statutory requirements for meter accuracy differ from those in place in many states.

If run in reverse, typical residential meters do not meet New York's stringent standards for meter accuracy under §67 (albeit existing residential meters have been approved under that statute). These standards are designed to protect the public and to ensure that billing disputes between utilities and their customers can be resolved expeditiously, fairly, and accurately. As a result, it is necessary to reconcile the directives of §66-j with the §67 requirements.

This may be accomplished by allowing customer-generators to select between installing one meter or two meters. Customers, however, should be advised that running a single meter in reverse does not meet accuracy standards, and that in any

billing dispute dependent upon those meter accuracy standards, the customer will be unable to rely upon net meter readings as a basis for a claim against the utility.

As a result, customers should be informed that installation of two meters is more accurate than use of a single meter, and that billing disputes at two-meter locations will be resolved on the usual standards for evaluating customer complaints. Customers selecting the single meter option will be required to waive, in writing, any billing complaint that is unresolvable because of the inaccuracy inherent in running a meter in reverse. Under §67, however, the customer that selects the single meter option may request the utility to inspect it, and replace the meter if appropriate. That relief will still be available to a customer that finds its billing complaint precluded because of the inaccuracy inherent in net metering with a typical single residential meter.

This result properly balances the interests of utilities and customer-generators, and the utilities are directed to draft appropriate language for inclusion in their tariffs and contracts. This arrangement should remain in effect until a cost-effective meter that meets accuracy standards running in reverse is approved. Although some meters that can perform this function already exist, they are designed for applications far larger than the 10 kW PV systems envisioned in §66-j, and are prohibitively expensive for use at residences with the 10 kW systems. As technology improves, the cost of bi-directional meters may decline, and their availability may increase, and at that time the two-meter option may be retired. Utilities are encouraged to work cooperatively with the PV industry in the approval of a cost-effective bi-directional meter, once one is developed.

c. Meter Installation Costs

Utilities also took different approaches to requirements for the installation of meters. Most of the

utilities would require the customer-generator to provide the meter boxes and sockets at their expense. Con Edison will provide the equipment if it deems installation of a second meter necessary, while RG&E would provide the equipment at its expense in all instances.

Customer-generators installing PV systems should be treated the same as other customers requesting metering at a residential location. Except for RG&E, the utilities currently require residential customers to provide the meter box and socket at the time a new meter location is connected. There is no reason to exempt customer-generators from this requirement. A meter box and socket is a necessary component of a PV system, similar to any of the other connection, safety, and reliability equipment that enable the system to function.

As a result, the cost of installing a meter box and socket is not a separate charge for interconnection imposed by the utility of the sort prohibited under §66-j(3)(b). Just as utilities may not be compelled to subsidize the installation of PV system components like structural supports or protective relays, they may not be compelled to subsidize installation of a necessary component like a meter box and socket. Moreover, the cost of this installation is not prohibitive, at less than $100 in most cases. As a result, the customer-generators should be compelled to bear the costs of any new meter box and socket, to the extent required. To ensure consistent treatment of customer-generators across the state, RG&E is directed to tariff the charge for meter boxes on the same basis as the other utilities.

d. TOU Net Metering

Some of the utilities provide for installation of net metering under TOU rate classifications. An overly-restrictive reading of §66-j, as requiring installation of only one meter in all instances, would prohibit net metering in conjunction with TOU rates. Since current residential TOU meters cannot run in

reverse, a second meter must be installed if net metering is desired at these locations.

The proper reading of the statute, presented above, permits utilities to implement net metering in conjunction with TOU rates through installation of the non-demand, non-time differentiated meter required under PSL §66-j(1)(6) as the second meter.[1] That meter would measure PV system output, and the output credit would then be subtracted from TOU metered consumption. LILCO and Central Hudson propose to apply the credit first against peak period TOU consumption. Presumably, any credit remaining would be matched against shoulder or off-peak period consumption, in order of descending costs. These two utilities seem to share NRDC's belief that most PV generation will be supplied during on peak periods falling on sunny days.

While those two utilities have volunteered to implement TOU net metering under this approach, and may proceed to do so at their option, others would deny net metering at TOU locations. Con Edison, for example, contends some of its on-peak hours occur during times when it is dark, and so the PV generation offset would be unavailable. On the other hand, at many utilities, sunlit hours on weekends fall into off-peak periods, and so crediting PV generation supplied at those times against peak period rates may be inappropriate.

It appears that net metering should be made available to TOU customers, if equitable implementation is feasible. Utilities may address this issue in their supplemental comments, while withholding net metering from TOU customers until the filings are decided.[2] They may also propose alternatives to the LILCO and Central Hudson method for crediting output at TOU locations.

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[1]TOU customers, of course, could obtain net metering by switching to a non-time differentiated rate classification, and selecting the one meter option.

[2]Con Edison may expand upon the opposition to TOU net metering expressed in its January 28, 1998 filing.

e. Net Metering and Retail Access

Con Edison would prohibit net metering in combination with retail access. Moreover, in the RG&E Retail Access Order, the relationship between net metering and retail access was deferred to this proceeding for resolution.[1]

This important issue requires further consideration. It appears that net metering might be feasible in conjunction with retail access, if a customer-generator could find a competitive energy services provider willing to undertake the net metering arrangement.[2] As a result, Con Edison is directed to provide additional justification for its prohibition beyond its January 28, 1998 filing, and the other utilities are directed to comment on the retail access arrangements they would prefer. Since retail access will not be widely available until 1999, additional time is available for consideration of this issue, and Con Edison and RG&E may continue their existing approaches.

2. The Uniform Interconnection Standards

After consultation among themselves, and discussion with other parties, the utilities formulated uniform interconnection standards, finalized in a January 20, 1998 letter authored by Central Hudson.[3] CPB and IREC argue that national standards render the uniform interconnection standards superfluous. This argument lacks merit.

PSL §66-j(5)(a) specifically provides that utilities may develop interconnection standards to preserve safe and adequate service, and that we may review and approve those

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[1]Case 96-E-0948, et al., Dairylea Cooperative, Inc. and Rochester Gas & Electric Corporation, Order Concerning Compliance Filings By Rochester Gas & Electric Corporation (Issued January 21, 1998).

[2]Under PSL §66-j(6) customer-generators must comply "with any applicable determinations of the Commission relating to restructuring of the electric industry."

[3]The standards are attached as Appendix B.

standards. Preservation of safe and reliable service is, of course, a paramount concern. Supporters of PV generation should themselves be especially concerned. Public disapproval of PV systems in response to even a few instances where reliability was adversely affected by installation or operation of a PV system, or where an individual suffered an injury attributable to PV system operation, could significantly curtail the growth of the PV industry. Therefore, the reasonable safety measures the utilities have proposed in addition to the national standards, other than the issues raised by their dedicated transformer and secondary network system requirements discussed below, are approved.

