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**AGGREGATED NET METERING IN ARIZONA:
ANALYSIS AND RECOMMENDATIONS**

Arizona Corporation Commission

NOVEMBER 15, 2010

I. INTRODUCTION

This report is intended to provide the Arizona Corporation Commission (Commission) with Commission Staff's (Staff) recommendations regarding the Commission's potential implementation of aggregated net metering (ANM). Keyes & Fox LLP assisted Staff in preparing this report. In order to do so, Keyes & Fox reviewed activity related to ANM in several states.¹ Appendix B provides a table summarizing that state research. Keyes & Fox also reviewed parties' oral comments made during the Commission's September 1, 2010 ANM workshop, as well as parties' related written comments.²

First, Staff offers some context for the discussion of ANM, including a brief definition of ANM and a summary of the policy arguments regarding ANM. Staff also provides its analysis of the existing Arizona net metering rules, and whether those rules would require modification in order to implement ANM. In brief, Staff concludes that ANM is not consistent with Arizona's net metering rules, and the Commission would have to undertake a rulemaking in order to implement ANM under the rules. Therefore, Staff recommends that the Commission move forward with allowing a limited ANM pilot program(s) in order to analyze the effects of ANM to determine if a rulemaking process should be undertaken to allow for full ANM implementation. Second, Staff offers specific programmatic recommendations related to a proposed ANM pilot. These programmatic recommendations are structured according to the salient issues that arose from Keyes & Fox's analysis of state activity related to ANM, and from parties' written and oral comments. In organizing our recommendations by issue, Staff hopes to highlight areas of agreement and diverging opinions related to ANM, and to provide actionable recommendations for how to address them in a pilot program. Our analysis is summarized in the Conclusion and Appendix A contains a summary of Staff's recommendations.

¹ Keyes & Fox LLP, *Aggregated Net Metering in Arizona: Summary of Policies in Other States* (September 2010) [hereinafter *State Summary*].

² Keyes & Fox LLP, *Aggregated Net Metering in Arizona: Summary of Party Comments* (September 2010) [hereinafter *Comment Summary*].

II. IMPLEMENTING ANM IN ARIZONA—CONSISTENCY WITH EXISTING RULES

We begin by offering a foundational definition of ANM in an effort to bring the Commission and all parties to agreement about the basic parameters of ANM. We then explain the policy rationales for ANM and discuss the arguments against ANM. Next, we examine the text of Arizona’s current net metering rules. We conclude that ANM is not consistent with the existing rules and that a rulemaking would be necessary should the Commission decide to move forward with implementation of ANM under the rules. Finally, we offer possible implementation approaches the Commission might take in the interim. Ultimately, Staff recommends that the Commission move forward with a limited pilot program that includes active roles for the Commission, participating utilities, and participating customers. The proposed pilot envisions that the Commission would require the largest Arizona investor-owned utilities (IOUs)—Arizona Public Service Company (APS), Tucson Electric Power (TEP), and UNS Electric—to participate, and permit the State’s cooperatives to participate. Proponents of potential ANM projects that do not fit within the pilot program could propose those projects to a utility, and ultimately to the Commission, for approval through a special contract.

A. Definition of ANM

Before beginning a discussion of ANM, it is important to establish basic agreement about what ANM entails. In their comments, all parties agreed that ANM applies to one customer aggregating several meters or accounts.³ Parties also agreed that totalizing meters—summing the readings from multiple meters—would not be necessary for ANM.⁴ Although states offered programmatic definitions of ANM that varied, all of their program structures implied the same basic understanding of ANM. They all referred to one party aggregating multiple meters, and none mentioned meter totalizing.⁵

Beyond these essential points of agreement, however, parties expressed a variety of opinions about how an ANM program should be structured, just as states evidenced a variety of approaches to ANM. We address these more specific programmatic decisions in the balance of this report.

³ *Comment Summary, supra* note 2, at 2.

⁴ *Id.*

⁵ *State Summary, supra* note 1, at 1.

For the purposes of the proposed ANM pilot program described in this document, “aggregated net metering” is defined as an extension of Arizona’s existing net metering rules to allow one customer who owns a generating asset (using renewable resources, a fuel cell or CHP) and receives service on multiple meters on properties contiguous with the site of the customer’s generation asset to aggregate loads from those multiple meters so that the customer’s generation can offset kWh purchased from the utility for the aggregated load.

B. Policy Rationales for and against ANM

Parties raised various policy rationales to support implementation of ANM, as well as downsides to an ANM program. For example, in support of ANM, Pima County (Pima), the City of Tucson (Tucson), and the Vote Solar Initiative (Vote Solar) emphasized that ANM allows larger customers with multiple meters, such as municipalities, to take advantage of the benefits of net metering when their electrical load—e.g., urban or developed areas—is distant from their ideal renewable facility sites—e.g., landfills or large open lots.⁶ Arizona’s two largest IOUs—APS and TEP—stated that ANM would benefit some customers.⁷ In addition, Vote Solar stated in its comments that ANM removes the disincentive for energy efficiency for certain larger customers, e.g., agricultural or municipal customers, whose systems produce more than their on-site load.⁸

Several parties stated that another policy rationale for ANM is that it encourages and extends the various benefits of renewable energy generally.⁹ Pima said in its comments that Arizona’s promotion of renewable energy, in particular solar energy via net metering, brought a variety of benefits to the state, including environmental benefits, the avoided cost of additional infrastructure, and increased jobs available in the solar installation industry.¹⁰ Pima emphasized that permitting new customers to take advantage of net metering may allow for an increase in such benefits, although APS stated that it is not necessarily reasonable to conclude that the same benefits will result from an ANM situation

⁶ *Comment Summary*, *supra* note 2, at 4-5, 14-16.

⁷ *Id.* at 16-17.

⁸ *Id.* at 15.

⁹ *Id.* at 14-16.

¹⁰ *Id.* at 14 (referring largely to R.W. Beck, Inc., *Distributed Renewable Energy Operating Impacts and Valuation Study* (2009) (prepared for APS)).

as from a more highly distributed renewable generation situation.¹¹ In addition, according to Venture Catalyst, the larger projects that ANM would likely encourage will move the market for solar in a more significant way and have a larger beneficial impact.¹² Finally, according to Vote Solar and Pima, ANM would also extend participation in Arizona’s net metering program to participants for whom it might not otherwise be possible or reasonable to participate, such as municipalities.¹³

On the other hand, according to many parties—some in favor of ANM, and some against it—ANM implicates cost-recovery and cost-shifting issues.¹⁴ In particular, utilities were concerned about cost recovery for existing investments in distribution infrastructure if ANM customers were allowed to apply net-metering credits to their whole bills, and did not have to pay demand charges, fixed fees, and other components of a customer’s bill that help the utility to recover its investments in fixed capacity.¹⁵ The utilities stated that these charges and fees, in addition to any additional administrative or other costs due to ANM, would need to be recovered from program participants in order for the program to remain revenue-neutral.¹⁶ They predicted that such costs would otherwise have to be shifted to non-participating customers.¹⁷ The State’s cooperatives were particularly concerned about such cost shifting, given their relatively small customer base.¹⁸ Should the Commission choose to move forward with full implementation, the Commission should consider how to address these cost issues, possibly through program design and implementation.¹⁹

¹¹ *Id.* at 14, 16.

¹² *Comment Summary, supra* note 2, at 15.

¹³ *Id.* at 5, 14-15.

¹⁴ *Id.* at 9-12, 15-18.

¹⁵ *Id.*

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ *Comment Summary, supra* note 2, at 12, 17-18.

¹⁹ For example, utilities might ensure that the recovery of distribution system and other capacity costs are not shifted to non-participating customers by crediting only the kWh component of an ANM customer’s bill and not a customer’s demand charges. Net metering customers that take service on demand-charge rates typically do not offset a significant portion of their demand charges with on-site generation. Therefore, in this respect, ANM customers would be treated the same as other net-metering customers under demand-charge rates, with the same beneficial results.

Finally, according to Pima, ANM is a more efficient way, per Renewable Energy Standard and Tariff (REST) incentive dollar, to achieve Arizona’s renewable energy goals due to economies of scale.²⁰ On the other hand, utilities were concerned that the potential popularity of ANM, as well as the expense of ANM generation facilities, would draw on utilities’ already strained REST program budgets, as well as possibly interfere with the success of future programs like feed-in tariffs.²¹ The utilities emphasized their desire to ensure that existing net metering customers and new smaller-sized customers still have an opportunity to participate in Arizona’s net metering program.²² They stated that they might not be able to accomplish this goal if ANM were implemented.²³ On a related note, TEP and APS stated that if ANM falls under the current REST definition of distributed generation, then that definition might have to be revised.²⁴ In relevant part, the REST rules defines “distributed generation” as “electric generation sited at a customer premises, providing electric energy to the customer load on that site or providing whole sale capacity and energy to the local Utility Distribution Company for use by multiple customers in contiguous distribution substation service areas.”²⁵

While these may be legitimate concerns, they are beyond the scope of this report. It does not need to be resolved to determine whether ANM is consistent with existing net metering rules. For the reasons discussed below, we determine that ANM is not consistent with existing net metering rules.

C. Consistency of ANM with Arizona’s Current Net Metering Rules

Arizona’s existing net metering rules²⁶ do not expressly address ANM. Although the rules do not explicitly prohibit ANM, Staff believes that the current rules are inconsistent

As for the distribution costs of utilities that do not recover their capacity costs from demand charges, the Commission might consider adjusting the value of the kWh credit applied to a participating meter in order to address concerns about cost shifting.

²⁰ *Comment Summary, supra* note 2, at 14.

²¹ *Id.* at 16-17.

²² *Id.*

²³ *Id.*

²⁴ *Id.* at 12-13 (referring to ARIZ. ADMIN. CODE § R14-2-1801(E)).

²⁵ ARIZ. ADMIN. CODE § R14-2-1801(E).

²⁶ ARIZ. ADMIN. CODE §§ R14-2-2301–2308; *see also* ARIZ. ADMIN. CODE §§ R14-2-1801–1815 (Renewable Energy Standard and Tariff (REST) rules, which also do not address ANM).

with implementation of ANM. As such, a formal rulemaking appears necessary to move forward with implementation of ANM under the rules.

The current rules define net metering as a “service to an Electric Utility Customer under which electric energy generated by or on behalf of that Electric Utility Customer from a Net Metering Facility and delivered to the Utility’s local distribution facilities may be used to offset electric energy provided by the Electric Utility to the Electric Utility Customer during the applicable billing period.”²⁷ This definition makes no mention of additional customer meters, which could imply that an ANM situation with multiple meters was not considered as part of net metering when the rules were promulgated. Therefore, a rulemaking would be necessary in order to incorporate ANM into the rules prior to ANM implementation under the rules.

In a related provision, the current rules define a net metering facility as an electricity-producing facility that: “(a) Is operated by or on behalf of a Net Metering Customer and is located on the Net Metering Customer’s premises; (b) Is intended primarily to provide part or all of the Net Metering Customer’s requirements for electricity; (c) Uses Renewable Resources, a Fuel Cell, or CHP to generate electricity; (d) Has a generating capacity of less than or equal to 125% of the Net Metering Customer’s total connected load . . .; and (e) Is interconnected with and can operate in parallel and in phase with an Electric Utility’s existing distribution system.”²⁸ In some ways, this definition appears to allow for ANM. It speaks in terms of a customer’s relationship with his utility with respect to that customer’s “requirements for electricity” and “total connected load,” not with respect to any particular customer meter. A customer’s generation facility must be on the customer’s “premises”²⁹ under the current definition, which would be true for ANM as well. However, like the definition of net metering, the definition of net metering facility makes no mention of a customer having multiple meters, or in particular where those meters might be located. Therefore, it similarly could imply that ANM was not contemplated when the rules were promulgated, and a rulemaking would be necessary in order to implement ANM under the rules.

²⁷ ARIZ. ADMIN. CODE § R14-2-2303, R14-2-2302(11).

²⁸ ARIZ. ADMIN. CODE §§ R14-2-2303, R14-2-2302(13).

²⁹ Premises is defined elsewhere in the electric utilities portion of the code as “[a]ll of the real property and apparatus employed in a single enterprise on an integral parcel of land undivided by public streets, alleys or railways.” ARIZ. ADMIN. CODE § R14-2-201(33).

Finally, the current net metering provision that details the billing process for net metering does not adequately accommodate ANM.³⁰ Rather, ANM would require its revision. Specifically, certain subsections of the billing provision—namely subsections A through E—appear to apply to a single meter of a participating customer.³¹ For example, Subsections A through D speak of a customer’s rate schedule and billing period in the singular, implying that a customer would only be net metering a single meter. Similarly, Subsection E regarding time-of-use rates appears to consider only a single meter on a time-of-use rate schedule. None of the net metering billing provision’s sections contain language mentioning or alluding to multiple meters, or language describing the meter aggregation process or how the utility should allocate kWh credits across meters. Therefore, these sections appear not to contemplate ANM, and would need to be revised in a rulemaking in order for ANM to be implemented under the net metering rules.

In addition, APS stated in its comments that the Commission generally adheres to its traditional rule of “one meter – one bill,”³² as described in the Electric Utilities section of the Arizona Administrative Code. That section reads, “[e]ach meter at a customer’s premise will be considered separately for billing purposes, and the readings of two or more meters will not be combined unless otherwise provided for in the utility’s tariffs.”³³ That is, the rule explicitly does not allow a utility to combine meter readings and bills for two or more meters, absent Commission-approved tariffs that allow them to do so. However, all states with formal ANM programs require allocating credits separately among multiple meters, and do not use the summary billing approach described by this rule.³⁴ Therefore, this rule may not be relevant to our discussion of ANM here.

Nevertheless, Arizona’s existing net metering rules are not consistent with implementation of ANM, as described above. Therefore, the Commission would need to undertake a rulemaking to move forward with implementation under the rules.

³⁰ ARIZ. ADMIN. CODE §§ R14-2-2303, R14-2-2306.

³¹ The remaining subsection, Subsection F, appears to apply to the customer, regardless of his number of participating meters. It describes the “truing up” process for total outstanding kWh credits at the end of the year—the utility must issue a check or billing credit to the customer for the customer’s balance.

³² *Comment Summary*, *supra* note 2, at 13 .

³³ ARIZ. ADMIN. CODE §§ R14-2-210(b)(1).

