**LMP-G in ERCOT**

*Prepared by the Loads in SCEDv2 Subgroup*

*of the ERCOT Demand Side Working Group*

XXXX, 2015

[1 EXECUTIVE SUMMARY 1](#_Toc421017883)

[1.1 Background 1](#_Toc421017884)

[*1.1.1* *What the LRISv2 Subgroup has learned about LMP-G* 1](#_Toc421017885)

[*1.1.2* *What is LMP-Proxy $G?* 2](#_Toc421017886)

[1.2 Impetus for the LMP-G Concept Paper 3](#_Toc421017887)

[2 LMP-G Concepts 3](#_Toc421017888)

[2.1 LMP-Volumetric G 3](#_Toc421017889)

[*2.1.1* *LMP-Volumetric G Overview* 3](#_Toc421017890)

[*2.1.2* *LMP-Volumetric G Challenges* 3](#_Toc421017891)

[2.2 LMP-Proxy $G 4](#_Toc421017892)

[*2.2.1* *LMP- Proxy $G Overview* 4](#_Toc421017893)

[*2.2.2* *LMP- Proxy $G Challenges* 5](#_Toc421017894)

[2.2.2.1 How to determine Proxy $G? 5](#_Toc421017895)

[2.2.2.2 Proxy $G Customer Eligibility 6](#_Toc421017896)

[*2.2.3* *LMP-Proxy $G Eligibility Check Options* 7](#_Toc421017897)

[Option 1: All Residential Exemption 7](#_Toc421017898)

[Option 2: DR Provider of Record (REP/DR QSE Administered) 8](#_Toc421017899)

[Option 3: DR Provider of Record (ERCOT verifies non-DR retail rates) 9](#_Toc421017900)

[3 Other Details 11](#_Toc421017901)

[3.1 ALR Disaggregation and Minimum Size Requirements 11](#_Toc421017902)

[*3.1.2* *ALR Served by a single REP* 11](#_Toc421017903)

[*3.1.3* *ALR Served by multiple REPs* 12](#_Toc421017904)

[3.2 Non-Opt In Entity Territory Considerations 13](#_Toc421017905)

[3.3 Management of Bounce Back Issues 14](#_Toc421017906)

[APPENDIX A – Discussion on Full LMP 15](#_Toc421017907)

[APPENDIX B – Bounce Back Example 17](#_Toc421017908)

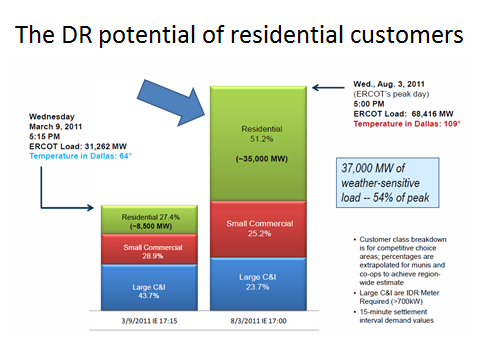
# EXECUTIVE SUMMARY

## Background

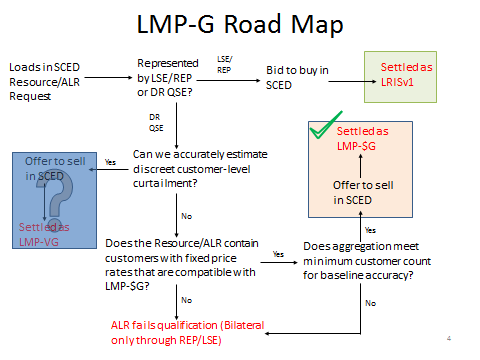
In the fall of 2011, the Technical Advisory Committee (TAC) voted to endorse the principle of “LMP-G” rather than “Full LMP” as the settlement mechanism to enable direct participation in the real-time market by DR QSEs (i.e. Curtailment Service Providers)[[1]](#footnote-1). As presented at TAC, LMP-G establishes the principle that a customer will not receive the benefit of their curtailment twice ( i.e. LMP plus avoided cost of energy). TAC endorsed ‘volumetric’ LMP-G (LMP-VG), which requires assignment of the estimated curtailment kWh back to a specific customer. Through significant discussion and analysis from ERCOT and stakeholders, the LRISv2 Subgroup determined that customer-specific curtailment cannot be estimated for the vast majority of customers, including all residential, with a sufficient level of accuracy to be considered for implementation.

### *1.1.1 What the LRISv2 Subgroup has learned about LMP-G*

(1) Residential customers must be aggregated to allow for accurate baseline estimation of curtailment quantity. A minimum size of an aggregation can be defined. Some mid-to-large commercial/industrial customers may have site-level curtailment quantity estimated with sufficient accuracy. Residential customers account for over 50% of the ERCOT summer peak load, and therefore represent the greatest potential for price responsive load. Depending on control systems, residential aggregations may be well-suited to follow SCED base point instructions.



(2) LMP-VG requires LSEs/REPs to bill customers for consumption that didn’t occur, which raises concerns about Public Utility Commission of Texas (PUCT) Substantive Rule and PURA violations. In addition, LMP-VG presumably targets larger customers which may be already be participating directly through other ERCOT programs (i.e. ERS, Load Resources) and represent less of an underserved segment compared to the residential class of customers. The LRISv2 Subgroup therefore recommends that an LMP-G initiative first focus on customers on fixed price contracts (which includes most of the residential market) and be based on LMP-Proxy $G which resolves the significant legal concerns associated with implementation of LMP-VG.