The specific criticisms IREC makes of the standards are rejected. IREC would require utilities to bear the costs of protecting their systems against solar equipment that has not yet been tested to demonstrate compliance with either the national or the utilities' standards. IREC claims that otherwise installations of technologically-advanced equipment may be delayed while testing is performed.

Requiring that equipment be tested first and installed second, however, is the normal course and is reasonable. Customers desiring to use experimental equipment not yet tested should bear the cost of their selection. Moreover, contrary to IREC's position, the relays and other additional equipment necessary to protect the utility system from untested PV systems are components of the PV installation itself. While §66-j prohibits utilities from imposing interconnection costs on customer-generators, it does not compel utilities to subsidize the customer's costs of installing, maintaining, or operating the PV systems. Since that type of subsidy is inherent in IREC's proposal, its request is denied.

IREC also questions inspection and testing requirements the utilities have proposed. It argues that utilities might harass customer-generators with repeated requests for tests, or might heap added test costs on the customers. There is no

evidence, however, that utilities will abuse the privilege to request tests.[1] Moreover, testing is a maintenance feature essential to operating a PV system. It is a customer-generator cost, not a utility cost, and, again, IREC cannot transmogrify the prohibition against interconnection costs in §66-j into a requirement that the utilities subsidize customer-generator equipment or operation costs. As a result, IREC's position lacks merit.

3. Installation of a Transformer

The uniform interconnection standards address the installation of a dedicated transformer tied to installation of a PV system. Section 66-j provides that utilities may install such a transformer, and charge the customer up to $350 for the installation.

The utilities other than Con Edison initially insisted upon installation of a transformer in all instances. In contrast, Con Edison would normally not install a transformer, but reserves the right to do so. The other utilities, however, modified their position in the January 20, 1998 uniform standards, to require installation where needed "to ensure conformance with utility safe work practices, to enhance service restoration operations, or to prevent detrimental effects to other utility customers." NRDC had objected to the blanket installation requirement, and also argues utilities should explain the need for any transformer installation.

Utilities must justify installation of a transformer in writing, if a customer so requests in writing. That requirement is appropriate, even with the utilities' revision of the uniform standard. As a result, utilities should provide in their tariffs or contracts that written justification for a decision to install a transformer, in conformance with the standards they have

[1]If any utility were to take that course, a customer complaint could be filed and considered, and appropriate relief against the utility could be ordered.

established, will be furnished upon a written request from the affected customer-generator. That justification should be provided without charge.

Utilities should also explain in their supplemental filings the basis for the transformer installation criteria they propound. Procedures for evaluating the need for transformer installations, and for providing the written justifications, may also be proposed.

4. Secondary Network Systems

Electricity is delivered to the secondary level customers that might install the 10 kW PV systems through utility radial or network systems. In a radial system, electricity flows in one direction from a central source. In a network system, electricity flows in several directions through the network. The network system is common in Con Edison's service territory, and in some high population density locations upstate. Con Edison perceives no problem with installing PV systems to its network systems, but the upstate utilities initially objected, and the uniform interconnection standards prohibited such installations. NRDC protested, but the utilities' revised standards substituted a utility reservation of right to deny installation in place of the prohibition.

If problems are experienced with installations at networked locations, customers residing in high population density areas will find themselves precluded from installing PV systems. The design and operation of network systems, however, differs substantially from utility to utility, and even from network system location to location at the same utility. Safety and reliability considerations may therefore also differ substantially depending upon the location of the network. Because preserving safety and reliability is both essential to the public interest and is crucial to public acceptance of net metering, further proceedings on this point are necessary.

Utilities supporting the uniform standard are directed to explain, in their supplemental comments, the need for restrictions at secondary network systems. Those utilities should also present detailed estimates of the cost of alleviating safety and reliability concerns. Limitations on the number of customers that could connect to a circuit, or other means for addressing network installations, should be thoroughly explored. In the interim, the current uniform standard may be retained, but utilities are required to explain in writing, upon request in writing from a prospective customer-generator, the reason for denying an interconnection to a network.

5. The 0.1% Cap

PSL §66-j(3)(a) provides that utilities may limit PV system purchases to .1% of their annual demand for the year 1996. The utilities, other than NYSEG, Niagara Mohawk, and RG&E, calculated their cap, and those calculations are accepted. Since the cap is premised upon 1996 data, the remaining three utilities, if they desire to avail themselves of it, must make the calculation now. They are directed to supply the calculation in their supplemental comments, or state their intention to waive the cap.

Generic Contract and Tariff Issues

Utilities propose a variety of differing contract and tariff clauses governing their relationship with customer generators. A number of these clauses resemble each other across utilities, and are clearly burdensome. These provisions are modified or rejected below. NRDC, however, questions the need for contracts at all, since Con Edison is able to implement §66-j through its tariff without contracts. NRDC's argument is rejected, because utilities are specifically authorized under §66-j(3)(a) to require contracts.

1. Contract Term

The length of the contract term varies widely among the utilities. At the extremes, O&R would provide for a term of up to 15 years, while Niagara Mohawk's term, albeit unspecified, is subject to termination by either party at any time upon 30 days notice. A uniform requirement is appropriate.

As Central Hudson has done, the term is set at five years. The contract would then be renewable for yearly periods thereafter, unless either party gives notice of cancellation within 30 days before the end of the term. This approach balances the interests of customer generators, in obtaining a contract of sufficient length to provide for financing of their PV systems, with the interests of utilities, in not entering into unduly long-term arrangements in a changing environment for the provision of electricity services.

2. Insurance, Easements and Indemnification

The utilities propose a variety of insurance, easement, and indemnification proposals. Uniformity is again appropriate. The utility proposals on liability insurance are clearly burdensome and overly costly. Indeed, NYSEG's proposed requirements are practically impossible for residential customers to meet. As a result, the utilities' insurance provisions are rejected, except that they may require customers to demonstrate the underwriting of at least $100,000 in liability coverage through their homeowners' policies.

The utilities' easement provisions are also burdensome. Demanding that customer-generators draft and record easements under the circumstances attending PV installations imposes unnecessary costs for no valid public purpose. Utilities, however, may extract, in their contracts and tariffs, permission to enter the customer's property, without notice when necessary. Many utilities already tariff similar requirements. Providing for that entry is essential to protect the public safety and preserve system reliability if a PV system malfunctions.