³⁴ *See State Summary*, *supra* note 1, at 10-11.

D. Recommended Approach for ANM in Arizona

The Commission has at least three options for ANM implementation: (1) full implementation under Arizona’s net metering rules; (2) limited implementation under Arizona’s net metering rules; or (3) a pilot program based on the Commission’s authority to issue a waiver of its rules for programs approved via a Commission Order. As discussed in the section above, Staff believes that both full and limited implementation would require a rulemaking in order to adopt net metering rules that accommodate ANM.

Recommendation: The Commission should move forward with a pilot program for ANM, with active roles for the Commission, participating utilities, and participating customers. The Commission should require pilot program participation by Arizona’s three IOUs—APS, TEP, and UNS Electric—and permit voluntary participation by Arizona’s cooperatives.

In this way, the Commission can investigate ANM in a flexible framework, test its benefits, and collect data for a potential rulemaking and future program implementation. In particular, Staff recommends that the Commission provide the basic guidelines for the pilot program as described in the ANM Programmatic Recommendations section below. Utilities would then propose their own individual programs within the Commission’s guidelines to the Commission for its approval. Finally, individual project proponents would apply to utilities to be part of their pilot programs. Utilities would decide independently whether or not to allow a particular project to participate. If a potential project does not fit within our suggested parameters for the pilot program, the project proponent could propose the project to a utility, and ultimately to the Commission, for approval through a special contract.

III. ANM PROGRAMMATIC RECOMMENDATIONS

As mentioned above, we have grouped our programmatic recommendations for our suggested pilot into four categories based on the main issues that emerged from our research into other states’ policies, and from parties’ oral and written comments. These four categories are: eligibility requirements for participation in ANM; technical requirements for participating customers and utilities; administration of an ANM program; and how to address the costs of ANM, and cost shifting in particular. For each of our recommendations, we provide our rationale, along with some context, including related policies in other states and parties’ positions on the relevant issues. We also explain our

suggested roles for the Commission, the participating utilities, and the participating customers for each recommendation.

A. Eligibility Requirements

The eligibility requirements that emerged as most central to ANM in our analyses were: eligible customer classes; eligible tariffs, and in particular whether meters on multiple tariffs might be eligible; system size or overall capacity restrictions; and geographic limitations with regard to the distance between generation and load.

1. Eligible customer classes

Recommendation: The Commission should allow only governmental and agricultural customers to participate in its pilot ANM program.

The majority of states with formal ANM programs permit all customer classes to participate in their net metering programs, including ANM.³⁵ Similarly, Arizona's current net metering rules similarly allow all end-use retail customers to participate in net metering,³⁶ and parties agreed in their written and oral comments that all customer classes should be eligible for ANM, as well.³⁷ However, several parties acknowledged that commercial, agricultural, and municipal customers would likely derive the most benefit from ANM, since residential customers rarely receive service through multiple meters.³⁸ Therefore, Staff recommends that the Commission permit only governmental and agricultural customers to participate in ANM for its initial pilot effort. In this way, two of the customer classes that would benefit most from ANM can test implementation of ANM in Arizona. Such an approach is aligned with Rhode Island's and California's ANM programs, which are limited to local government customers, and New Jersey's pilot ANM program, which is limited to agricultural customers.³⁹

³⁵ *Id.* at 3.

³⁶ ARIZ. ADMIN. CODE §§ R14-2-2303, R14-2-2302(7), (11), (12).

³⁷ *Comment Summary*, *supra* note 2, at 3.

³⁸ *Id.*

³⁹ *Id.*

2. Eligible tariffs

Recommendation: The Commission should permit all tariffs to participate in its pilot ANM program.

As with customer classes, the majority of states with formal ANM programs permit all tariffs to participate in net metering, including ANM.⁴⁰ Arizona’s current net metering rules follow suit—they do not specify a particular tariff or tariffs for net metering, generally.⁴¹ Most parties that commented on the subject—namely Pima, Vote Solar, and APS—stated that participating customers could be on any tariff.⁴² Such an approach appears fair and makes sense to Staff. Therefore we recommend that the Commission permit all tariffs to participate in its pilot ANM program.

Recommendation: The Commission should allow each participating utility to decide whether or not to require a pilot program customer to have all of his participating meters on the same tariff.

The Commission did not receive substantial feedback as to whether or not a pilot program customer’s participating meters should all be on the same tariff. Only TEP said that meters should all be on the same tariff to make ANM easier and less costly to administer.⁴³ As for states with formal ANM programs, two states require that all participating meters be on the same tariff, whereas the majority permit, or appear to permit, participating meters to be on different tariffs. Given the absence of consensus among parties and states, we recommend that the Commission leave this issue to utilities, and allow them to make the decision on a project-by-project basis.

⁴⁰ *State Summary*, *supra* note 1, at 3.

⁴¹ ARIZ. ADMIN. CODE §§ R14-2-2303, R14-2-2302(7), (11), (12).

⁴² *Comment Summary*, *supra* note 2, at 3. We note that TEP stated that retail tariffs should not be used for ANM at all, since they do not permit adequate cost recovery for utilities.

⁴³ *Id.*

3. Capacity restrictions

Recommendation: The Commission should apply the generation capacity restriction in the current net metering rules—125 percent of a participating customer’s total connected load—to its pilot ANM program.

Parties generally agreed in their comments that system size would be limited by physical and technical conditions, as well as cost.⁴⁴ For example, the size of a customer’s rooftop or site would limit the size of the solar system that customer could install. Similarly, the cost of a system less the incentives that a customer might receive for that system would affect his decisions about what size system that customer would install. In addition, Arizona’s current net metering rules cap system size at 125 percent of a participating customer’s “total connected load.”⁴⁵ Such a limitation is similar to the approach taken by Delaware, which caps ANM system size at 110 percent of an ANM customer’s aggregate electrical consumption across that customer’s aggregated meters.⁴⁶ Applying the same 125-percent limitation to ANM customers would ensure that all customers’ generation facilities are sized appropriately to meet the aggregate demand on participating meters. Therefore, staff recommends that the Commission apply the 125-percent cap to ANM systems.

Recommendation: The Commission should require each participating utility to propose a cumulative capacity limitation and an ANM system-size limitation for that utility’s particular ANM program. The Commission would be able to approve the proposed limitations before the utility could move forward with its ANM program.

For both system-size and capacity restrictions, all states have applied the same rules to ANM as apply to regular net metering, but their approaches and specific limitation choices varied.⁴⁷ Arizona’s current net metering rules offer no guidance here since they contain neither an absolute system-size nor a cumulative capacity restriction. Similarly, parties did not offer comments on this issue. Therefore, Staff recommends that the

⁴⁴ *Comment Summary, supra* note 2, at 3-4.

⁴⁵ ARIZ. ADMIN. CODE § R14-2-2302(13)(d).

⁴⁶ *State Summary, supra* note 1, at 7.

⁴⁷ *Id.*

Commission look to each utility for a proposed cumulative capacity limitation and ANM system-size limitation for that utility's individual ANM program. The Commission can then assess whether it finds the proposed limitations to be reasonable, and either approve, reject, or modify them.

4. Geographic restrictions

Recommendation: For the ANM pilot programs, the Commission should limit the distance between an ANM customer's generation facility and that customer's participating meters to the same property or contiguous properties.

The geographic distance between customer generation and participating meters emerged as one of the most controversial issues for parties. Parties' positions on geographic restrictions for ANM related closely to their positions on the cost of ANM, particularly its distribution costs, as well as its impacts on utilities' cost recovery. APS and TEP advocated for requiring an ANM generation facility to be on the same property as participating meters or on a contiguous property.⁴⁸ The IOUs emphasized that an ANM customer with a generating facility on a separate, non-contiguous property from his load would incur distribution costs that all ratepayers would ultimately have to pay.⁴⁹ Other parties, including Pima and Vote Solar, believed no such limits were necessary, as long as the generation facility and participating meters were within a single utility's service territory.⁵⁰ In this way, according to at least Pima and Vote Solar, entities such as municipalities can take advantage of ideal renewable generation sites that are far away from their load centers.⁵¹

Not surprisingly, given the controversy in Arizona, other states have taken varying approaches to geographic restrictions in their ANM programs. Two of the states with formal ANM programs surveyed require the generating facility and all meters to be on the same property or contiguous properties.⁵² Two other states require they be only in the

⁴⁸ *Comment Summary, supra* note 2, at 5.

⁴⁹ *Id.* at 5, 9-10, 16-17.

⁵⁰ *Id.* at 5.

⁵¹ *Id.* at 5, 9-10, 14-15.

⁵² *State Summary, supra* note 1, at 7-8.

same utility's service territory.⁵³ The remaining two states with specific requirements occupy a range between these two approaches.⁵⁴

Given the lack of consensus among states and among parties, and the limited pilot program approach that we have suggested, Staff recommends that the Commission restrict ANM to the same property or contiguous property. Once the Commission, utilities, and customers understand more fully how ANM functions within these geographical restrictions, the Commission can decide whether or not to expand ANM geographically, perhaps in a future rulemaking proceeding.

B. Technical Requirements

Recommendation: The Commission should apply the technical requirements—in particular, the meter, equipment, and interconnection requirements—under Arizona's current net metering rules to its ANM pilot program.

Regarding major technical issues, e.g., metering, equipment, and interconnection, ANM does not appear to be different from regular net metering. All states with formal ANM programs have the same meter, equipment, and interconnection requirements for ANM as for regular net metering.⁵⁵ Regarding interconnection, the Arizona IOUs ultimately agreed that existing interconnection procedures for net metering would adequately address any reliability or safety concerns that ANM might raise.⁵⁶ As for metering and equipment requirements, parties were generally hesitant to state firm opinions, since the exact parameters of an Arizona ANM program are not yet known.⁵⁷ Nonetheless, several stated that most sites with participating meters would require only a single-direction meter, whereas the site with the generation facility would likely require a bi-directional meter, at least if the facility served any on-site load.⁵⁸ Such requirements are in line with Arizona's

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ *Id.* at 8-9.

⁵⁶ *Comment Summary, supra* note 1, at 7; *see* ARIZ. ADMIN. CODE §§ R14-2-1811, R14-23-2302(13)(e) (existing Arizona interconnection procedures).

⁵⁷ *Comment Summary, supra* note 1, at 5-6.

⁵⁸ *Id.*

existing metering and equipment rules, which require that the meter on a customer's generation facility must be bi-directional but make no statement about any other participating meters (since other participating meters were not contemplated).⁵⁹

C. Program Administration

The program administration issues that emerged as most central to ANM in our analyses were: the process for designating participating meters; the process for changing participating meters; and the process for allocation of excess generation credits among multiple meters, including the order in which to do so and the component(s) of the bill to which to apply such credits.

1. Designation of participating meters

Recommendation: The Commission should permit a customer to aggregate an unlimited number of that customer's meters, and should allow that customer to designate which meters to aggregate, within any limits that a utility is permitted to set, e.g., tariff restrictions.

ANM programs in all states contemplate a single customer (versus multiple customers) aggregating multiple meters, and all states permit customers to designate participating meters.⁶⁰ All Arizona parties indicated acceptance of this approach.⁶¹

Similarly, most parties agreed that the number of participating meters should be unlimited, and only two states offer specific limits to participating meters.⁶² Staff recommends that the Commission allow a customer to designate an unlimited number of participating meters. We base our recommendation on the near consensus among commenting parties, and on utilities' ability to limit participating meters in other ways, e.g., via requiring all participating meters to be on contiguous property.

⁵⁹ See ARIZ. ADMIN. CODE § R14-2-2304 (existing Arizona meter requirements).

⁶⁰ *State Summary*, *supra* note 1, at 1, 9.

⁶¹ *Comment Summary*, *supra* note 2, at 2.

⁶² *Id.* at 8; *State Summary*, *supra* note 1, at 9.

2. Change of participating meters

Recommendation: The Commission should permit utilities to decide how frequently ANM customers may change their participating meters and what notice to require from customers. However, the Commission should require utilities to allow such changes at least every six months.

Although parties disagreed on the appropriate time period for allowing changes to participating meters, no party offered a substantive rationale that could guide our recommendation.⁶³ Most states do not specify the permissible time period for making changes to participating meters, though three states require that the customer give the utility adequate notice before making the change, either 60 or 90 days depending on the state.⁶⁴ Staff recommends allowing utilities to decide the appropriate frequency for changes to participating meters, and whether or not to require some sort of advance notice from participating customers. We base our recommendation on utilities' understanding of their own administrative needs. However, Staff also recommends that the Commission require utilities to allow ANM customers to make participating meter changes at least every six months in order to permit customers to have at least some degree of flexibility.

3. Allocation of excess generation credits to multiple accounts

Recommendation: The Commission should require a utility to allocate any excess generation credits to the meter connected to the renewable generation facility first, and then to the other participating meters.

All states with formal ANM programs require utilities to allocate credits first to the meter attached to the generation account and then to participating meters,⁶⁵ and we recommend that the Commission take the same approach. Our recommended approach does not require customers to have on-site demand—that is, demand at customer generation facility's meter—in order to participate in ANM, as Arizona IOUs advocated.⁶⁶ However, if such on-site demand exists, our recommended approach requires customers to

⁶³ *Comment Summary, supra* note 2, at 8.

⁶⁴ *State Summary, supra* note 1, at 9-10.

⁶⁵ *Id.* at 10-11.

⁶⁶ *Comment Summary, supra* note 2, at 5.

apply excess generation credits to the generation account's meter first, and then to other participating meters. Although parties did not address this issue directly, all of their suggested approaches to credit allocation could accommodate it.⁶⁷ Furthermore, parties generally agreed that an ANM customer could meet at least some on-site demand with a net-metering generation facility.⁶⁸

Recommendation: The Commission should permit utilities to decide how to allocate excess generation credits among a customer's participating meters.

States with formal ANM programs are split as to how to allocate excess generation credits among participating meters, as were commenting parties. The two approaches that states use are either to allocate credits equally among participating accounts, or to allow customers to rank their participating meters in some way.⁶⁹ Parties offered both of these approaches as suggestions. Vote Solar and Pima suggested that customers could rank their participating meters, or allocate credits however they would prefer, whereas TEP suggested that the utility could allocate credits equally among a customer's participating meters.⁷⁰ In addition, Pima and APS suggested different types of summary billing, which would not require allocation, but instead would require the utility to sum all of the customer's meters under one bill, or multiple bills according to tariff.⁷¹ If a utility chooses to implement a summary billing approach, it would likely need special Commission permission under the traditional "one meter – one bill" rule to revise its tariffs to explicitly allow for it.⁷² This additional step may be a disincentive for utilities to choose this approach for allocation.

Given the lack of consensus among states and among parties, and in particular the disagreement between TEP and APS, Staff recommends that the Commission allow participating utilities to decide how to allocate excess generation credits. As noted above, utilities have a better understanding of their own administrative requirements and

⁶⁷ See *id.* at 8-9.

⁶⁸ *Id.* at 5.

⁶⁹ *State Summary, supra* note 1, at 10-11.

⁷⁰ *Comment Summary, supra* note 2, at 8-9.

⁷¹ *Id.*

⁷² See ARIZ. ADMIN. CODE §§ R14-2-210(b)(1). See Section II.C above for a more detailed discussion of the "one meter – one bill" rule.

preferences, and therefore they are the best entity to make this type of decision within our suggested pilot framework.

Recommendation: The Commission should require that utilities credit only the kWh component of an ANM customer's bill, if the customer's utility breaks out such a component.

In order to address parties' concerns related to cost recovery and cost shifting, Staff recommends that the Commission require utilities to credit only the kWh component of an ANM customer's bill, in order to ensure that the customer continues to pay the full demand component and other non-energy charges. This recommendation mirrors what all other states with formal ANM programs require.⁷³ Arizona's current net metering rules similarly require only an excess kWh credit.⁷⁴ In making this recommendation, we acknowledge that TEP has indicated that it does not unbundle its rates for many of its customers, including municipal customers; rather, in these cases, it recovers some or all of its costs in its kWh rate.⁷⁵ We discuss related cost-recovery and cost-shifting concerns in more detail in the Program Costs section below.

D. Program Costs

Cost issues, especially cost shifting and cost recovery, emerged as some of the more contentious issues that parties raised in their comments, as discussed above in the Implementing ANM in Arizona section. Parties' stances on the costs of ANM were closely connected to their views on the extent to which the distribution system would be impacted by ANM and how distant ANM generation could be from participating meters, as well as by their opinion on the administrative costs that would result from ANM implementation. In addition, as discussed above, TEP does not recover its capacity costs from demand-based rates.⁷⁶ Therefore, the process for allocating excess generation to the kWh component of an ANM customer's bill does not adequately address TEP's cost-recovery and cost-shifting concerns, in particular. Similar cost concerns appear to have arisen in other states with

⁷³ *State Summary, supra* note 1, at 11-15.

⁷⁴ *See* ARIZ. ADMIN. CODE § R14-2-2306(C)-(E).

⁷⁵ *Comment Summary, supra* note 2, at 10.

⁷⁶ *Id.*

formal ANM programs, as every state addresses them explicitly.⁷⁷ However, states have taken varying approaches, some more detailed than others.

Staff's suggested pilot program for ANM should help the Commission to assess the magnitude of these issues in reality. In addition, the pilot program should provide the Commission with at least some of the necessary information to address cost issues if the Commission decides to move forward with a rulemaking and ANM implementation in the future. At that point, the Commission could decide whether or not the cost issues raised are serious enough to merit concrete remedies. For example, the Commission could choose to allow utilities to adjust the value of the kWh credit applied to the participating meter in order to address cost-recovery and cost-shifting concerns. Such an adjustment would allow utilities to recoup distribution, administrative, and other appropriate costs as the Commission deems appropriate. The Commission could calculate the value of the adjustment based on its experience in the pilot program and on feedback from utilities. For the time being, in this pilot program stage, Staff does not recommend that the Commission take any additional action regarding cost issues beyond data collection.

IV. CONCLUSION—AGGREGATED NET METERING IN ARIZONA

Staff believes that ANM is not consistent with Arizona's existing net metering rules. Therefore, the Commission would have to undertake a formal rulemaking to implement ANM under the rules. Instead, Staff recommends that the Commission adopt a pilot program for ANM. We base our recommendation on our analysis of Arizona's existing net metering rules, along with comments from parties,⁷⁸ activity in other states,⁷⁹ and our understanding of policy rationales related to ANM. Specifically, we recommend a flexible framework in which the Commission provides basic guidelines for utilities to move forward with their own independent ANM pilot programs. Appendix A contains a summary of our programmatic recommendations. If a particular project does not fit within the pilot program parameters that the Commission chooses to adopt, it could still move forward by special contract.

⁷⁷ *State Summary, supra* note 1, at 11-15.

⁷⁸ *Comment Summary, supra* note 2.

⁷⁹ *State Summary, supra* note 1.

APPENDIX A: SUMMARY OF RECOMMENDATIONS

Implementation Approach

- The Commission should move forward with a pilot program for ANM, with active roles for the Commission, participating utilities, and participating customers. The Commission should require pilot program participation by Arizona’s three IOUs—APS, TEP, and UNS Electric—and permit voluntary participation by Arizona’s cooperatives.

Eligibility Requirements

- **Eligible customer classes:** The Commission should allow only governmental and agricultural customers to participate in its pilot ANM program.
- **Eligible tariffs:** (1) The Commission should permit all tariffs to participate in its pilot ANM program. (2) The Commission should allow each participating utility to decide whether or not to require a pilot program customer to have all of his participating meters on the same tariff.
- **Capacity restrictions:** (1) The Commission should apply the generation capacity restriction in the current net metering rules—125 percent of a participating customer’s total connected load—to its pilot ANM program. (2) The Commission should require each participating utility to propose a cumulative capacity limitation and an ANM system-size limitation for that utility’s particular ANM program. The Commission would be able to approve the proposed limitations before the utility could move forward with its ANM program.
- **Geographic restrictions:** For the ANM pilot programs, the Commission should limit the distance between an ANM customer’s generation facility and that customer’s participating meters to the same property or contiguous properties.

Technical Requirements

- The Commission should apply the technical requirements—in particular, the meter, equipment, and interconnection requirements—under Arizona’s current net metering rules to its ANM pilot program.

Program Administration

- **Designation of participating meters:** The Commission should permit a customer to aggregate an unlimited number of that customer’s meters, and should allow that customer to designate which meters to aggregate, within any limits that a utility is permitted to set, e.g., tariff restrictions.
- **Change of participating meters:** The Commission should permit utilities to decide how frequently ANM customers may change their participating meters and what notice to require from customers. However, the Commission should require utilities to allow such changes at least every six months.
- **Allocation of excess generation credits to multiple accounts:** (1) The Commission should require a utility to allocate any excess generation credits to the meter connected to the renewable generation facility first, and then to the other participating meters. (2) The Commission should permit utilities to decide how to allocate excess generation credits among a customer’s participating meters. (3) The Commission should require that utilities credit only the kWh component of an ANM customer’s bill, if the customer’s utility breaks out such a component.

Program Costs

- For the time being, in this pilot program stage, Staff does not recommend that the Commission take any additional action regarding cost issues beyond data collection.

APPENDIX B: SUMMARY OF ANM ACTIVITY IN OTHER STATES

ANM status		Eligible customers	Eligible tariffs	System capacity limit	Cumulative capacity limit	Geographic location	ANM admin limits	Allocating credits	Crediting of excess generation to bill	Additional fees
CA	Full program	Local government	All must be TOU	ANM = 1 MW	250 MW within 3 major IOU's service territories	W/in geographical boundaries of local government	Only 50 accts; can change once/year w/ 60 days notice	By customer percentage	Only to kWh component	\$500 one-time set-up fee; \$30 monthly billing fee
OR	Full program	All	Any but must be the same	Res = 25 kW Non-res = 2 MW	None	Same property or contiguous property		By customer ranking	Only to kWh components of full retail rate	For additional meters/equipment required; permitted to request admin fee
PA	Full program	All	Any	Res. = 50 kW Non-res = 3 MW, up to 5 MW	None, except no "adverse impact"	W/in 2 miles of generation	Can change w/ 60 days notice	Equally	To full retail rate, excluding monthly charges, e.g., demand charges	For meter/equipment upgrades; any incremental aggregation costs; potential stranded cost recovery fee
RI	Full program	Cities, towns, etc.	Appears to be any	General = 1.65 MW City/town location = 2.25 MW City/town owned = 3.5 MW	2% of peak load; 1 MW reserved for projects < 25 kW		Only 10 accts		Only to kWh charges	Reasonable compliance costs aggregated on annual basis into per-kWh surcharge
WA	Full program	All	Any	All = 100 kW	0.25% of 1996 peak demand (will increase to 0.5% in 2014)	Utility service territory		Equally	Only to kWh component	Standard monthly charge; meter/equipment upgrades; permitted to request additional fee, e.g., aggregation basic charge
WV	Full program	All	Appears to be any	Res = 25 kW Comm = 500 kW Indus = 2 MW Muni/coop = 50 kW	3% of aggregate peak demand in previous year; 0.5% reserved for residential	Same property or contiguous property but w/in 2 miles of generation		Equally	To rate excluding any charges not related to energy consumption, e.g., demand charges	Meter/equipment costs and other system upgrade costs
DE	Statute passed; rules pending	All	Any	Res = 25 kW Ag/muni = 100 kW Non-res = 500 kW or 2 MW + 110% avg load	5% of peak demand	Utility service territory	Can change once/year w/ 90 days notice	By customer ranking	Res = to sum of charges Non-res = to kWh components of sum of charges	For additional meters/equipment required; permitted to request cost-recovery fee
NJ	Pilot program	Agricultural	Appears to be any			Same property				
CT	Considering	Agricultural, municipal, non-profit?								
MD	Considering									

**AGGREGATED NET METERING IN ARIZONA:
SUMMARY OF PARTY COMMENTS**

Arizona Corporation Commission

SEPTEMBER 30, 2010

Second Consultant Report

KEYES & FOX, LLP

I. INTRODUCTION TO PARTY COMMENTS

In an effort to gauge stakeholder interest in aggregated net metering (ANM) and to analyze issues related to the potential implementation of an ANM policy, the Arizona Corporation Commission (Commission) solicited written comments and held a September 1, 2010 workshop. This document is a summary of written comments submitted to the Commission and substantive oral comments made during the workshop. It is intended to provide the Commission with the basic positions of all interested stakeholders regarding key issues related to ANM.

Parties that submitted written comments included:

- Pima County (Pima)¹
- Vote Solar Initiative (Vote Solar)
- Arizona Electric Power Cooperative, Inc., Southwest Transmission Cooperative, Inc., Duncan Valley Electric Cooperative, Inc., Graham County Electric Cooperative, Inc., Mohave Electric Cooperative, Inc., Navopache Electric Cooperative, Inc., Trico Electric Cooperative, Inc., and Sulphur Springs Valley Electric Cooperative, Inc. (Cooperatives)
- Mohave Electric Cooperative, Inc., and Navopache Electric Cooperative, Inc. (Mohave/Navopache)
- UNS Electric, Inc., and Tucson Electric Power Company (TEP)
- Arizona Public Service (APS)
- Wal-mart Stores, Inc., and Sam's West, Inc. (Walmart)

Parties that provided substantive oral comments during the workshop included:

- Commissioner Newman
- Commission Staff (Staff)
- Pima
- Cooperatives
- Mohave/Navopache
- TEP
- APS

¹ The current summary does not include comments from the letter that Pima filed on September 23, 2010.

- Association of Municipal Power Users (AMPUA)
- Robert Orsello—electrical engineer who designs community solar systems
- City of Tucson (Tucson)
- City of Oro Valley (Oro Valley)
- Venture Catalyst, Inc.—consulting firm specializing in project development

A list of all workshop participants can be obtained from the Commission.

Comments have been organized into categories based on key issues raised by participants. First, this summary discusses the definition of ANM, in order to establish a common starting point. Next, the summary discusses areas of disagreement among the parties, including eligibility for ANM, and technical, administrative and cost issues. In addition, the summary lays out two legal issues raised by participants—the possible need to modify Arizona’s net metering rules, and the use of solar service agreements (SSAs) for ANM systems under Arizona law. Finally, the summary covers some concluding ideas expressed by parties related to the potential impacts of ANM in Arizona and what a future ANM program might look like. Ultimately seven of the parties that commented, either orally or in writing, generally supported implementing ANM. APS and TEP opposed implementation, but nonetheless provided comments regarding aspects of ANM, should the Commission choose to move forward with a program. However, APS and TEP specified that if the Commission implements ANM, it should do so with a limited pilot program. The Cooperatives and Mohave/Navopache did not support or oppose ANM, stating that further study was needed before they could take a position, though they also provided input on some key elements of ANM.

II. DEFINING AGGREGATED NET METERING

Parties offered a range of definitions for ANM and its sister programs—virtual net metering, community net energy metering, and community choice aggregation. Parties also offered various goals that ANM might achieve, such as cost effectively promoting solar energy, increasing jobs, and increasing participation in solar programs. However, parties consistently described ANM as applying to one customer aggregating several meters or accounts, although Vote Solar indicated that the Commission might want to reassess the definition of ANM in the future. Parties also agreed that totalizing meters would not be necessary for ANM.

The comment summary below illustrates the primary areas of disagreement between parties regarding ANM, namely eligibility requirements for a potential program, as well as technical, administrative, and cost issues. Parties also raised some legal issues, which are described further below.

III. ELIGIBILITY REQUIREMENTS FOR ANM

A. Customer Classes and Tariffs

Parties generally agreed that all customer classes should be eligible for ANM. Some parties acknowledged, however, that commercial, agricultural, and municipal customers would likely derive the most benefit from ANM. Residential customers rarely receive service through multiple meters. Several parties commented on related cost-recovery and cost-shifting issues, which are discussed in more detail in the Costs section below.

Parties disagreed, however, whether customers had to be on a particular tariff, and whether all of a customer's accounts had to be on the same tariff versus multiple tariffs.

Pima, Vote Solar, and APS all stated that customers could be on any tariff, and that a customer's accounts could be on multiple tariffs. Both Pima and APS suggested the idea of summary billing, where accounts would be summed by tariff for billing purposes. APS also pointed out that for administrative simplicity, it might be easier to separate non-residential accounts from residential accounts, if any residential accounts ended up participating in an ANM program.

Conversely, TEP stated that ANM should not use current retail tariffs. According to TEP, its present retail rate structure is not designed to properly recover costs in an ANM context, as discussed in more detail below. If retail tariffs are used, however, TEP said that all of a customer's accounts should be on the same tariff, since multiple tariffs make calculations regarding aggregation and allocation substantially more difficult.