Indemnification provisions, however, are entirely unnecessary. As NRDC points out, existing negligence and contract principles are sufficient to govern the relationship between utilities and their customers that install PV systems, and there is no reason to impose these provisions otherwise. As a result, utilities are directed to strike all indemnification provisions from their proposed tariffs and contracts.[1]

3. Termination, Modification, and Assignment

A number of utilities propose modification or termination of the contract upon the outcome of judicial or administrative proceedings or future legislative action. A proper termination or modification clause under these circumstances, however, allows the utility to terminate or modify the contract only if a court or agency decision striking down all or part of the net metering statute becomes final and non-appealable. RG&E has drafted an appropriate clause applicable to court decisions, and the other utilities may employ it.

Proposals to automatically revise the contracts upon legislation are also inappropriate. Any future legislation will itself identify the extent to which modification of the contracts is desired, and efforts to constrain future legislative discretion, such as Central Hudson proposes, are rejected.

Utilities are directed to add a provision to their contracts on dispute resolution. The contracts will provide that they are subject to our continuing jurisdiction, and that any disputes arising under the contracts should be first presented to us. This will insure that the important public policy goals underlying §66-j are met on a continuing basis, and that our special expertise is available to resolve the technical matters inherent in disputes over these contracts.

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[1]The limitation of liability clauses, however, resemble existing utility requirements and so may survive.

Several of the utilities would terminate the contract upon the sale of the residence by the customer-generator, or would otherwise restrict assignment of the contract. These utilities, however, would permit themselves to freely assign the contract. These provisions require modification in one respect.

The customer-generator should be permitted to assign the contract to a subsequent purchaser of the residence. Once solar equipment is installed at a residence, the identity of the homeowner does not generally affect the obligations under the contract. Moreover, prohibiting the assignment of the contract upon a sale could inhibit the ability of a homeowner to find a purchaser for the property. As a result, assignment to subsequent purchasers of the residence should be permitted.

Utilities, however, should be allowed to freely assign their rights. In the changing environment accompanying the advent of retail competition, successor entities may assume some or all utility obligations. In those circumstances, free assignment of these contracts is important to the functioning of the transition to competition and so will be allowed.

4. Additional Interconnection Requirements

Four utilities propose requirements in addition to the uniform interconnection standards. NYSEG and Niagara Mohawk reference their QF interconnection bulletins and requirements in their tariffs. LILCO and O&R create separate appendices of new requirements in addition to the uniform interconnection standards list. These proposals could result in the imposition of unnecessary and burdensome requirements on customer-generators. As a result, these utilities should be directed to delete all references to the QF interconnection bulletins or additional requirements from their tariffs, and to require only the uniform interconnection standards the utilities have agreed upon in their January 20, 1998 letter.

5. Interconnection Charges

Utilities take a variety of approaches to charges for interconnection expense. Some, including Con Edison, would explicitly charge the customer-generator for all reasonable interconnection expenses, while others would limit the interconnection expenses, and others are unclear on this point. PSL §66-j(3)(b), however, is unmistakable -- it prohibits all interconnection charges other than $350 for installation of the dedicated transformer. Contrary to Con Edison's interpretation, the statute therefore is intended to result in a different rule for interconnection costs than the rule under PSL §66-c.

As a result, all the utilities are required to tariff a statement that they will not charge any interconnection expenses other than the $350 for the dedicated transformer, if it is needed. All language inconsistent with this statement should be removed from each tariff and contract.[1]

Some utilities would charge customer-generators expenses upon removal of the PV systems, or upon reconnection after a disconnection. These charges may be imposed on customer-generators only on a non-discriminatory basis.

Customer-generators need not be exempted from disconnection and reconnection charges applicable to residential customers generally. Charges targeted specifically to customer-generators, however, like recovery of utility costs upon removal of a PV system, are akin to interconnection charges. To the extent that the statute prohibits interconnection charges, these other charges, which could discourage PV installations by threatening customer-generators with liability for a cost of unknown magnitude at the time a PV system is removed, are also prohibited.

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[1]Alone among the utilities, RG&E proposes to add tax to the $350; it should explain its position in the supplemental comments discussed above.

6. Testing and Inspection

The utilities proposed a wide variety of testing and inspection requirements, in addition to the testing requirements listed in the uniform interconnection standards. These additional requirements include keeping a maintenance and repair log for utility review. Because the uniform standards adequately provide for testing and inspection, the various additional testing requirements are rejected.

The wide variety of proposed testing requirements would likely create confusion, and, in many cases, they are onerous and burdensome to customer-generators. As a result, utilities are directed to delete from their tariffs and contracts all testing, inspection, and recordkeeping requirements, except for those set forth in the uniform interconnection standards. Those provisions allow the utilities to test or inspect the equipment upon reasonable notice to the customer-generator, in order to ensure compliance with the interconnection standards. They also provide for certification of compliance with the standards before a PV system is first interconnected. These provisions are sufficient to protect the public safety.

Utility-Specific Issues

Several of the utilities' individual tariff and contract provisions raise issues. Criticizing LILCO, NRDC questions the utility's requirement of a 600 amp outdoor disconnect switch, and it and CPB question the references to customer generators in the utilities' stand-by tariff. LILCO reports that the 600 amp figure is a clerical error, and that it will be revised. As to the stand-by tariff reference, it exempts customer-generators from the application of that tariff and provides for imposition of the $350 charge. Because these are proper purposes, the location of this language is not important, and so the tariff may remain.

NRDC also criticizes language in the NYSEG contract, including a provision stating that NYSEG is not obligated to

"transmit" PV generation. The NYSEG contractual language, however, is acceptable for now. In general, the language is standard boilerplate that does not unduly harm the interests of customer-generators. As to the obligation to "transmit," NYSEG apparently seeks to clarify that it is not obligated to wheel PV-generated electricity at retail to another customer. While such a requirement appears appropriate, NYSEG should comment on its interpretation of and justification for the language.

Niagara Mohawk's proposed tariff and contract contained many of the objectional provisions discussed above. In addition, if its proposal to fund its alleged net metering lost revenues from external sources is rejected, Niagara Mohawk proposes to treat customer-generators as QFs. As one component of this approach, it would purchase their output at avoided cost and sell to them at stand-by rates, unless its alleged lost revenues are funded from an external source.

This approach violates the §66-j(4) provision requiring net metering through crediting of output against input. It must be deleted. Similarly unacceptable under §66-j are the burdensome requirements that the customer-generator comply with FERC QF requirements, submit to an interconnection study, and pay QF-style metering charges in addition to tariffed residential charges. Niagara Mohawk is directed to strike from its tariffs these and all other references to QFs and QF requirements.

Retirement of An Annual Credit

CPB believes that any credit accumulated at the end of the annual period should be retired at avoided cost rates inclusive of capacity credits, instead of at energy-only avoided cost. NYSEG's position resembles CPB's, but other utilities, like Central Hudson, provide for energy-only payments. CPB supports its position on the grounds that the PV systems provide peak period supply and other benefits, justifying a capacity measurement.