B. System Size

Parties offered varying opinions on the size of a system that should or should not be eligible for an ANM program, with varying degrees of specificity. No party addressed minimum system size; instead, all focused on maximum size. Pima commented that system size would be constrained by physical and technical conditions and requirements, e.g., a system could not exceed the capacity of an interconnection point. Pima pointed out that

larger systems would be less costly, due to economies of scale, and would therefore require lower levels of performance-based incentive (PBI) funds. Pima suggested controlling system size by limiting the PBI available per customer, which would in turn promote efficiency in the use of Renewable Energy Standard and Tariff (REST) program dollars. Pima also said that system size, as well as geographic location, were not relevant to the definition of distributed generation or net metering—even utility-scale projects could be eligible as long as they were customer-generated.

Tucson pointed out that there are smaller projects, e.g., one or two megawatts (MW), that could benefit from ANM, such as solar panels on a warehouse or landfill site with minimal load that could generate power for other buildings or locations. Tucson said that it wants the ability to make more choices internally at the city level without being constrained by current net metering rules and programs.

TEP pointed to technical constraints similar to those Pima described. TEP also commented that system size would be driven by costs, and emphasized its concerns about cost-shifting issues, which are discussed in more detail below. TEP cautioned that parties must take care in defining total load and what it entails, and in differentiating between energy and capacity.

Both Vote Solar and APS offered more specific opinions on system size. Vote Solar suggested using the size limitations in the current net metering rules—125 percent of a customer’s annual load—but applying them in an aggregated fashion, i.e., as if each designated meter could accommodate an on-site system that meets current net metering requirements and then aggregating those meters to allow a single system to meet 125 percent of the aggregated load on the meters. APS stated that systems should not exceed one hundred percent of annual historical consumption for all buildings on a customer’s single premises. APS also pointed out that under REST rules systems must be less than two MW.

C. Geographic Location—Generation in Relation to Load

Parties exhibited significant disagreement over the appropriate location of an ANM generation facility in relation to the load that facility would be serving. As discussed in more detail below in the Costs section, the geographic requirements of ANM relate closely to its costs, particularly its distribution costs, and possibly its transmission costs as well.

On one hand, Pima and Vote Solar believe that ANM load should be permitted in separate geographic locations from generation, as long as all locations are within the same utility service territory. Pima further narrowed this limitation to the same distribution grid. Both Vote Solar and Pima pointed to the problem that many municipalities face—their loads are in one, or several, location(s) whereas properties ideal for solar are in a separate location from that load. Mr. Orsello added that his company had interviewed 25 municipalities last year regarding their opinions on solar. He said municipalities were generally interested in participating in solar programs that would allow them to get state and federal incentives, and also to take control of power production and create some additional revenue through producing their own energy. He noted, however, that without ANM, these sorts of projects cannot move forward. APS disagreed and said municipalities could participate in solar programs without ANM, and in fact APS believes that ANM raises some major legal issues, as discussed in more detail below.

On the other hand, APS and TEP advocated for a more limited geographic scope. TEP suggested that all ANM meters, including the meter attached to the generation facility, should be on contiguous properties. Moreover, APS stated that all meters should be on a single premises, which it defined as a single property or contiguous properties under identical ownership and generally not separated by a public or private right-of-way. Both APS and TEP supported their statements by referring to the distribution costs, and possibly transmission costs, that they said may result from separating generation from load.

Pima, Vote Solar, Mr. Orsello, APS, and TEP agreed that under an ANM program a generator could serve on-site demand, with monthly excess allocated to other accounts. In addition, both APS and TEP stated that a generator should serve some on-site demand, i.e., that the generation site should have some load, and TEP said that it must do so under the current net metering definition.

IV. TECHNICAL ISSUES

A. Meters and Other Equipment

Parties generally indicated that metering and equipment needs would depend on the exact parameters of a future ANM program. Pima, Vote Solar, and APS stated that a single-direction meter would be required at all sites except for potentially the generation site, where a bi-directional meter would be necessary if the generator served some on-site

load. Therefore, the potential for meter upgrades would be site- and program- dependent, and may be unnecessary in some cases.

Pima stated that ANM may present an opportunity to update equipment to allow for wireless Internet monitoring of generation, which could help to promote Smart Grid capabilities, and could provide utilities with important real-time data. APS noted that it has already had to make certain technological improvements for its community solar pilot, which may or may not be helpful to ANM. Mohave/Navopache indicated that they are in the midst of installing Smart Grid components and software, but that they were not sure whether ANM would require additional meters and equipment.

Mohave/Navopache also noted a potential for major technical changes and upgrades, including to meters and other equipment, as well as to computer systems and software. TEP similarly stated that upgrades to meters and other equipment, e.g., transformers and other hardware, may be necessary and may ultimately be extensive, depending on the exact contours of an ANM program.

Walmart submitted a specific request for competitive metering, which it said would ensure that customers could install their own qualifying meters, rather than rely on those provided by a utility. Walmart stated that this would allow for expanded customer choice, and would allow customers to take advantage of real-time energy management and provide other benefits.

B. Impact on Load Research, Cost Allocation, and Rate Design

Vote Solar anticipated very little impact on these areas beyond the existing effects of traditional net metering. Other parties, however, foresaw various impacts. Comments related to the costs of these impacts are described briefly here, and in more detail in the Costs section below.

Pima said that ANM would provide valuable real-time data to utilities, which could improve load management. Further, Pima said that ANM would lead to fewer installations to achieve the same total amount of renewable energy generated, which in turn would reduce interconnection studies and costs, and reduce demand management complexity. Pima added that ANM should facilitate the development of decoupling in rate design, which it described as a win-win for ratepayers and utilities.

APS stated that ANM would have a significant impact on load research. According to APS, if an ANM meter were part of a load sample, the research meter would have to be moved to another site. It said that although ANM meters could be used for data collection and program evaluation, this would be independent of traditional load research. In addition, APS stated that ANM would result in a reduction of energy billed by APS, which would lead to revenue loss to the utility in the short term, and potentially to rate increases for non-participating customers over time. Further, APS said that significant cost shifting to non-participating customers would occur in the longer term, at least if ANM were structured according to existing net metering rules.

Finally, TEP said that ANM would require additional firm capacity and system enhancements, and therefore would lead to little to no net cost reduction. Further, TEP emphasized that ANM would require a new rate structure to recover costs fairly, via non-volumetric rate elements, and that this new structure must be revenue neutral.

C. Reliability and Safety Impacts

Initially TEP stated that ANM would raise safety and reliability issues. APS similarly said that if a broad ANM program were adopted, such issues could arise. However, both utilities agreed during the workshop that if interconnection procedure requirements were met, these safety and reliability issues would be addressed. Vote Solar and Pima also agreed that existing interconnection procedures address any such issues.

In addition, Pima stated that increased distributed generation, which ANM would encourage, improves reliability and safety. In particular, locating generation at individual facilities closer to their loads improves safety because such facilities are usually better protected than the larger transmission infrastructure and therefore less vulnerable to outside interference.

V. ADMINISTRATION

A. Charge for Enrollment

Parties disagreed about whether customers should be charged for enrollment in an ANM program. Their opinions were largely dependent on each party's particular perspective on the costs of a potential program. Pima and Vote Solar both stated that there should be no additional charge beyond what is required of traditional net metering customers. Conversely, APS and TEP both stated that customers should be responsible for

the costs of ANM, including any distribution, administrative, and technical costs, as described in the Costs section below.

B. Designation and Change of Participating Accounts

All parties agreed that a customer should designate participating accounts upon signing up for ANM. Most recommended doing so in writing or in an initial formal agreement between the customer and the utility. Pima, Vote Solar, and APS all believe that the number of participating meters should be unlimited, although APS reiterated its understanding that all meters should be on a single premises. TEP was unsure on whether or how to limit the number of accounts, citing lack of information.

As for changing accounts, parties were in some disagreement about how frequently a customer could change participating accounts. Responses included: monthly or quarterly (Vote Solar), every six months (Pima), annually (APS), or every five years (TEP).

C. Allocation of Excess Generation Credits to Multiple Accounts

Parties had various suggestions for how to allocate excess kWh credits among multiple ANM accounts.

TEP suggested allocating kWh credits equally among all of a customer's accounts.

Vote Solar suggested that a customer should rank his or her accounts, and then a utility could fully apply kWh credits to each account in a customer's specified order. That is, the utility would give kWh credits up to the full bill amount on the first ranked account, and then the balance of credits to the next ranked account up to the full bill amount, and so on.

Pima suggested that a customer could allocate kWh credits to multiple accounts however he or she wished, and a utility would apply credits according to the customer's allocation. Alternatively, Pima suggested that a utility could sum accounts according to tariff (including associated average surcharges), and then allocate kWh credits to each collection of summed account in a priority sequence identified by the customer.

APS suggested a similar summary billing approach that would not require allocation or changes. Instead, the utility could sum all participating accounts and then apply the kWh credits. However, APS cautioned that this approach would involve IT costs, and if a broad

ANM program were implemented, more significant billing system changes could be necessary.

VI. COSTS AND COST SHIFTING

Cost issues, and especially cost shifting, emerged as some of the more contentious issues in the comments and workshop. Cost issues relate closely to other topics discussed above, including administration, technical issues, and eligibility.

A. Distribution Costs and Demand Charges

Participants' views on the extent of distribution system infrastructure that is needed to facilitate any particular ANM arrangement were intimately connected to their views on permitted geographic separation between generation and load in an ANM program. At least to some degree, the further generation is from the load, i.e., the various participating meters, the greater the reliance on utilities' distribution systems. Conversely, if generation and load are near each other, e.g., on contiguous properties or the same premises, the need for distribution system infrastructure to connect generation with load is likely be significantly lower or nonexistent. There are also different perspectives on what is a reasonable means of allocating distribution system costs to utility customers. These differences in perspectives lead to different views about the costs to which ANM customers should be held accountable.

Vote Solar stated that ANM distribution costs should not be an issue, especially if accounts were on the same property. Vote Solar also pointed out that some customers might already pay full contribution toward the cost of existing distribution system infrastructure through payment of demand charges. By comparison, Pima argued that distribution costs assessed to ANM customers should be only incremental to present maintenance costs, if present at all. Pima emphasized the benefits of ANM, as described in more detail in the Party Positions on ANM section below, and stated that the benefits of ANM outweigh the costs such that there are no net costs. Pima's argument seemed to focus on whether there is a need for new distribution system infrastructure to accommodate an ANM facility as opposed to cost recovery for distribution system infrastructure that is already in place.

Both APS and TEP stated concerns about the potential for additional distribution costs to be incurred due to ANM, as well as other additional costs, and both suggested that participating customers should bear these costs. Both utilities acknowledged that if ANM

customers are assessed demand charges that the recovery of these charges should result in a revenue-neutral ANM tariff and would make an ANM program less costly to other customers. Put another way, APS and TEP supported crediting ANM generation only against variable generation component of participating customer bills, not distribution or transmission charges.

TEP explained that it has unbundled its retail rates and that distribution and transmission charge components cover the fixed costs of wheeling electricity through its system. TEP said that certain customers, including certain large customers, industrial customers, and mining customers, are currently under demand-charge rates that recover transmission and distribution costs through non-volumetric billing components. TEP explained that these demand charges are based on the cost of maintaining a certain level of transmission and distribution capacity (wires, transformers, etc.). However, TEP said that smaller commercial customers and municipal customers are on purely volumetric rates. For this reason, TEP concluded that allowing ANM customers to use generation to offset distribution and transmission system billing components would result in a shifting of the recovery of these costs to non-participating customers.

APS said that unlike TEP it has many rate schedules with demand charges, including some of its residential rates. For customers taking service under these rate schedules, APS agreed that the potential for cost shifting to non-participating customers with regard to distribution and transmission system cost recovery would be minimized. When asked whether it would be possible to determine project or location specific transmission and distribution system costs and benefits, APS said it would be possible, but potentially quite difficult, to identify such costs and benefits of individual ANM projects on distribution and transmission grids and charge customers accordingly.

B. Administrative Costs

Both Pima and Vote Solar stated that the administrative burden, e.g., IT costs, billing system costs, should not be prohibitive, and that utilities should bear these costs.

Conversely, APS, TEP, and the Cooperatives stated that there would be significant costs, in particular for billing software upgrades and interim manual billing that utilities would have to perform. They said that the extent of such costs were uncertain without more detail about what a program would look like.

C. Additional Costs Issues

In addition to the possible meter, distribution and administrative costs described above, parties raised some additional cost issues.

Pima said that the Commission must consider which budget would fund an ANM program and associated PBIs. Pima said such a decision should be undertaken prior to the REST budget determination in October 2011. Pima suggested using up to 50 percent of the utility renewable energy wholesale budget, awarded on a first-come first-served basis to projects implemented within a year by entities with the lowest cost PBIs.

Walmart requested that utilities pay customers a price for excess generation that accurately reflects the applicable hourly wholesale location-based marginal price. Walmart said this structure would provide appropriate economic signals, i.e., would be equivalent to the revenues the customer would receive if such generation were sold directly into the wholesale energy market, and would be equivalent to the benefit to utilities from purchasing such generation. This would help customers to evaluate cost-savings and cost-effectiveness appropriately.

D. Cost Shifting

Parties agreed that the issue of cost shifting is essential to a discussion of ANM. However, parties took varying stances on the subject of cost shifting and how to treat it within a potential ANM program.

Pima said that costs of ANM would not exceed the benefits, which include avoided utility costs plus avoided external costs plus external benefits, as described in more detail below in the Party Positions section. Thus, Pima saw cost shifting as less of a concern. Further, Pima said that current rates already shift costs between customer classes in various ways. Therefore, if the Commission considers cost shifting in its ANM program, it should rethink other cost shifting within its approved rate structures as well. Similarly, Vote Solar said that cost shifting due to ANM raises the same issues as traditional net metering, and therefore does not raise additional concerns. Further, Vote Solar, like Pima, stated that any cost examination, including an examination of cost shifting, should also examine the benefits of ANM.

APS, TEP, the Cooperatives, and Mohave/Navopache all expressed serious concern regarding cost shifting. APS said that ANM would lead to revenue erosion for utilities and ultimately entail significant cost shifting to nonparticipating customers in the longer term, at least under current net metering rules. TEP shared similar cost-shifting concerns. As

described above, both APS and TEP acknowledged that demand charges might provide a viable cost-recovery solution to cost-shifting concerns.

The Cooperatives expressed particular concern that ANM would only benefit larger customers, e.g., commercial or agricultural customers, at the expense of smaller non-participating customers. Mohave/Navopache reiterated this concern, and focused in particular on the burden on smaller, poorer customers.

Mr. Orsello expressed similar concerns to the utilities regarding cost shifting. He also noted that storage of solar power is a major issue, since it will likely be overproduced during the daytime. He said that ratepayers are going to have to pay the cost of storing and distributing that power in order for the program to work for participants. He explained that this is the reason that electricity is not appropriately analogized to water in this respect.

VII. LEGAL ISSUES

A. Relationship of ANM to Existing Net Metering Rules

Vote Solar and Pima both stated that the current net metering rules could cover ANM. Vote Solar described ANM as a new application of the existing rules, which might change some aspects of net metering as applied to certain customers, e.g., might change the process for rolling over excess generation credits at month's end or might result in different load-sizing restrictions.

Pima pointed to R-14-2-2302, which defines net metering currently. In particular, Pima noted subsection 13, which states that a net metering facility means a "facility for the production of electricity that... has a generating capacity less than or equal to 125 percent of the net metering customer's total load." Pima said that "total load" should encompass multiple meters or metered loads. Pima also said that the term "distributed generation" refers primarily to customer generation, and that is not related to system size or the geographic locations of the generation and load. Pima said that instead of modifying the rules, the Commission could clarify that the current rules are intended to include ANM.

APS, TEP and the Cooperatives all agreed that the current net metering rules would need to be modified to incorporate ANM. The Cooperatives described traditional net metering and ANM as directly interrelated, and said that ANM should not be a stand-alone policy, but rather incorporated into the rules via modification.

TEP said that ANM was not originally contemplated in the rules, and that modifying the rules would involve a time-consuming formal rule-making process. TEP added that if ANM comes under the umbrella of distributed generation, then the REST rules may also need to be discussed and potentially modified. TEP noted that it currently has a community solar program that involves a utility-scale, utility-purchased, wholesale transaction wheeled through its system like standard utility-scale generation. It said that the community solar tariff is in place to allow people to engage with TEP and help it to build more solar in the community. TEP said this program is unrelated to net metering, and it could serve as a substitute for an expanded net metering program. TEP emphasized that its community solar program requires customers to pay a portion of the renewable energy credit needed to support these solar projects, rather than having all ratepayers share that cost. TEP said that the community solar program benefits from REST incentives.

APS described ANM as a very significant departure from the Commission's traditional "one meter – one bill" rule (R14-2-210(B)), which was originally enacted in 1982. This departure would require a new rulemaking. APS acknowledged that it had a service schedule (Schedule 4) that allows it to have an exception to the traditional rule in certain specified circumstances, i.e., to allow for totalized meters. APS agreed with TEP that ANM may impact REST rules and require the amendment of those rules as well. APS also pointed to additional issues that ANM raises: retail competition and the need for regulation of it; retail wheeling and the potential for FERC jurisdiction; and municipal power, e.g., community choice aggregation. APS noted that it has a pilot community power program that has been approved for a single distribution feeder in the Flagstaff area, which has a similar model to TEP's community solar program.

B. Solar Service Agreements

While parties did not provide extensive opinions on this subject, several raised it as something to keep in mind moving forward. APS and TEP raised it primarily in connection with limiting eligibility for ANM to one customer with multiple meters versus multiple customers. APS directed attention to prior proceedings—the SolarCity case—regarding solar service agreements (SSAs). It said that, during those proceedings, the Commission and other parties laid out their positions on SSAs and the definition of a public service corporation. APS said that if the definition of a public service corporation is expanded to include an SSA provider providing energy to more than one customer, or perhaps even more than one facility of one customer, parties might change their positions. APS said that ANM would ultimately require a reevaluation of the definition of a public service

corporation under Arizona law. Vote Solar agreed that such a reevaluation might have to occur. Staff said that the Commission is expecting a case to be filed soon that will revisit the SSA issue with regard to commercial customers (vs. nonprofit, school, or government customers).

Tucson and AMPUA both stated that the Constitution allows municipalities to establish and run an electric utility. AMPUA pointed to a project in Gilbert that recently did so. APS said this was true, but that it required a public vote and compensation to the utility.

VIII. PARTY POSITIONS ON ANM

Parties understood the positive and negative impacts of ANM differently, and disagreed as to how to weigh the costs against the benefits. Consequently, they took varying positions on whether and how to adopt ANM in Arizona

Pima supports immediate, full implementation of ANM, rather than a trial program. It saw no value in temporary adoption unless full implementation could not be achieved in a timely manner, e.g., by 2011. Pima said that full implementation would keep costs low. Pima stated, however, that if a trial program is implemented, Pima wants to be a major participant, as it hopes to construct a 15-MW distributed generation facility.

Pima emphasized the positive impacts that ANM would have in the state. Pima stated that ANM would increase the installation of renewable distributed generation. Pima also said that ANM is more efficient per REST dollar, and the most efficient way to achieve Arizona's fifteen percent renewable energy goal. Pima said that ANM will only become less costly as installations increase and predicted that in three to five years subsidies for ANM may no longer be necessary. Pima said that ANM would lead to avoided costs for utilities, as well as avoided external costs, e.g., water pollution, brown power losses to evaporation, acid rain, and air quality problems. In addition, Pima said ANM would provide external benefits, including job creation, higher wage jobs, related income tax revenues, continued development of and investment in solar energy, the attraction of solar component manufacturers to Arizona, and the enhanced ability of public agencies to leverage existing use of parcels and control electricity operating costs, thus mitigating the need to increase taxes or fees. In its comments Pima relied heavily on a study by R.W. Beck from 2009 entitled "Distributed Renewable Energy Operating Impacts and Valuation Study," which was prepared for APS, as discussed below. Ultimately, Pima stated that ANM has no net costs, when weighed against the benefits.

Vote Solar supports full implementation of ANM, with or without an initial pilot project. Vote Solar said a pilot project could allow the Commission to work through any issues that come up. Vote Solar said that ANM should provide additional opportunities in Arizona for distributed generation, if the program is designed correctly. It also said that ANM would broaden the benefits of the solar economy to a wider group of customers. Furthermore, Vote Solar said that ANM removes the disincentive for energy efficiency for certain customers, e.g., agricultural and governmental customers, whose systems produce more than their on-site load. Although Vote Solar acknowledged a certain degree of ANM program complexity, it said that downside was outweighed by ANM's benefits.

Tucson and Oro Valley also support ANM. Tucson acknowledged that implementation of ANM could possibly come in stages in order to address the various issues raised. It also stated its preference for seeing some aspect of the program accessible to multifamily buildings, where each unit is separately metered. Tucson also addressed the importance of ANM for facilitating installations of solar systems on rooftops with large areas that sit atop a small amount of retail load. Tucson envisioned that an ANM program could allow solar installations on such rooftops to provide electricity to nearby businesses or residences. Oro Valley noted that it is building its first solar project at its town hall, and ANM could help to support future projects.

Venture Catalyst supports ANM as an additional strategy to supplement all of the beneficial programs that utilities already have to promote solar energy. It pointed out that, by aggregating demand, utilities can move the market for solar in a more significant way, and therefore have a larger beneficial impact. Venture Catalyst agreed with TEP and other parties that cost effectiveness was an important factor in deciding whether and how to implement ANM.

Mr. Orsello said that he is a strong advocate of ANM. However, he said that the program must be carefully designed in such a way that all ratepayers do not subsidize a small percentage of customers for overproducing solar energy. He also said that an ANM program would have to address power storage and distribution issues. He agreed that it is important to use renewable energy credits and other funds cost effectively in order to promote solar. However, Mr. Orsello said that it seemed like utility solar programs—including community solar and feed-in tariffs—would not be as innovative and as effective at promoting new technology as ANM. He said that ANM would encourage more entrepreneurship and would create a more dynamic business environment, as well as

creating jobs and other economic benefits for Arizona. Mr. Orsello urged parties and the Commission to design these programs with the future in mind.

Commissioner Newman stated that ANM has significant potential to benefit Arizona, including economically and environmentally, and said he would be interested in considering at least a pilot program. He acknowledged that ANM is controversial, and involves important and complicated revenue and cost questions. Commissioner Newman said any program could not be overly burdensome to utilities. He said he is hopeful that investor-owned utilities (IOUs) together with the cooperatives would be able to figure out the best way to implement an ANM program. He suggested schools or municipalities as possible projects. He said that one of the benefits of ANM is to avoid building new transmission, particularly in rural areas, and thus to avoid the associated negative externalities, e.g., negative environmental impacts.

APS and TEP do not support implementing ANM. APS pointed out that it already exceeds its REST budget with high demand for net metering, and it is concerned about displacing projects interested in the current program. It said REST would need to be revised to include ANM. In addition, APS said that ANM may compete with or reduce the feasibility of possible future feed-in tariff programs. Furthermore, APS said that adopting ANM fully would exacerbate existing net metering problems related to cost shifting and revenue erosion.

APS acknowledged that ANM would positively impact some customers and subsidize renewable installation for them, but said this would come at the expense of non-participating customers. APS also said that it was the entity that commissioned the R.W. Beck study cited frequently by Pima. APS acknowledged the benefits of solar as described in the study, but said that the study focused on a highly distributed situation, i.e., multiple rooftops on individual feeders creating high-density solar within the distribution system. APS said that the study did not consider an ANM situation, i.e., larger facilities interconnected on a single feeder distant to the load.

TEP said that ANM may have an adverse effect on the currently successful distributed generation market in Arizona. Like APS, TEP said that it is already meeting or exceeding compliance targets under REST. It said it would need to reduce funding for traditional net metering projects to implement ANM, which would stem the growth of smaller or even some large commercial distributed generation, which achieve many of the same benefits that Pima and Venture Catalyst emphasized. TEP emphasized the

importance of choosing the most cost-effective means of promoting solar, particularly in terms of the REST program. Like APS, TEP acknowledged that ANM may be beneficial for some customers, due to economies of scale, but that only a small minority would be able to take advantage of the ANM program. As discussed above, TEP said that its community solar program could be a good alternative to adopting ANM. TEP and Pima had unsuccessful negotiations in the past about Pima's potential participation in the TEP program. Pima cited cost concerns as a major barrier for its participation, and said that ANM would present a better cost situation for its proposed solar project.

Although TEP and APS did not support implementation of ANM, they said that if the Commission chooses to adopt ANM, it should do so in a limited pilot program in order to stem the issues they have raised and to avoid crowding out smaller distributed generation projects. APS added that it would be best to monitor other states' programs and to draw lessons from them before moving forward. APS suggested that any pilot should involve only single sites or premises with multiple accounts served by a single customer-owned renewable energy generation facility on the same site or premises. APS referenced Far Niente Winery and Google as potential examples. These examples were discussed in a PowerPoint presentation provided at the beginning of the ANM workshop. APS said customers under any rate schedule could be eligible, and that the program should use summary billing, as described above in the Administration section. As a hypothetical, APS described a school site with many meters on various buildings on school property, with photovoltaic solar on one of those buildings. APS stated that a wider application of ANM should await the results of further study and/or such a pilot, and be accompanied by per customer revenue decoupling for affected electric utilities.

TEP said any trial program should contain a number of components, including: require revenue neutrality; include fair and equitable cost recovery; require customer responsibility for costs; require customer compliance with all safety and other requirements; be cost-beneficial to customers as a whole; be designed to avoid cost shifting across rate classes; and be equitable and not unduly discriminatory. TEP emphasized the importance of getting the rules right to create a successful ANM program, and that doing so would be complicated.

The Cooperatives and Mohave/Navopache currently decline to support or reject ANM. The Cooperatives said that there are many technical and cost issues to resolve before they could accurately balance the costs and benefits of ANM. Similarly, Mohave/Navopache emphasized that there are many unanswered technical and cost issues that require further

study. The Cooperatives said that the timeline for decisions on this matter was too short, and that one workshop was insufficient. The Cooperatives, like TEP, said that ANM may not lead to increased installation of solar, but rather would result in a few large commercial or agricultural projects. Both the Cooperatives and Mohave/Navopache were particularly concerned about cost issues and the potential for rate increases. Throughout their comments, the Cooperatives and Mohave/Navopache emphasized the unique situation of cooperatives, particularly as compared to IOUs, and particularly with regard to cost shifting. In a cooperative utility situation, customers bear the full brunt of additional costs. Further, cooperative customers in Arizona are frequently poorer and less able to bear those costs. The Cooperatives and Mohave/Navopache indicated that they want to be sure that ANM could be implemented in a way that addresses these issues, and further study would assist in doing that.

**AGGREGATED NET METERING IN ARIZONA:
SUMMARY OF POLICIES IN OTHER STATES**

Arizona Corporation Commission

SEPTEMBER 30, 2010

First Consultant Report

KEYES & FOX, LLP

I. INTRODUCTION TO STATE POLICIES

The Commission requested an organized collection of information on other jurisdictions' current use of and experience with aggregated net metering (ANM) policies. This summary examines statutes, regulations, tariffs, and other related documents in ten states that currently permit ANM or are evaluating doing so. States reviewed include California, Connecticut, Delaware, Maryland, New Jersey, Oregon, Pennsylvania, Rhode Island, Washington, and West Virginia. All of these states conceive of ANM as involving one customer aggregating multiple meters.¹

The aforementioned states are in varying stages of ANM development. Six states—California, Oregon, Pennsylvania, Rhode Island, Washington, and, most recently, West Virginia—currently have ANM integrated into their net-metering programs.² Utilities operating in those states have formulated corresponding tariffs.³ Delaware recently (July

¹ This summary does not address community solar programs or other programs that allow for participation by multiple customers on a single generation system.