Because the §66-j limits the size of a PV system to only 10 kW, however, it is not certain that an annual credit, will, in fact, accrue to an actual customer installing one of these PV systems. As a result, the issue of retirement of the credit need not be addressed immediately. Instead, utilities are directed to comment further on this issue.

In their comments, the utilities are directed to forecast PV system output, compare the output to consumption patterns at feasible PV installation sites, and describe the circumstances, if any, where a net annual credit would accrue. If an actual accrual is unlikely, deciding the method for retiring the credit may be deferred until a time when it is demonstrated that an accrual will occur.

Utilities, however, should explore the possibility of retiring a potential annual credit with a voucher, calculated at avoided cost, for use in reducing future utility bills at the residential PV locations that produced the credit. Since §66-j is not intended as a vehicle for making sales to utilities, the voucher approach might best implement the statute, in the event that a net annual credit will accumulate at some locations. Utilities may also propose and comment on other methods for retiring the credit, and may comment on the capacity credit issue.

CONCLUSION

NRDC suggests that the utility should be required to report, within one year, on the progress of PV system installations. This reporting requirement is appropriate, and is adopted. Otherwise, utilities are required to make the revisions to their tariffs and contracts, and make the filings, discussed above.

The Commission orders:

1. The electric utilities described in the body of this Order are directed to cancel the tariff amendments and supplements listed in Appendix C on or before February 11, 1998.

2. The above electric utilities are directed to make the further tariff filings described in the body of this Order. The tariff revisions shall be filed on not less than one day's notice, to take effect on or before March 12, 1998. The tariff revisions made in the compliance filing shall not become effective on a permanent basis until approved.

3. The above electric utilities are directed to file the comments described in the body of this Order, by the date for making the tariff compliance filings, and to serve the comments on all parties to these proceedings. Responses to the compliance filings and comments may be made within 30 days of their filing.

4. The above electric utilities are directed to report, within one year after the date of this Order, on the progress of PV system installations.

5. These proceedings are continued.

By the Commission,

(SIGNED) JOHN C. CRARY
Secretary

POSITIONS OF THE PARTIES

The Utilities

A. Central Hudson

Central Hudson begins by reporting that the .1% cap under §66-j limits its obligation to purchase solar energy to .8 MW. The utility would pay any annual net credit at its energy-only avoided cost on the annual anniversary of a PV system's installation.

The utility says it will employ a single meter at non-time differentiated residential locations, but that two meters are required where time-of-use (TOU) customers desire to net meter. The TOU customer would be required to set meter mounting equipment at the time it installs its PV system. PV output at TOU locations would be credited against peak period usage.

A list of uniform interconnection standards developed in cooperation among the seven major electric utilities is attached to Central Hudson's filing. The standards include settings for an automatic disconnect device, requirements for installation of a manual disconnect device and a dedicated distribution transformer, a prohibition against attachment of solar equipment to utility secondary network utility systems, and a testing requirement providing for written certification, by a licensed contractor, that the PV system meets the uniform standards.

Central Hudson proposes a contract with a term of five years, renewable on an annual basis thereafter until terminated. The contract permits the utility to inspect and test the solar equipment, and requires the customer to permit the utility to witness a system functional test upon timely notification from the customer. Customers also would be required to purchase $1,000,000 in liability insurance from underwriters generally accepted in the industry, and to indemnify Central Hudson for any lawsuits arising out of the agreement or the PV installation. Central Hudson is not liable to the customer, except upon utility gross negligence in the operation of its equipment, and is not liable for any harm it might cause to the PV system.

If the customer removes the PV system, it must reimburse Central Hudson for all costs associated with removing the utility's interconnection equipment. The customer may not assign or transfer the agreement, but Central Hudson may transfer without the customer's consent. Central Hudson would also require the customer to provide an easement or right-of-way agreement, at the customer's cost, enabling the utility to access the PV system. The agreement automatically terminates upon revision or repeal of §66-j.

By letter dated January 20, 1998, Central Hudson reported changes to the utilities' uniform interconnection standards. Rather than requiring installation of a dedicated distribution transformer in all instances, the utilities would now reserve the right to require installation "if the utility decides that the transformer is necessary to insure conformance with the utility's safe work practices, to enhance service restoration operations or to prevent detrimental effects to other utility customers." The prohibition against attachment to secondary network systems was modified to a reservation right to refuse interconnections at those locations. The testing requirements were also revised, from a mandate to perform testing at regular intervals, to a reservation of right to require a test upon request.

B. Con Edison

Unlike the other utilities, Con Edison proposes to implement net metering through tariff provisions without requiring a contract with the customer-generator. Con Edison would require the customer to pay reasonable interconnection costs, including a maximum of $350 for installation of a dedicated transformer, if needed. The utility would pay any annual credit owed during the first billing period that ends on or after each calendar year. It would employ a single meter, subject to a reservation of right to install a second meter where

necessary, but would deny net metering to TOU service classifications. It calculates its §66-j cap at 8.158 MW.

While Con Edison generally supports the uniform interconnection standards developed by the utilities, it finds two of the standards unnecessary in its service territory. First, it believes that it will not ordinarily be required to install a dedicated secondary transformer, albeit it reserves the right to install the transformer where necessary. Second, it is able to permit attachment of PV facilities to its secondary network systems. Con Edison points out, that unlike other utilities in the state, its distribution system is predominantly a secondary network system, and is designed so that the 10 kW PV system should not adversely affect the utility system in most instances.

Con Edison also asserts that §66-j will require it to purchase energy from the customer-generators at a price in excess of avoided cost. This feature, says the utility, requires ratemaking treatment in response. Net metering, the utility continues, is an environmental public policy program, and consequently may be funded from the non-bypassable system benefits charge (SBC) proposed in Opinion No. 96-12. The utility would calculate the amount recoverable from the SBC:

> by estimating the amount of energy delivered by a customer-generator, based on the customers' weather-adjusted historical usage, and multiplying such estimated energy deliveries by the difference between the average rate applicable to the residential service and the average S.C.-11 buy-back energy rate.

Finally, the utility reserves the right to challenge the legality of §66-j under PURPA or the Federal Power Act.

On January 28, 1998, Con Edison supplemented its filing. It reports that it joins in a request from Niagara Mohawk, also dated January 28, 1998, that additional procedures be provided for, so that utilities may adequately respond to the contentions of CPB and NRDC.

Con Edison also reacts to selected criticisms propounded by CPB and NRDC. The utility maintains that the other parties misunderstand the interconnection charges the utility would impose on customer-generators. According to Con Edison, the charge would fund the cost of system modifications needed to allow the customer to feed power into the utility's system, and is uniformly applied to all backfeeding customers. According to Con Edison, §66-j does not overrule the precept, embodied in PURPA and PSL §66-c, that on-site generators should not impose interconnection costs on either the utility or other ratepayers. Con Edison also repeats its suggestion that, if such costs are not recovered from the customer-generator, they should be funded through the SBC.