² CAL. PUB. UTIL. CODE §§ 2821–30 (1996), *available at* <http://www.leginfo.ca.gov/calaw.html>; OR. ADMIN. R. 860-039 (2007), *available at* <http://apps.puc.state.or.us/orders/2007ords/07-319.pdf>; 52 PA. CODE § 75 (2008) *available at* <http://www.pacode.com/secure/data/052/chapter75/subchapBtoc.html>; R.I. GEN. LAWS § 39-26-6(g)(ii) (2009), *available at* <http://www.rilin.state.ri.us/statutes/title39/39-26/39-26-6.htm>; WASH. REV. CODE § 80.60 (2006), *available at* <http://apps.leg.wa.gov/RCW/default.aspx?cite=80.60&full=true>; W. VA. CODE R. § 150-33 (2010), *available at* <http://www.psc.state.wv.us/scripts/orders/ViewDocument.cfm?CaseActivityID=299384&Source=Docket>.

³ *See, e.g.*, Cal. P.U.C. Sheet No. 29206-E-14-E, Rate Schedule RES-BCT (effective Apr. 22, 2010) (Pacific Gas & Electric), *available at* http://www.pge.com/tariffs/tm2/pdf/ELEC_SCHEDS_RES-BCT.pdf; Cal. P.U.C. Sheet No. 45378-E-83-E, Rate Schedule RES-BCT (effective Apr. 22, 2010) (Southern California Edison), *available at* <http://www.sce.com/NR/sc3/tm2/pdf/CE315.pdf>; Cal. P.U.C. Sheet No. 21848-E – 51-E, RES-BCT (effective, Apr. 22, 2010) (San Diego Gas & Electric), *available at* http://www.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_RES-BCT.pdf; P.U.C. Or. No. 35, Schedule 135 (effective Oct. 1, 2007) (PacifiCorp), *available at* http://www.pacificpower.net/content/dam/pacific_power/doc/About_Us/Rates_Regulation/Oregon/Approved_Tariffs/Rate_Schedules/Net_Metering_Service_Optional_for_Qualifying_Customers.pdf; P.U.C. Or. No. E-18, Schedule 203 (effective Oct. 24, 2007) (Portland Gas & Electric), *available at* http://www.portlandgeneral.com/our_company/corporate_info/regulatory_documents/pdfs/schedules/sched_203.pdf; Tariff Electric Pa. P.U.C. No. 3 (effective Aug. 1, 2007) (PECO Energy Co.), *available at* <http://www.peco.com/NR/rdonlyres/84A46407-58CC-4FF8-89E5-552FEFF4B397/6915/RateRS2.pdf> (major Pa. IOU net-metering tariffs identical to PECO's tariff); R.I.P.U.C. No. 2035 § III.B (effective Sept. 30, 2009) (National Grid), *available at* https://www.nationalgridus.com/narragansett/non_html/rates_tariff.pdf; Pacific Power & Light Schedule 135 (effective Feb. 1, 2007) (PacifiCorp), *available at* http://www.pacificpower.net/content/dam/pacific_power/doc/About_Us/Rates_Regulation/Washington/Approved_Tariffs/Rate_Schedules/Net_Metering_Service.pdf; Puget Sound Energy Schedule 150 (effective March 14, 2008), *available at* http://www.pse.com/SiteCollectionDocuments/rates/elec_sch_150.pdf; P.S.C. W. Va. Tariff Nos. 12, 17, 21 (AEP Companies and Allegheny Power) (effective Aug. 30, 2010).

2010) amended its net-metering statute to allow for ANM.⁴ It has set a 2011 deadline for the Delaware Public Service Commission and appropriate local regulatory authorities to adopt implementing regulations.⁵ New Jersey has no formal ANM program, and it has not yet undertaken a rulemaking to incorporate ANM into its net-metering program, but it has adopted a pilot ANM program operating under its existing net-metering rules.⁶ Two more states—Connecticut and Maryland—are currently considering ANM. Connecticut is in the process of holding hearings regarding specific questions related to ANM.⁷ Similarly, Maryland has established a technical working group on ANM to consider a program.⁸

The structure of this summary is based on ANM issues that parties raised in their oral and written comments to the Arizona Corporation Commission (Commission). First, the summary examines eligibility requirements for ANM across the states, including: eligible customer classes; eligible tariffs or rate schedules; system capacity and cumulative capacity restrictions; and geographic restrictions as to the distance between an ANM generation facility and its load. Second, it investigates how states have addressed two technical issues: metering and equipment requirements, and reliability and safety issues. Third, the summary examines states' administration of ANM, in particular the designation and change of participating accounts or meters, and the allocation of excess generation credits between participating accounts. Fourth, the summary reviews how states have dealt with the costs of ANM, and in particular the issue of cost shifting between participants and nonparticipants. Finally, it provides a brief conclusion, outlining where states have taken the same or similar approaches to ANM, and where states' approaches vary more widely.

⁴ DEL. CODE tit. 26, § 1014(e)(9) (1999), as amended by S.B. 267 (Jul. 26, 2010), *available at* <http://delcode.delaware.gov/title26/c010/index.shtml>.

⁵ *Id.*

⁶ N.J. Board Pub. Utils. Order, In the Matter of William C. Skye d/b/a Redskye Farms Net Metering for Solar System by August 31, 2008, at 3–4 (Feb. 3, 2009) (docket EO08060410).

⁷ *See, e.g.*, Notice of Request for Written Comments, D.P.U.C. Declaratory Ruling Concerning Net Metering (Jun. 28, 2010) (docket 10-03-13), *available at* [http://www.dpuc.state.ct.us/dockcurr.nsf/\(Web+Main+View/All+Dockets\)?OpenView&StartKey=10-03-13](http://www.dpuc.state.ct.us/dockcurr.nsf/(Web+Main+View/All+Dockets)?OpenView&StartKey=10-03-13).

⁸ *See* H.B. 801 (July 1, 2010), amending MD. CODE PUB. UTIL. COS. § 7-306 (2009), *available at* http://mlis.state.md.us/2010rs/chapters_noln/Ch_437_hb0801E.pdf.

II. ELIGIBILITY REQUIREMENTS FOR ANM

A. Customer Classes

Five states—Delaware, Oregon, Pennsylvania, Washington, and West Virginia—allow all customer classes to participate in their net-metering programs, including ANM.⁹ West Virginia specifies that the land used for a generation facility must be used for a private residence for residential customers, or in the “normal course of business” for commercial and industrial customers.¹⁰

Two states restrict participation in their ANM programs to certain customer classes. In California, participation is limited to bundled-service local governments, which includes cities, counties, school districts and certain other political subdivisions of the state.¹¹ In Rhode Island, ANM is available to cities, towns, state agencies, educational institutions, non-profit affordable housing entities, farms, or the Narragansett Bay Commission.¹²

As for the three states without formal programs, New Jersey’s pilot ANM program is available only to agricultural customers already participating in the state’s Customer On-Site Renewable Energy (CORE) program.¹³ Maryland is considering allowing agricultural, municipal, and non-profit customers to participate in ANM.¹⁴ Finally, Connecticut is considering whether its current net-metering rules limit the program to residential customers or whether other classes are covered, and how this would affect ANM.¹⁵

⁹ DEL. CODE tit. 26, § 1014(e) (1999), as amended by S.B. 267 (Jul. 26, 2010); OR. ADMIN. R. 860-039 (2007); 52 PA. CODE § 75.12 (2008); WASH. REV. CODE § 80.60.010(7) (2006); W. VA. CODE R. § 150-33-2.5 (2010).

¹⁰ W. VA. CODE R. § 150-33-2.5 (2010).

¹¹ CAL. PUB. UTIL. CODE § 2830(b) (1996); Cal. P.U.C. Sheet No. 29206-E-14-E, Rate Schedule RES-BCT, Applicability (effective Apr. 22, 2010) (Pacific Gas & Electric); Cal. P.U.C. Sheet No. 45378-E-83-E, Rate Schedule RES-BCT, Applicability (effective Apr. 22, 2010) (Southern California Edison); Cal. P.U.C. Sheet No. 21848-E-51-E, RES-BCT, Applicability (effective, Apr. 22, 2010) (San Diego Gas & Electric).

¹² R.I. GEN. LAWS § 39-26-6(g)(ii) (2009); R.I.P.U.C. No. 2035 § III.B.1 (effective Sept. 30, 2009) (National Grid).

¹³ N.J. Board Pub. Utils. Order, In the Matter of William C. Skye d/b/a Redskye Farms Net Metering for Solar System by August 31, 2008, at 3–4 (Feb. 3, 2009) (docket EO08060410); Letter from William W. Barndt, Manager, Regulatory Strategy & Policy, Atlantic City Electric, to Kristi Izzo, Secretary, N.J. Board Pub. Utils. 2 (Mar. 2, 2010) (re ANM pilot program at Redskye Farms).

¹⁴ H.B. 801 § 2(b)(2)(i)–(iii) (July 1, 2010), amending MD. CODE PUB. UTIL. COS. § 7-306 (2009).

¹⁵ Notice of Request for Written Comments, D.P.U.C. Declaratory Ruling Concerning Net Metering 1 (Jun. 28, 2010) (docket 10-03-13).

B. Tariffs and Rate Schedules

In three states—Delaware, Pennsylvania, and Washington—ANM participants may aggregate meters regardless of tariff or rate class.¹⁶ In addition, New Jersey’s pilot ANM program is available to mixed-use residential and non-residential projects, which presumably entail different tariffs.¹⁷

Two states—West Virginia and Rhode Island—do not specify particular tariffs or that all of a customer’s meters must be on the same tariff.

Oregon and California have instituted specific tariff requirements for ANM. Oregon requires that an ANM customer must have all of its participating meters on the same rate schedule, though it does not specify a particular rate schedule.¹⁸ In California, all accounts—including the generation account and all other participating accounts—must be on a time-of-use (TOU) rate schedule.¹⁹

Maryland and Connecticut are considering how ANM would function both within the same rate class, and across different rate classes.²⁰

C. System Capacity and Cumulative Capacity Restrictions

Regardless of their policies on customer class and tariff eligibility, all states employ system capacity and/or cumulative capacity restrictions. Most states address net metering and ANM under the same restriction or set of restrictions

¹⁶ DEL. CODE tit. 26, § 1014(e)(8) (1999) (as amended by S.B. 267 (Jul. 26, 2010)); 52 PA. CODE § 75.12 (2008); WASH. REV. CODE § 80.60.010(7) (2006).

¹⁷ N.J. Board Pub. Utils. Order, In the Matter of William C. Skye d/b/a Redskye Farms Net Metering for Solar System by August 31, 2008, at 3–4 (Feb. 3, 2009) (docket E008060410); Letter from William W. Barndt, Manager, Regulatory Strategy & Policy, Atlantic City Electric, to Kristi Izzo, Secretary, N.J. Board Pub. Utils. 2 (Mar. 2, 2010) (re ANM pilot program at Redskye Farms).

¹⁸ OR. ADMIN. R. 860-039-0065(1)(c) (2007); P.U.C. Or. No. 35, Schedule 135, Special conditions § 4(iii) (effective Oct. 1, 2007) (PacifiCorp).

¹⁹ CAL. PUB. UTIL. CODE § 2830(a)(2), (a)(5), (b)(2) (1996); Cal. P.U.C. Sheet No. 29206-E-14-E, Rate Schedule RES-BCT, Applicability § 3 (effective Apr. 22, 2010) (Pacific Gas & Electric); Cal. P.U.C. Sheet No. 45378-E-83-E, Rate Schedule RES-BCT, Applicability (effective Apr. 22, 2010) (Southern California Edison).

²⁰ Notice of Request for Written Comments, D.P.U.C. Declaratory Ruling Concerning Net Metering 2 (Jun. 28, 2010) (docket 10-03-13); H.B. 801 2(b)(i)–(iii) (July 1, 2010), amending MD. CODE PUB. UTIL. Cos. § 7-306 (2009).

Two states—Pennsylvania and Oregon—limit only system capacity. Pennsylvania allows for residential systems to be 50 kilowatts (kW) and nonresidential systems to be 3 megawatts (MW).²¹ Pennsylvania also has an exception for customers with systems over 3 MW who make their systems available to operate in parallel with the utility during grid emergencies.²² These systems can be as large as 5 MW.²³ Pennsylvania does not cap cumulative capacity for net metering or ANM, though it does state that the total capacity of net-metering facilities may not “adversely impact service to other Customers... [or] compromise the protection scheme(s) employed on the Company’s electric distribution system.”²⁴ Similarly, Oregon restricts residential net-metering systems to not more than 25 kW, and nonresidential systems to not more than 2 MW. Oregon expressly does not limit the cumulative generating capacity of net-metering systems installed in the state.²⁵

The remaining six states with formal ANM programs have instituted both system capacity and total capacity limitations. In West Virginia, residential net-metering systems are restricted to 25 kW, commercial systems to 500 kW, and industrial systems to 2 MW.²⁶ West Virginia further specifies that net-metering generation facilities of customers served by rural electric cooperatives, municipally owned electric utilities, or utilities serving fewer than thirty thousand residential customers must be 50 kW or smaller.²⁷ West Virginia limits cumulative net-metering generation capacity at 3 percent of a utility’s aggregate customer peak demand during the previous year.²⁸ It also reserves at least 0.5 percent for residential net-metering customers.²⁹ In addition, West Virginia gives utilities the ability to petition the state’s regulatory commission to limit the addition of net-metering facilities

²¹ 73 PA. CONS. STAT. § 1648.2(13) (2009), *available at* <http://www.pacode.com/secure/search.asp>; Tariff Electric Pa. P.U.C. No. 3, Applicability (effective Aug. 1, 2007) (PECO Energy Co.).

²² 73 PA. CONS. STAT. § 1648.2(13); Tariff Electric Pa. P.U.C. No. 3, Applicability.

²³ 73 PA. CONS. STAT. § 1648.2(13); Tariff Electric Pa. P.U.C. No. 3, Applicability.

²⁴ Tariff Electric Pa. P.U.C. No. 3, Applicability.

²⁵ OR. ADMIN. R. 860-039-0010, -0075 (2007); P.U.C. Or. No. 35, Schedule 135, Applicable (effective Oct. 1, 2007) (PacifiCorp); P.U.C. Or. No. E-18, Schedule 203, Definition (effective Oct. 24, 2007) (Portland Gas & Electric).

²⁶ W. VA. CODE R. § 150-33-2.5 (2010).

²⁷ *Id.*

²⁸ *Id.* § 150-33-3.1; P.S.C. W. Va. Tariff Nos. 12, 17, 21.

²⁹ W. VA. CODE R. § 150-33-3.1; P.S.C. W. Va. Tariff Nos. 12, 17, 21.

when net-metering capacity exceeds certain percentages of peak load on line sections for different types of circuits.³⁰

In Washington, all net-metering systems are limited to not more than 100 kW.³¹ The state caps cumulative net-metering generation capacity at 0.25 percent of the utility's 1996 peak demand.³² This cumulative limit will increase to 0.5 percent in 2014.³³

In Rhode Island, net-metering systems may not be larger than 1.65 MW.³⁴ Rhode Island allows for two exceptions, however. First, if systems are developed, but not owned, by cities or towns, are located on city or town land, and provide power to that city or town, then they may be as large as 2.25 MW.³⁵ Second, if systems are owned entirely by cities, towns, state agencies, or the Narragansett Bay Commission, then they may be as large as 3.5 MW.³⁶ Overall, net metering in Rhode Island is limited by statute to 2 percent of peak load, provided that at least 1 MW is reserved for projects smaller than 25 kW.³⁷

In California, ANM systems may not have capacities of more than 1 MW.³⁸ Further, cumulative ANM is restricted to 250 MW within the service territories of the state's three largest investor-owned utilities (IOUs)—Pacific Gas & Electric, Southern California Edison, and San Diego Gas & Electric.³⁹ Each utility may only allow ANM in its service territory up

³⁰ W. VA. CODE R. § 150-33-3.2.

³¹ WASH. REV. CODE §§ 80.60.010(10)(b), 80.60.030(4)(b) (2006); Pacific Power & Light Schedule 135-1, Special Conditions § 1 (effective Feb. 1, 2007); Puget Sound Energy Schedule 150-d, Special Terms & Conditions for Aggregation § 1 (effective March 14, 2008).

³² WASH. REV. CODE § 80.60.020(1)(a); Pacific Power & Light Schedule 135-1; Puget Sound Energy Schedule 150-a, Availability § 3.

³³ WASH. REV. CODE § 80.60.020(1)(a).

³⁴ R.I.P.U.C. No. 2035 § III.B (effective Sept. 30, 2009) (National Grid).

³⁵ *Id.*

³⁶ *Id.*

³⁷ *Id.*

³⁸ CAL. PUB. UTIL. CODE § 2830(a)(4)(A) (1996); Cal. P.U.C. Sheet No. 29206-E-14-E, Rate Schedule RES-BCT, Applicability (effective Apr. 22, 2010) (Pacific Gas & Electric); Cal. P.U.C. Sheet No. 45378-E-83-E, Rate Schedule RES-BCT, Applicability (effective Apr. 22, 2010) (Southern California Edison); Cal. P.U.C. Sheet No. 21848-E-51-E, Rate Schedule RES-BCT, Special Conditions § 3(a) (effective, Apr. 22, 2010) (San Diego Gas & Electric).

³⁹ CAL. PUB. UTIL. CODE § 2830(h).

to its share of that 250 MW, which is based on the ratio of its peak demand to total peak demand of all electrical corporations in California.⁴⁰

Finally, in Delaware, residential systems are restricted to 25 kW, agricultural and certain municipal systems are restricted to 100 kW, and other non-residential systems are restricted to either 500 kW (for the state’s cooperative customers) or 2 MW (for the state’s IOU customers).⁴¹ Delaware also caps cumulative generation from all net metering at 5 percent of a utility’s peak demand.⁴² In addition, Delaware limits net-metering system size by specifying that it may only be large enough to meet a certain percentage of the customer’s demand. For ANM specifically, Delaware requires that a generating facility be designed to produce no more than 110 percent of an ANM customer’s aggregate electrical consumption across that customer’s aggregated meters, based on the average aggregate consumption of the two previous 12-month periods.⁴³

D. Geographic Location—Generation in Relation to Load

Two states—Delaware and Washington—allow ANM participants to aggregate meters regardless of physical location, as long as all of the meters are within one utility’s service territory.⁴⁴ They specify that the ANM generation facility must be on property owned by the customer.⁴⁵

All other states with formal programs impose geographic limitations on their ANM programs, except for Rhode Island, which does not address the issue explicitly. In Oregon, all meters must be on the same property or contiguous properties, and must be served by the same primary feeder.⁴⁶ In West Virginia, ANM-participating meters must be located on

⁴⁰ Cal. P.U.C. Sheet No. 29206-E-14-E, Rate Schedule RES-BCT, RES-BCT Cap; Cal. P.U.C. Sheet No. 45378-E-83-E, Rate Schedule RES-BCT, Applicability; Cal. P.U.C. Sheet No. 21848-E-51-E, RES-BCT, Applicability.

⁴¹ DEL. CODE tit. 26, § 1014(d)(1), (e)(8)(c) (1999), as amended by S.B. 267 (Jul. 26, 2010).

⁴² *Id.* § 1014(e)(7).

⁴³ *Id.* § 1014(e)(8)(b). This requirement mirrors Delaware’s requirement for net metering facilities. *Id.* § 1014(d)(5).

⁴⁴ WASH. REV. CODE § 80.60.010(7) (2006).

⁴⁵ *Id.* § 80.60.010(10)(b) (2006); DEL. CODE tit. 26, § 1014(e)(8); Pacific Power & Light Schedule 135-1, Special Conditions § 1 (effective Feb. 1, 2007).

⁴⁶ OR. ADMIN. R. 860-039-0065(1)(a), (d) (2007); P.U.C. Or. No. 35, Schedule 135, Special Conditions § 4(i), (iv) (effective Oct. 1, 2007) (PacifiCorp).

the same “tract of land” as the generation facility, or else on contiguous tract(s) but within two miles of the generation facility.⁴⁷ In Pennsylvania, all ANM meters must be within the same utility’s service territory, and participating meters must be within two miles of the customer’s property on which the generation facility sits.⁴⁸ Finally, in California, all ANM accounts must be within the geographical boundaries of the participating local government.⁴⁹

As for states without formal ANM programs, New Jersey’s pilot program requires that all accounts be on the same property, which must be within Atlantic City Electric’s territory.⁵⁰ The Maryland ANM technical working group is considering how ANM would function with all accounts on the same property and with accounts on different properties.⁵¹

III. TECHNICAL ISSUES

A. Meters and Other Equipment

All states with formal ANM programs specify the type(s) of meter to be used in their net metering programs, and these requirements apply equally to ANM.⁵² Generally, these states require some type of bi-directional meter at the ANM generation site.

⁴⁷ W. VA. CODE R. §§ 150-33-2.5, -6.5 (2010).

⁴⁸ 73 PA. CONS. STAT. § 1648.2(13) (2009); 52 PA. CODE § 75.12 (2008); Tariff Electric Pa. P.U.C. No. 3, Metering Provisions § 3 (effective Aug. 1, 2007) (PECO Energy Co.).

⁴⁹ CAL. PUB. UTIL. CODE § 2830(a)(1), (4)(C) (1996); Cal. P.U.C. Sheet No. 29206-E-14-E, Rate Schedule RES-BCT, Applicability § 1 (effective Apr. 22, 2010) (Pacific Gas & Electric); Cal. P.U.C. Sheet No. 45378-E-83-E, Rate Schedule RES-BCT, Special Conditions § 5(b)(3) (effective Apr. 22, 2010) (Southern California Edison); Cal. P.U.C. Sheet No. 21848-E-51-E, Rate Schedule RES-BCT, Special Conditions § 3(b) (effective, Apr. 22, 2010) (San Diego Gas & Electric).

⁵⁰ N.J. Board Pub. Utils. Order, In the Matter of William C. Skye d/b/a Redskye Farms Net Metering for Solar System by August 31, 2008, at 3–4 (Feb. 3, 2009) (docket EO08060410); Letter from William W. Barndt, Manager, Regulatory Strategy & Policy, Atlantic City Electric, to Kristi Izzo, Secretary, N.J. Board Pub. Utils. (Mar. 2, 2010) (re ANM pilot program).

⁵¹ H.B. 801 § 2(b)(2)(i)–(iii) (July 1, 2010), amending MD. CODE PUB. UTIL. COS. § 7-306 (2009).

⁵² Cal. P.U.C. Sheet No. 29206-E-14-E, Rate Schedule RES-BCT, Special Conditions § 1; DEL. CODE tit. 26, § 1014(e)(6) (1999), as amended by S.B. 267 (Jul. 26, 2010); OR. REV. STAT. § 757.300(2)(a)–(b) (2009); 52 PA. CODE § 75.14(a); Tariff Electric Pa. P.U.C. No. 3, Metering Provisions § 1; R.I.P.U.C. No. 2007 § 8.1 (effective Sept. 30, 2009) (National Grid); WASH. REV. CODE § 80.60.20(1)(b) (2006); W. VA. CODE R. § 6.1; P.S.C. W. Va. Tariff Nos. 12, 17, 21, Metering.

B. Reliability and Safety Impacts

All states with formal programs ensure continued system reliability and safety by requiring that any net-metering generation facility, including any ANM facility, is designed and installed to operate in parallel with the electric utility distribution system, and that all generator equipment and installations comply with the utility's technical requirements, e.g., interconnection requirements.⁵³

IV. ADMINISTRATION

A. Designation and Change of Participating Accounts

There appears to be universal agreement among the states with formal programs that a customer may designate which accounts will participate in the state's ANM program. States include various time and content specifications regarding customer notice to the utility of program participation. Only a few states discuss the designation and change of participating accounts in more detail.

Two states—Rhode Island and California—explicitly limit the number of accounts that can participate in their ANM programs. Rhode Island limits the number of participating accounts to 10.⁵⁴ California limits the number of accounts to 50.⁵⁵

Three states—Pennsylvania, California, and Delaware—have instituted requirements related to changing participating accounts. In Pennsylvania, an ANM customer must give the utility 60 days notice to add additional meters.⁵⁶ In California, a

⁵³ Cal. P.U.C. Sheet No. 29206-E - 14-E, Rate Schedule RES-BCT, Local Government Responsibilities; Cal. P.U.C. Sheet No. 21848-E - 51-E, Rate Schedule RES-BCT, Special Conditions §§ 3, 6; DEL. CODE tit. 26, § 1014(e)(5); N.J. STAT. § 48:3-87(e)(2) (2008); OR. REV. STAT. § 757.300(4); OR. ADMIN. R. 860-039-0015-0045; P.U.C. Or. No. 35, Schedule 135 §§ 5 - 11; P.U.C. Or. No. E-18, Schedule 203, Special Conditions; Tariff Electric Pa. P.U.C. No. 3, Applicability, Special Conditions §§ 5-11; R.I.P.U.C. No. 2035 § III.B.4 (effective Sept. 30, 2009) (National Grid); WASH. REV. CODE §§ 80.60.010(10)(c), 80.60.040; Pacific Power & Light Schedule 135-2, Special Conditions § 7 (effective Feb. 1, 2007); Puget Sound Energy Schedule 150-b, Terms & Conditions (effective March 14, 2008); W. VA. CODE R. § 150-33-2.5; P.S.C. W. Va. Tariff Nos. 12, 17, 21, Conditions of Service (AEP Companies and Allegheny Power).

⁵⁴ R.I. GEN. LAWS § 39-26-6(g)(ii)(B) (2009); R.I.P.U.C. No. 2035 § III.B.1.

⁵⁵ Cal. P.U.C. Sheet No. 29206-E-14-E, Rate Schedule RES-BCT, Benefiting Account Limitations; Cal. P.U.C. Sheet No. 21848-E-51-E, Rate Schedule RES-BCT, Special Conditions § 5.

⁵⁶ OR. ADMIN. R. 860-039-0065(2).

customer can change its aggregated accounts once per year, after providing 60 days notice.⁵⁷ In Delaware, a customer can change its list of aggregated meters once per year, as well, but after providing 90 days notice.⁵⁸

B. Allocation of Excess Generation Credits to Multiple Accounts

States take varying approaches on how to allocate excess generation credits among multiple accounts. All states with formal ANM programs appear to contemplate some on-site demand where the ANM generation facility is located, since they all require utilities to allocate credits first to the meter attached to the generation account, as discussed below.

Rhode Island allows ANM participants to credit additional accounts once a utility has applied credits to the meter through which the generation facility supplies electricity.⁵⁹ However, it does not specify how to apply those additional credits.

Pennsylvania, Washington and West Virginia allocate credits among meters by applying credits first to the meter through which the generation facility supplies electricity to the distribution system, and then crediting equally to the customer's remaining participating meters.⁶⁰ Washington's Puget Sound Energy is an exception. In that case, customers must request this equal allocation; if not, the utility allocates credits to meters with lower energy charges first, and then to meters with higher energy charges.⁶¹

Oregon and Delaware require ANM customers to rank their participating meters in the order in which they wish them to receive excess generation credits. In Oregon, the utility must then apply excess kWh credits to the meter through which the generation facility supplies electricity, i.e., the on-site meter. If excess credits remain, the utility applies them to other meters that have the same billing charge as that first meter. If excess

⁵⁷ CAL. PUB. UTIL. CODE § 2830(e); Cal. P.U.C. Sheet No. 45378-E-83-E, Rate Schedule RES-BCT, Special Conditions § 9(f).

⁵⁸ DEL. CODE tit. 26, § 1014(e)(8)(e).

⁵⁹ R.I.P.U.C. No. 2035 § III.B(1).

⁶⁰ 52 PA. CODE § 75.13(c) (2008); Tariff Electric Pa. P.U.C. No. 3, Billing Provisions § 3 (effective Aug. 1, 2007) (PECO Energy Co.); WASH. REV. CODE § 80.60.030(4)(c) (2006); W. VA. CODE R. § 5.2.e (2010); P.S.C. W. Va. Tariff Nos. 12, 17, 21, Monthly charges § 5 (AEP Companies and Allegheny Power) (effective Aug. 30, 2010).

⁶¹ Puget Sound Energy Schedule 150-d, Special Terms & Conditions for Aggregation § 8 (effective March 14, 2008).

credits still remain, then the utility applies them to any additional meters in the customer's specified rank order.⁶² In Delaware, the utility must apply excess kWh credits to the meter through which the generation facility supplies electricity, and then to the customer's other meters in the customer's specified rank order.⁶³

California takes a slightly different approach from Oregon and Delaware. In California, participating customers can specify the allocation of credits by percentage to each meter, after the credits have been applied to the generation meter.⁶⁴

V. COSTS AND COST SHIFTING

All states with formal ANM programs explicitly address the cost of ANM to some degree. However, they take a variety of approaches to dealing with costs, and in particular to addressing the issue of cost shifting between ANM participants and nonparticipants. In some instances, states apply identical rules and requirements to ANM as to net metering generally, whereas in other instances, states have made additional specific rules for ANM.