Disagreeing with CPB, Con Edison cannot find within §66-j the intent to foreclose utility recovery of lost revenues. Con Edison also voices its disagreement with NRDC's proposal to calculate lost revenues premised upon predicted PV system output rather than adjusted historic usage. Contradicting NRDC's arguments further, the utility claims that PV systems will not necessarily contribute towards system peak, because system output is likely low during late afternoons on cloudy hot days, when system peaks occur. The utility also maintains that the residential system peak on its system occurs during hours when it is dark.

Con Edison also maintains that excluding retail access customers from the net metering program is appropriate. The utility interprets §66-j as providing for net metering only with electric utilities, not with competitive providers of electric services. In a retail access situation, the utility continues, net metering could be accomplished only through use of two meters, one to record energy supply so that Con Edison recovers its distribution costs, and one to record PV output, so that the competitive provider may properly calculate its generation services bill. Con Edison concludes that its tariff should be approved as filed.

C. LILCO

LILCO calculates its §66-j cap at 3.6 MW. It would insist upon two meters, with the customer providing the meter mounting equipment, at its cost, as a component of its PV installation. LILCO says two meters are necessary, because a single meter running backwards is inaccurate. For TOU customers, the utility would subtract output from peak period usage first, and then offset it against other time periods. Any annual credit would be paid on the anniversary of the customer's entry into the program.

LILCO supports the uniform interconnection standards. Under its tariff, LILCO would limit interconnection costs to $350 per customer, "payable in full when an isolated transformer is installed."[1] LILCO's contract generally resembles Central Hudson's, except that LILCO would continue the contract for a term of 15 years. LILCO also would not insist upon witnessing the system functional test, so long as it can reserve the right to do so.

D. NYSEG

NYSEG would restrict solar system installations to the primary legal residences. In addition, NYSEG imposes technical interconnection requirements, including the uniform standards, through its Interconnection Bulletin applicable to QFs. Like LILCO, NYSEG would require two meters, with the customer providing the meter boxes and sockets. The utility reserves its right to challenge §66-j under applicable federal and state law, including PURPA, and would terminate its net metering contracts if the courts overturn §66-j in whole or in part. The utility does not calculate its §66-j cap, but notes that the cap does adhere.

In NYSEG's contract with customer-generators, the length of term is left open. Interconnection costs are limited

[1]Proposed Leaf No. 51.

to $350, and customers must also bear the costs of any necessary disconnection or reconnection. The customer must also provide NYSEG with an easement or right-of-way, paying all associated expenses and costs, including recording fees. NYSEG would also require the customer to indemnify it for any act or failure by the customer in performance of the agreement, to submit to testing and inspection requirements and to provide liability insurance in the amount of $1,000,000. The qualifications underwriters acceptable to NYSEG are specified in detail. NYSEG would compensate customer-generators for any annual credit at avoided cost, including capacity costs.

E. Niagara Mohawk

Describing the requirements of §66-j as a statutory purchase mandate, Niagara Mohawk insists implementation must comply with PURPA. As a result, the utility asserts any payments it makes in excess of its avoided costs must be funded from an external source, such as the SBC or the State Treasury. Niagara Mohawk maintains this result is consistent with Opinion No. 96-12, and FERC's interpretation of PURPA.[1] If its costs are so funded, Niagara Mohawk continues, and if its proposed tariff and contract are accepted in their entirety, it will waive the §66-j cap on PV purchases.

Niagara Mohawk has tariffed its proposed contract for customer-generators. Under the contract, the term is indeterminent, but either party may cancel upon 30 days written notice. The utility would also require the installation of two meters, and would permit net metering at TOU locations, albeit the method for crediting TOU customers is not specified.

Niagara Mohawk's tariff provisions, however, provide for net metering only if the difference between retail rates and avoided costs is funded from an external source. Otherwise, Niagara Mohawk intends to treat all PV output as a purchase at

[1]CGE Fulton LLC, 70 FERC ¶61,290 (1995).

avoided cost, and input at PV locations as a sale at tariff retail rates. If net metering losses are funded, annual payments of any available credit would be made on the anniversary of entry into the PV contract.

Niagara Mohawk also makes customer-generators responsible for meter installation charges, unless those costs are funded from an external source. It takes the same approach to interconnection costs other than metering, including any cost above $350 for installation of a dedicated transformer, which it would require. The first $350 would be borne by the customer. Moreover, Niagara Mohawk reserves discretion to require a complete interconnection study, charging the cost to the customer unless funded from an external source. The utility would also compel customers to maintain a record of repair, and to invite the utility to witness initial testing of the PV facility, notifying it at least 60 days in advance of the test. The utility adopts the uniform interconnection standards.

Niagara Mohawk would require the customer-generator to carry liability insurance in the amount of $500,000. On indemnification, Niagara Mohawk requires that each party indemnify the other against all claims, arising out of operation of the solar equipment, that occur on the indemnifying party's side of the point of delivery, and for claims related to the operation of the customer switching equipment.

The contract explicitly provides that neither party waives its rights under PURPA. Niagara Mohawk also reserves the right to unilaterally file for a change in any of the terms and conditions of its tariff at any time, and states that the tariff will supersede the terms of the power purchase agreement. Finally, the tariff and contract require that the customer-generator be, and remain throughout the term of the contract, a QF under FERC's regulations.

Niagara Mohawk supplemented its filing on January 28, 1998. The utility maintains that critics of its net metering filing did not adhere to a reasonable procedural schedule for

addressing comments in this proceeding. The utility maintains it is entitled to an opportunity to respond to those parties. Analyzing PSL §66-j(3)(a), which requires a Commission decision on net metering by February 13, 1998, the utility contends that establishing a reasonable procedural schedule would be an adequate decision to comply with the statutory directive.

F. RG&E

Expressing concern that §66-j is preempted by PURPA,[1] RG&E registers its objection to the requirement that it net meter production from customer-generators. It notes it has drafted its proposed contract to reflect that objection, by specifying that the agreement be modified to conform to any final court Order. RG&E does not mention the .1% cap.

RG&E would require two meters, with the customer installing the meter box. Other interconnection costs would be limited to the $350 for installation of a dedicated transformer. RG&E would require the customer to keep maintenance records, and it reserves the right to inspect the PV system before it connects it. As to indemnification, the contract compels the customer-generator to hold the utility harmless for any claims arising out of the installation or operation of the PV system.

RG&E made two revisions to its tariff after filing. On November 25, 1997, it conformed its prior filing to the utilities' agreed-upon uniform interconnection standards. It also agreed to bear the costs of the installation of the meters and meter boxes. It would, however, charge tax on the $350 for installation of a dedicated transformer. On January 12, 1998, RG&E further modified its contract to require the customer-generator to carry liability insurance in the amount of $500,000.

[1]As the basis for its concern, RG&E cites Connecticut Light and Power Co., 70 FERC ¶60,012 (1995), reh. den., 71 FERC ¶61,035.

G. O&R

O&R calculates its §66-j cap at 1.0 MW. The utility would accomplish net metering through a single standard meter. Any overall credits would be paid at the end of each 12-month period, at avoided cost. O&R's contract provides that it takes precedence over the terms of the tariff. The agreement provides for a term of 15 years, and specifies that the PV systems may only be installed at primary residences.

The contract also requires the customer to warrant its title to the electricity the system produces, and to indemnify the utility for any claims arising out of that warranty or the performance of the PV system, except where the claim arises from the sole gross negligence or willful misconduct of the utility. The contract limits each party's liability to the other.

The agreement is made subject to all present and future laws, and specifies that it will not take effect until all regulatory approvals have been obtained. It further provides that either party may intervene in administrative or judicial proceedings affecting the terms of the contract. Either party may also petition for regulatory relief.

O&R adopts the utilities' uniform interconnection standards, but also establishes its own metering and equipment protection requirements. Before interconnection, O&R must first inspect the completed PV equipment installation. The customer is responsible for providing the equipment necessary to accommodate metering. O&R says it will provide equipment and labor necessary to perform all utility system modifications, at the customer's expense. The customer is also required to maintain a log recording performance of maintenance and listing unusual operational events.

NRDC

On January 20, 1998, Pace Energy Project, the Solar Energy Industries Association, and the National Resources Defense Council (NRDC) filed joint comments on the utilities' net

metering tariffs. NRDC claims that the utilities' proposals, with the exception of Con Edison's tariff, impose burdensome, unnecessary and expensive requirements on the customer-generators. According to NRDC, these requirements defeat the purposes of §66-j -- to assist homeowners in reducing their energy costs, to expand the deployment of renewable energy resources, and to foster cleaner air. NRDC is particularly concerned that the utilities have seized upon reliability issues as a means for stifling the development of generation sources that will compete with them, and discouraging consumers from installing solar equipment.

A. The Uniform Interconnection Standards

In reviewing the set of uniform interconnection requirements the utilities developed, NRDC highlights two concerns. Although it believes that solar equipment as currently designed is safe without the interconnection standards, NRDC would acquiesce to the requirements, but for the mandated installation of a dedicated distribution transformer and the ban against installation of solar equipment on secondary networks. NRDC reports that net metering statutes adopted in Nevada and Maryland prohibit the interconnection conditions the utilities demand.

Referencing §66-j(3)(b), NRDC declares that dedicated transformers should be installed only where necessary to protect other customers. NRDC finds no basis for a blanket requirement that transformers be installed at all solar equipment locations. NRDC notes that Con Edison will not implement a blanket requirement, and will not ordinarily insist upon installation of a transformer.

Discerning that transformers are needed primarily to prevent islanding (i.e., where a system pocket remains live even though nearby locations are de-energized), and to prevent "bad"

harmonics from affecting power quality at neighboring locations,[1] NRDC believes modern solar equipment is designed to prevent those problems even without installation of a transformer. Moreover, NRDC continues, even though the statute limits the charge for a transformer to $350, that amount may be large enough to discourage an otherwise willing customer from installing solar equipment. As a result, NRDC would delete the transformer requirement, but, in the alternative, would require the utility to test and monitor a local distribution system, and demonstrate that a transformer is necessary before it compels installation.

Addressing the secondary network configuration issue, NRDC relates that networks may flow power to customers from two directions, as opposed to radial network flow from a central source in one direction. Again pointing to Con Edison, NRDC asserts that utility operates the largest secondary network system in the state, but it does not propose to prohibit the connection of solar equipment to that system. NRDC would delete the other utilities' ban on those installations, but, in the alternative, would permit a utility to exercise an exclusion only if it can demonstrate that a specific installation will cause specific problems.

B. The Two Meter Issue

A number of the utilities, NRDC reports, require the use of two meters instead of one meter, to measure separately production from the solar equipment and customer usage purchased from the utility. NRDC quotes §66-j as providing for the use of a net energy meter, defined as "a non-demand, non-time differentiated meter that measures the reverse flow of electricity." Clearly, says NRDC, the law calls for use of a single meter rather than dual meters.

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[1]NRDC Comment, p. 12.

Moreover, NRDC discerns, some of the utilities requiring dual meters would also compel the customer to install the meter box and socket for the second meter. NRDC characterizes this proposal as an additional cost, again in conflict with the statute. NRDC urges that the utilities be required to allow use of a single meter, and if certain meter types fail to meet accuracy standards in the reverse direction, NRDC recommends that the utility should replace that type of meter with a more modern meter at no cost.

C. Contract Requirements

Turning to the tariff and contract requirements, NRDC complains that the utilities' proposals differ dramatically from each other. This alone, it says, could discourage installation of solar equipment, because equipment manufacturers, installers and sales personnel will have to familiarize themselves with local requirements instead of furnishing equipment on the same basis across the state.

NRDC then lists the requirements it finds objectionable, beginning with the proposals of Niagara Mohawk and NYSEG to impose technical requirements applicable to QFs on customer-generators. NRDC finds those requirements costly and burdensome. NRDC would delete the requirements for purchase of liability insurance in amounts ranging from $500,000 to $1,000,000, or would substitute $100,000 coverage under the homeowner's existing insurance policy. NRDC claims the expense of purchasing the additional insurance could discourage solar equipment installation and points out that NYSEG's additional insurance requirements may be beyond the ability of a homeowner to satisfy.

Analyzing the utilities' proposed indemnification requirements, NRDC claims they are both burdensome to customers and tilted unfairly in the utilities' direction. Criticizing Central Hudson, O&R and LILCO in particular, NRDC claims their indemnification provisions would require customer-generators to

cover utility expenses when the damage results from utilities' ordinary negligence, or even partly from its gross negligence, because only claims solely attributable to the utility's gross negligence are exempt from indemnification.

Some of the utilities, NRDC continues, require customer-generators to deed over and record easements to their property. No other state, says NRDC, has imposed such a requirement, and doing so would be costly and burdensome. NRDC asserts that these requirements run afoul of the statutory prohibition against the imposition of any additional fee on customer-generators, beyond the $350 for the dedicated transformer, for installation of solar equipment.

NRDC also finds the utilities' language on interconnection costs confusing. Under some of the utility tariffs, it complains, interconnection costs are imposed on customer-generators in violation of the statute, and in other cases the $350 limit applicable to transformer costs is transmogrified into a general interconnection cost limit.