California has adopted rules and tariffs that are specific to ANM, though they overlap to some extent with the state's net-metering rules and tariffs. California's utility commission must ensure that the application of the kWh generation credit to aggregated meters "does not result in a shifting of costs to bundled service subscribers," including in particular costs associated with billing.⁶⁵ The utilities include these costs as charges to ANM participants, levying a one-time \$500 set-up fee per generating account and a monthly \$30 billing fee per generating account.⁶⁶ In addition, ANM participants bear the costs of metering and interconnection.⁶⁷ Further, California allows utilities to credit only

⁶² OR. ADMIN. R. 860-039-0065(2), (4) (2007).

⁶³ DEL. CODE tit. 26, § 1014(e)(8)(f).

⁶⁴ Cal. P.U.C. Sheet No. 29206-E-14-E, Rate Schedule RES-BCT, Special Conditions § 2(b) (effective Apr. 22, 2010) (Pacific Gas & Electric); Cal. P.U.C. Sheet No. 45378-E-83-E, Rate Schedule RES-BCT, Special Conditions § 9(c) (effective Apr. 22, 2010) (Southern California Edison).

⁶⁵ CAL. PUB. UTIL. CODE § 2830(d) (1996).

⁶⁶ Cal. P.U.C. Sheet No. 29206-E-14-E, Rate Schedule RES-BCT, Billing Costs & Customer Charges; Cal. P.U.C. Sheet No. 45378-E-83-E, Rate Schedule RES-BCT, Rates (effective Apr. 22, 2010); Cal. P.U.C. Sheet No. 21848-E-51-E, Rate Schedule RES-BCT, Applicability.

⁶⁷ CAL. PUB. UTIL. CODE § 2830(b)(5), (6); Cal. P.U.C. Sheet No. 29206-E-14-E, Rate Schedule RES-BCT, Special Conditions § 1; Cal. P.U.C. Sheet No. 45378-E-83-E, Rate Schedule RES-BCT, Special Conditions § 6-7.

the customer's "electricity usage," i.e., the energy or kWh component of a customer's bill, not the other bill components, e.g., monthly billed minimum charges, customer charges, meter charges, facilities charges, and demand charges.

Delaware specifies that all net-metering rates must be identical with respect to structure and monthly charges to regular rates.⁶⁸ However, net-metering customers must pay for any additional meters or equipment beyond what is normally required under that customer's service classification.⁶⁹ Delaware requires that utilities credit residential net-metering customers for excess generation at "an amount per kilowatt-hour equal to the sum of delivery service charges and supply service charges."⁷⁰ However, it requires that utilities credit nonresidential customers for excess generation with an amount per kWh "equal to the sum of the volumetric energy (kWh) components" of the delivery and supply service charges.⁷¹ Thus, Delaware appears to require that nonresidential net-metering customers—likely the predominant type of customer in any ANM program since residential customers are unlikely to have multiple meters—receive a generation-only credit. Further, Delaware permits utilities to request assessment of additional fees for nonresidential net-metering customers "if the electric utility's direct costs of interconnection and administration of net-metering for these customer classes outweigh the distribution system, environmental, and public policy benefits of allocating the costs among the electric supplier's entire customer base."⁷²

Oregon also specifies that a utility must credit any net-metering participant, including any ANM participant, only for the kWh component(s) of the full retail rate.⁷³ It requires that all net-metering customers pay (and not be credited for) monthly charges, including basic, demand, facilities, and reactive demand charges.⁷⁴ In addition, Oregon requires that net-metering customers pay for any additional meters or equipment beyond

⁶⁸ DEL. CODE tit. 26, § 1014(e)(1), (4) (1999), as amended by S.B. 267 (Jul. 26, 2010).

⁶⁹ *Id.* § 1014(e)(6).

⁷⁰ *Id.* § 1014(e)(1).

⁷¹ *Id.*

⁷² *Id.* § 1014(e)(4).

⁷³ OR. REV. STAT. § 757.300(2)(c), 3(c) (2009); OR. ADMIN. R. 860-039-0055, -0065(3) (2007); P.U.C. Or. No. 35, Schedule 135, Special Conditions § 2 (effective Oct. 1, 2007) (PacifiCorp); P.U.C. Or. No. E-18, Schedule 203, Monthly Billing (effective Oct. 24, 2007) (Portland Gas & Electric).

⁷⁴ P.U.C. Or. No. 35, Schedule 135, Special Conditions § 2; P.U.C. Or. No. E-18, Schedule 203, Monthly Billing.

what is normally required under that customer's service classification.⁷⁵ Oregon permits its utilities, with prior approval of its regulatory commission, to charge ANM customers in particular a "reasonable fee to cover the administrative costs" of ANM.⁷⁶

In Pennsylvania, utilities must charge and credit all of their net-metering customers at the "full retail rate," which in that state includes certain generation, transmission, and distribution charges.⁷⁷ However, Pennsylvania's net-metering credit does not include or apply to any other monthly charges under a net-metering customer's normal rate, including customer charges, demand charges, and other applicable charges.⁷⁸ Further, although the utility must install a new meter if required at its own expense, any further upgrades are at the customer's expense.⁷⁹ In addition, ANM customers are responsible for the incremental costs of aggregating their meters, either physically or virtually, including account-processing costs.⁸⁰ Finally, if a net-metering small commercial, commercial or industrial customer's self-generation results in a ten percent or more reduction in the customer's annual purchase of electricity from the utility, the customer is responsible for its share of stranded costs to prevent cost shifting.⁸¹

Rhode Island requires that credits for any net-metering customer must be calculated by multiplying the amount of excess kWh generated by the sum of: "(1) the Standard Offer or Last Resort Service charge, if applicable; (2) the distribution kWh charge for the applicable rate class; (3) the transmission kWh charges for the applicable rate class; and (4) the transition charge.⁸² Rhode Island specifies that net metering "shall be limited to charges assessed on a per kilowatt-hour basis," and that customers with demand meters will continue to pay kilowatt- and/or kilovolt-ampere-based charges.⁸³ Rhode Island also allows any "prudent and reasonable" costs that the utility incurs in complying with net

⁷⁵ OR. REV. STAT. § 757.300(2)(a)-(b).

⁷⁶ OR. ADMIN. R. 860-039-0065(7); *see also* OR. REV. STAT. § 757.300(2)(c).

⁷⁷ 52 PA. CODE § 75.13(c), (i) (2008); Tariff Electric Pa. P.U.C. No. 3, Billing Provisions §§ 1-2 (effective Aug. 1, 2007) (PECO Energy Co.),

⁷⁸ 52 PA. CODE § 75.13(c), (i); Tariff Electric Pa. P.U.C. No. 3, Billing Provisions § 1.

⁷⁹ 52 PA. CODE § 75.14(b); Tariff Electric Pa. P.U.C. No. 3, Metering Provisions § 2.

⁸⁰ 52 PA. CODE § 75.14(e) (2008); Tariff Electric Pa. P.U.C. No. 3, Metering Provisions § 3.

⁸¹ 52 PA. CODE § 75.15 (2008); Tariff Electric Pa. P.U.C. No. 3, Billing Provisions § 4.

⁸² R.I.P.U.C. No. 2035 § III.B.1 (effective Sept. 30, 2009) (National Grid).

⁸³ *Id.* § III.B.3

metering, including ANM, to be aggregated on an annual basis by the utility and recovered from all customers through a uniform per kWh surcharge embedded in the distribution component of the rates reflected on customer bills.⁸⁴

In Washington, utilities may apply excess generation credits only to the “electric energy” or kWh component of any net-metering customer’s bill.⁸⁵ Utilities may also charge all net-metering customers the standard minimum monthly charge under each customer’s normal rate; this minimum monthly charge cannot be offset by generation credits.⁸⁶ In addition, although a utility must install any meters or software required for net metering, the net-metering customer must bear the costs of these upgrades.⁸⁷ The utility may charge additional fees or charges only if the state’s regulatory commission formally determines that the utility has incurred net costs (exceeding benefits), and that “[p]ublic policy is best served by imposing these costs on the customer-generator rather than allocating these costs among the utility’s entire customer base.”⁸⁸ The Washington regulatory commission permits Puget Sound Energy to charge its ANM customers that aggregate virtually an additional monthly “Aggregation Basic Charge” per aggregated meter, similar to the California utilities’ ANM monthly charge.⁸⁹ Puget Sound Energy’s Aggregation Basic Charge is equivalent to the basic charge under each customer’s normal rate.⁹⁰

Finally, West Virginia requires that any net-metering credits shall not be applied to any fixed monthly minimum bill, customer charge, demand charges, or other charges not related to energy consumption, as would be applied to a net-metering customer under his or her normal rate.⁹¹ West Virginia also clarifies that the utility is responsible for installing

⁸⁴ *Id.* § III.B.5; *see also* R.I. GEN. LAWS § 39-26-6(h) (2009).

⁸⁵ Puget Sound Energy Schedule 150-a, Net Energy Billing Terms & Conditions § 1-4 (effective March 14, 2008).

⁸⁶ WASH. REV. CODE § 80.60.20(1)(c); Pacific Power & Light Schedule 135-1, Special Conditions § 5 (effective Feb. 1, 2007); Puget Sound Energy Schedule 150-a, Monthly Rates (effective March 14, 2008).

⁸⁷ WASH. REV. CODE § 80.60.030(2); Pacific Power & Light Schedule 135-2, Special Conditions § 7; Puget Sound Energy Schedule 150-b, Terms & Conditions.

⁸⁸ WASH. REV. CODE § 80.60.20(1)(c).

⁸⁹ Puget Sound Energy Schedule 150-d, Special Terms & Conditions for Aggregation § 6.

⁹⁰ *Id.*

⁹¹ W. VA. CODE R. § 5.2.a-c (2010); P.S.C. W. Va. Tariff Nos. 12, 17, 21, Monthly charges § 4 (AEP Companies and Allegheny Power) (effective Aug. 30, 2010).

a new meter for any net-metering customer, if necessary, but the customer must bear this cost, along with any other equipment costs, system upgrade costs, or other related costs.⁹²

VI. CONCLUSION

For some aspects of ANM, many or all states are taking the same approach. For example, all states with formal programs address system reliability and safety concerns by requiring that ANM facilities meet states' and/or utilities' technical standards. Likewise, all states require the same meters for ANM as for their broader net-metering programs. Most states with formal ANM programs—five of the seven—allow all customer classes to participate. Similarly, most states allow meter aggregation regardless of tariff class, either specifying thus or else not addressing the subject at all.

By contrast, states' approaches for other aspects of ANM vary, sometimes widely. For example, although all states limit system capacity, or cumulative aggregate net metering or ANM capacity, their approaches are different. Some limit one or the other, and some limit both. As for the specific limits themselves, their levels also vary. Similarly, although several states with formal programs—four of the seven—limit the geographic distance between generation and load, their limits varied from the boundaries of the local government customer in California, to the same property or contiguous properties in other states. In addition, although all states allowed that customers would choose which accounts could participate in ANM, states were inconsistent as to whether and how they restricted designation and change of participating accounts, and how utilities would allocate excess generation credits to participating accounts. For the latter issue, however, two primary approaches emerged: some states required utilities to apply credits equally to accounts, whereas others allowed the customer to either rank accounts or specify percentages of credits per account. Regardless of approach, all states stipulated that credits first be applied to the generating account. Finally, although all states tended to credit only the kWh component(s) of net-metering customer's bills, their overall approaches to addressing costs and cost shifting varied. In the end, however, cost issues emerged as key across all states.

⁹² W. VA. CODE R. §§ 3.5, 6.2, 6.5; P.S.C. W. Va. Tariff Nos. 12, 17, 21, Metering.

TABLE: State Aggregated Net Metering Policies

	ANM status	Eligible customers	Eligible tariffs	System capacity limit	Cumulative capacity limit	Geographic location	ANM admin limits	Allocating credits	Crediting of excess generation to bill	Additional fees
CA	Full program	Local government	All must be TOU	ANM = 1 MW	250 MW within 3 major IOU's service territories	W/in geographical boundaries of local government	Only 50 accts; can change once/year w/ 60 days notice	By customer percentage	Only to kWh component	\$500 one-time set-up fee; \$30 monthly billing fee
OR	Full program	All	Any but must be the same	Res = 25 kW Non-res = 2 MW	None	Same property or contiguous property		By customer ranking	Only to kWh components of full retail rate	For additional meters/equipment required; permitted to request admin fee
PA	Full program	All	Any	Res. = 50 kW Non-res = 3 MW, up to 5 MW	None, except no "adverse impact"	W/in 2 miles of generation	Can change w/ 60 days notice	Equally	To full retail rate, excluding monthly charges, e.g., demand charges	For meter/equipment upgrades; any incremental aggregation costs; potential stranded cost recovery fee
RI	Full program	Cities, towns, etc.	Appears to be any	General = 1.65 MW City/town location = 2.25 MW City/town owned = 3.5 MW	2% of peak load; 1 MW reserved for projects < 25 kW		Only 10 accts		Only to kWh charges	Reasonable compliance costs aggregated on annual basis into per-kWh surcharge
WA	Full program	All	Any	All = 100 kW	0.25% of 1996 peak demand (will increase to 0.5% in 2014)	Utility service territory		Equally	Only to kWh component	Standard monthly charge; meter/equipment upgrades; permitted to request additional fee, e.g., aggregation basic charge
WV	Full program	All	Appears to be any	Res = 25 kW Comm = 500 kW Indus = 2 MW Muni/coop = 50 kW	3% of aggregate peak demand in previous year; 0.5% reserved for residential	Same property or contiguous property but w/in 2 miles of generation		Equally	To rate excluding any charges not related to energy consumption, e.g., demand charges	Meter/equipment costs and other system upgrade costs
DE	Statute passed; rules pending	All	Any	Res = 25 kW Ag/muni = 100 kW Non-res = 500 kW or 2 MW + 110% avg load	5% of peak demand	Utility service territory	Can change once/year w/ 90 days notice	By customer ranking	Res = to sum of charges Non-res = to kWh components of sum of charges	For additional meters/equipment required; permitted to request cost-recovery fee
NJ	Pilot program	Agricultural	Appears to be any			Same property				
CT	Considering	Agricultural, municipal, non-profit?								
MD	Considering									