NRDC also lists other contractual or tariff provisions that it finds objectionable. It notes Con Edison would deny net metering to retail access customers purchasing generation supply from non-utility sources. NRDC recommends more study on this important issue, and contends that energy suppliers other than utilities may be willing to enter into net metering arrangements with customers.

Analyzing Niagara Mohawk's tariff, NRDC questions the provision providing for a metering charge, the provision requiring an interconnection study, and the "overly cumbersome" on-site testing and notification requirements.[1] As to NYSEG, NRDC complains that utility unfairly imposes disconnection and reconnection costs on the customer-generator, that the contract does not lay out all the rights and responsibilities of the parties, that it permits termination without justification or if

[1]NRDC Comment, p. 27.

any court strikes down §66-j, and that it contains a confusing provision allowing NYSEG to refuse to transmit PV power. NRDC would authorize the customer to terminate the contract if it removes its PV system, but would allow NYSEG to terminate only if a court decision on invalidity became final and non-appealable.

NRDC criticizes LILCO's proposals to terminate the agreement upon sale of the residence and require a 600 amp outdoor disconnect switch. NRDC would permit assignment of the PV contract to a purchasing homeowner, and points out that standard residential service is usually sized at 200 amps, making the 600 amp figure excessive. NRDC would also revise Central Hudson's termination requirement, which is triggered upon any revision or repeal of §66-j, to require modification of the contract to comply with the change, not only to terminate it.

D. Funding Lost Revenues

Analyzing the Con Edison and Niagara Mohawk proposals to fund revenue shortfalls out of the SBC, NRDC perceives both benefits and disadvantages, and so takes no position. NRDC does, however, offer its views on calculation of lost revenues if it is decided to fund them. Any estimate of those revenues, NRDC continues, should reflect the value PV systems provide to utilities, including their on-peak availability during hot, sunny summer days.

NRDC would therefore reject Con Edison's proposal to measure lost revenues based on the customer's weather-adjusted historic energy usage, and would instead begin with the predicted PV system output. Once the benefits of solar power are taken into account, NRDC discerns, lost revenues may be minimal. As to Niagara Mohawk's proposal, NRDC perceives a potential conflict with its restructuring agreement, which prohibits the utility from charging residential customers exit fees. NRDC analogizes that utility's lost revenue calculation to such a fee.

E. PURPA Arguments

NRDC also responds to the legal arguments the utilities make against §66-j. Conceding that FERC has prohibited states from requiring utilities to purchase electricity under PURPA at prices above avoided cost,[1] NRDC finds these decisions irrelevant to net metering. NRDC maintains that §66-j does not implement PURPA in any way. Instead, consistent with FERC precedents, the statute is an appropriate and independent exercise of the state's authority to make energy policies. FERC, NRDC insists, has sanctioned state exercises of authority to make energy policies.[2]

NRDC also maintains that net metering is the offset or exchange of electricity, not a purchase or sale of electricity. A net metering customer, it continues, offsets electricity that would otherwise be purchased from the utility with electricity generated from the PV system on-site. These sorts of offsets and exchanges, NRDC asserts, are common among utilities and other electric generators, and are not considered sales. The Federal Power Act, NRDC stresses, so distinguishes between the sale and the exchange of electricity.[3] As a result, NRDC concludes, net metering does not implicate PURPA.

In support of its position, NRDC notes that electric usage is measured and billed over a metering period, and is generally not billed based on instantaneous measurement. Utility rates, it continues, are based on costs averaged over some period of time, rather than on instantaneous measurement. Under net metering, NRDC argues, the metering period is extended to encompass an annual period. Any excess at the end of the year is credited back to the utility at avoided cost, a rate that is

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[1]See, e.g., Connecticut Light and Power Co., supra.

[2]Midwest Power Systems, Inc., 78 FERC ¶61,067 (1997); Southern California Edison Co. and San Diego Gas and Electric Co., 70 FERC ¶61,125 (1995), reh. den. 71 FERC ¶61,269.

[3]16 U.S.C.A. §824;(a)(1).

acceptable under PURPA. As a result, NRDC concludes that net metering does not implicate the FERC prohibition against payments in excess of avoided cost.

NRDC also relates that the Maine PUC has addressed the PURPA issue in the context of its net metering requirements.[1] That PUC, NRDC continues, concluded that net metering "provides for a billing and metering procedure that is well within the state's authority over the retail practices of utilities."[2] The Maine PUC therefore rejected the FERC Connecticut Light and Power Co. decision as irrelevant to net metering.

F. Conclusion

NRDC concludes that Con Edison's proposed net metering tariff and model application form should serve as the model for other utilities. NRDC would clarify Con Edison's tariff only to specify that interconnection costs other than the $350 transformer charge are not permissible. In addition, it would require utilities to inform customers on procedures for filing a complaint with the Commission if a dispute over PV interconnection or operation arises. NRDC would also compel the utilities to submit a report within one year describing implementation of §66-j, including the number of systems interconnected, the amount of energy they produce, and lessons learned.

CPB

The Consumer Protection Board (CPB) makes five recommendations. First, it urges rejection of the Niagara Mohawk and Con Edison proposals for cost recovery of lost revenues. CPB maintains that the 0.1% cap on PV installations is sufficient to obviate the need for any lost revenue correction. CPB also

[1]Docket No. 97-513, Maine Public Utilities Commission, Order (Issued October 27, 1997).

[2]NRDC Comment, p. 33.

interprets the statutory prohibition against imposition of charges or fees as prohibiting lost revenue recovery.

CPB further interprets the statutory prohibition against fees as overriding several other utility proposals. It maintains Con Edison's interconnection cost recovery plan is in conflict with the statute. A similar interpretation, CPB asserts, adheres to NYSEG's imposition of QF interconnection requirements on customer-generators. CPB extends the criticism to O&R's restrictions on interconnection.[1]

Second, CPB questions the uniform interconnection standards the utilities have devised. Reiterating NRDC's concerns, CPB insists that dedicated transformers should not be installed in all instances. The utilities, says CPB, should not automatically and needlessly incur transformer costs in the range of $1,500 to $3,000, especially since the customer-generator's contribution is limited to $350. CPB also joins NRDC in urging rejection of the utility prohibition against the connection of PV systems to utility secondary network systems. On the other uniform interconnection standards, CPB would defer to national standards, and reject the utilities' specific proposals.

Third, CPB objects to the two-meter requirement, and to the proposals to charge for the metering box and socket. CPB notes, however, that TOU meters will not run in reverse. TOU customers, it says, should be provided the option of exiting from the TOU rate and employing the existing meter mount for a non-time differentiated meter.

Fourth, CPB believes the indemnification and homeowner insurance requirements would add costs to PV installations. It describes these, and similar requirements, as designed more to inhibit PV installation than to further legitimate public policy goals. It urges their rejection.

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[1]CPB would apply a similar analysis to RG&E's interconnection proposals, but that utility revised its proposals, as discussed above.

Fifth, CPB perceives that utilities would pay their energy-only avoided cost rate if there is a net credit remaining at the end of the annual period. CPB would employ instead the avoided capacity and energy cost rate. CPB claims the higher rate recognizes the contribution solar equipment will make to system peak requirements, and to forestalling expansions of local distribution capacity. The energy-only rate, it concludes, would not reflect those contributions.

NYSEIA

In support of NRDC, the New York Solar Energy Industry Association (NYSEIA) claims that installation of PV systems will reduce energy imports into New York, thereby retaining monies within the state. NYSEIA emphasizes the importance of commensurate state and nationwide standards, because manufacturing multiple versions of solar equipment would drive up the costs for both equipment producers and customer-generators. It urges adoption of the utilities' revised uniform interconnection standards as a first step towards achieving uniformity.

IREC

The Interstate Renewable Energy Council (IREC) reports that, despite substantial cooperation with the New York utilities, it still disagrees with some of the terms and conditions set forth in the uniform interconnection standards. IREC first criticizes the requirement that solar equipment installed in New York meet national static and dynamic performance standards, or that utility-grade protective relays be installed where the requirements are not met. Since newly-developed types of solar equipment may not have been tested, says IREC, utilities should install the needed relays at their cost. IREC, however, urges cooperation of all interested parties, including manufacturers, on rapid development and implementation of testing protocols.

Fearing that the uniform interconnection standard testing requirements might permit utilities to harass customer-generators by compelling excessive testing, IREC would limit tests to no more than once every four years. IREC also views the cost of the test as an additional fee of the type prohibited by §66-j, and so would require the utility to bear the cost.

IREC also supports NRDC on the dedicated transformer, the secondary network system, and the two-meter issues. It would, however, require utilities to test standard residential meters running in reverse. IREC seeks to refine understanding of the effect running a meter backwards has on accuracy.

Solarex

In its comments, Solarex, a business unit of Amoco/Enron Solar, also voices its support for NRDC's positions. Solarex maintains that the solar electricity industry will grow where it is welcome, but complains that New York utilities have requested imposition of unnecessary, burdensome and costly requirements. Solarex also argues solar equipment manufacturers will not locate factories or invest in markets where doing so would involve "an expensive and protracted battle with entrenched interests."[1]

[1]Solarex Comment, p. 1.

PHOTOVOLTAIC INTERCONNECTION STANDARDS FOR RESIDENTIAL SOLAR ELECTRIC POWER PRODUCING FACILITIES OF 10 kW OR LESS

Technical Requirements For Interconnecting Residential Photovoltaic Power Producing Facilities 10 kW or Less, Single Phase, 600 Volts or Less, In Parallel With a Utility System

1. Design Requirements

A. The power producing facility shall be tested by a nationally recognized testing laboratory and conform to all applicable local, state and federal building codes and National Standards and any authorities having jurisdiction.

B. The power producing facility shall have an automatic switching device operated by over and under voltage protection and over and under frequency protection:

1) The power producing facility shall automatically disconnect from the utility system within six cycles if the voltage falls below 60 volts (nominal 120 volt base) at the inverter interface point.

2) The power producing facility shall automatically disconnect from the utility system within two seconds if the voltage rises above 132 volts or falls below 104 volts (nominal 120 volt base) at the inverter interface point.

3) The power producing facility shall automatically disconnect from the utility system within two cycles if the voltage rises above 180 volts (nominal 120 volt base) at the inverter interface point.

4) The power producing facility shall automatically disconnect from the utility system within six cycles if the frequency rises above 60.5 Hertz or falls below 59.5 Hertz at the inverter interface point.

5) Following a power producing facility disconnect as a result of a voltage or frequency excursion as stated in Section (1)(B)(1-4) above, the power producing facility shall remain disconnected until the utility service voltage has recovered to utility acceptable voltage and frequency limits for a minimum of five minutes.

6) The above set points shall not be changed or modified by the power producing facility owner or representative.

7) All devices or systems used for voltage and frequency measurement and automatic disconnection shall be type tested by the manufacturer for both static and dynamic performance. Dynamic performance is defined by the proper response to a set of digitized waveforms available from the Empire State Electric Energy Research Corporation or the connecting utility. Proof of proper performance shall be in the form a certified test report. At the time of production, design and performance must meet or exceed requirements of ANSI/IEEE Standards C37.90.1 and 929. If the power producing facility does not comply with these requirements, utility grade protective relays, approved by the utility, are required.

2. Manual Disconnect Device

A. The power producing facility shall be capable of being isolated from the utility system by means of an external, manual, visible load break, disconnecting switch installed by the owner of the power producing facility, electrically located between the power producing facility and the utility system.

B. The disconnect switch shall be located within 10 feet of the external electric service meter.

C. The disconnect switch shall be readily accessible for operation by utility personnel at all times and be capable of being padlocked only in the open position. Operation of this switch is at the sole discretion of the utility without prior notice.

D. The disconnect switch shall be clearly marked, "Generator Disconnect Switch" with permanent 3/8 inch letters or larger.

3. Dedicated Distribution Transformer

A. The connecting utility reserves the right to require that the power producing facility connects to the utility's system through a dedicated distribution transformer if the utility decides that the transformer is necessary to ensure conformance with utility safe work practices, to enhance service restoration operations or to prevent detrimental effects to other utility customers.

4. Network Application

A. The utility reserves the right to exclude the power producing facility from connection to secondary network utility systems.

5. Power Producing Facility Performance

A. The electrical output of the power producing facility shall meet the latest IEEE Standard 519 and ANSI C84.1 at the time of placement into service.

6. Testing and Maintenance

A. Upon initial parallel operation of the photovoltaic system, or any time a photovoltaic system adjustment or revision is made, a system functional test demonstrating compliance with Section (1)(B)(1-5) above is required, including written certification of compliance with all of the terms of this Appendix, by a licensed or qualified installation contractor acceptable to the utility. This test is a system acceptance test demonstrating to utility personnel that the photovoltaic system controls are operational and disconnect from the utility when the utility voltage and frequency parameters are outside of the limits described in Section (1)(B)(1-5) above. Built-in software testing routines may be used to verify, on demand, correct operation of the photovoltaic system controls. The software testing routines shall be production verified and tested.

B. The connecting utility reserves the right to require the power producing facility owner to operationally test the photovoltaic system controls. The utility will either witness the test or will require written certification by a licensed or qualified installation contractor acceptable to the utility.

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