### *1.1.2 What is LMP-Proxy $G?*

Under a LMP-Proxy $G implementation, retail customers are compensated “as if they had entered into a long-term contract to purchase electricity at their retail rate but instead, during a peak demand period, resold the electricity to others at the market rate (LMP).”[[2]](#footnote-2)

Therefore, Proxy $G is an estimate of the rate at which the retail customer would have purchased the electricity which will allow settlement to treat the customer as if it had first purchased the power it wishes to resell to the market.In other words, Proxy $G represents a proxy for the “purchase price” or “contract price” that is generally representative of what retail customers paid for their electricity which includes a risk premium.

## Impetus for the LMP-G Concept Paper

Numerous complex policy and technical issues remain to be addressed for LMP-$G to be implemented. Recent discussion at the LRISv2 Subgroup has revealed that the principles of LMP-G may not achievable without significant complexity and impact to the existing wholesale and retail markets. The LRISv2 Subgroup and the DSWG agreed that a concept paper should be drafted to describe all issues related to LMP-G, including revisiting Full LMP, to facilitate stakeholder review and consideration. The remaining sections of this LMP-G concept paper describe the policy and technical issues related to LMP-G as well as pros and cons. This paper will then be presented to WMS and TAC for further direction on these policy and technical matters.

# LMP-G Concepts

LMP-G settlement seeks to replicate an end use customer purchasing energy at their retail rate and then reselling that energy at market price. The LRISv2 subgroup has discussed two separate LMP-G concepts: LMP-volumetric G and LMP-$G.

## LMP-Volumetric G

### *2.1.1 LMP-Volumetric G Overview*

(1) LMP-VG would involve ERCOT settling a REP whose customer’s load is curtailed due to a SCED dispatch as if the customer had purchased the energy that was curtailed. The curtailed kWh would be directly assigned to the individual customer ESI ID. Direct assignment of the load to individual ESI IDs could be accomplished by ERCOT for NOIEs, large commercial and industrial single-site Load Resources, and potentially small numbers of aggregations of larger C&I customers that are similarly situated (i.e., the aggregation could be accurately baselined).

### *2.1.2 LMP-Volumetric G Challenges*

(1) REPs have raised concerns about customer billing associated with LMP-VG, suggesting that the REP should be allowed to bill the end use customer for energy not consumed (curtailed energy), as a “make-whole” provision. While REPs desire to be “made-whole” for their wholesale energy purchases, from a customer perspective, the concept of being billed for energy not consumed is problematic because customers have no obligation to buy any particular amount of energy from their REP. Additionally, PUCT rules do not allow REPs to bill customers for unused energy. Therefore, if LMP-VG is included as an option for participation by large commercial and industrial customers, then a PUCT rulemaking will be needed to clarify the implementation details.

(2) One of the key policy decisions that must be addressed in implementing the LMP-G approach is which of the versions of LMP-G should be adopted. In order to focus on the large energy reduction potential in the residential and small commercial classes, the DSWG subgroup working on this issue has focused on LMP-Proxy $G, which appears to be feasible for mass market customers. The LMP-VG approach may still be feasible for implementing Loads in SCED among large commercial customers. These customers are more likely to be capable of being baselined on an individual basis, and through customer agreement, they could be charged for energy not metered. So the initial policy decision is whether in the immediate future to continue the effort to implement Loads in SCED using the LMP-Proxy $G approach, to seek to obtain the benefits of DR from residential and small commercial customers, or to pursue instead the LMP-VG approach, or pursue both. Setting aside either LMP-VG or LMP-Proxy $G for now does not necessarily mean it would be set aside forever. If either version of implementing LMP-G can be implemented among suitable customers, and DR Providers and customers participate in SCED as a result, there would be an opportunity in the future to implement the approach that was previously set aside.

## LMP-Proxy $G

### *2.2.1 LMP- Proxy $G Overview*

(1) The purpose of LMP-Proxy $G is to avoid double payments to customers through a different mechanism than LMP-VG. As is discussed above, Volumetric G would increase the demand-response customer’s load during a DR event, so that the customer’s load-serving entity (a REP or NOIE) would be billed for the energy the customer would have consumed, as if the customer had not participated in the event, at the energy market price, and it is assumed that the LSE would bill the customer for that additional consumption at the contract or tariff price. In this situation, the DR QSE would receive the LMP for the DR deployment, and the customer would receive whatever contractual benefit the DR Provider and the customer had agreed to. However, the customer would probably not get the additional benefit of a lower energy bill resulting from reducing consumption of energy during the DR event, because of the billing of the Volumetric G to the customer’s LSE. Thus, a double payment to the retail customer would probably be avoided. (As is discussed in more detail below, the LSE-customer relationship is to a large extent unregulated, so there is not a certainty that all LSEs would bill their customer for the additional consumption represented by Volumetric G.) Because of the difficulties with Volumetric G discussed, above, a different approach was needed.

(2) The LMP-Proxy $G approach would avoid the double payment problem through matching transactions at a rate equal to the energy market price, or LMP, minus the retail energy price, or Proxy $G. Under LMP-Proxy $G, ERCOT would pay DR Providers for load reductions in SCED at a price equal to LMP-Proxy $G, and it would charge LSEs at a price equal to LMP-Proxy $G for their customers’ load reductions. From a billing perspective, this approach mirrors the billing that would occur under LMP-Volumetric G. Under either concept, there is no double payment from ERCOT and no uplift payments, because the payments to DR providers are covered by the charges to LSEs.

(3) The LMP-Proxy $G approach would also avoid the obstacles of billing customers for energy they do not consume and estimating load reductions for individual retail customers. ERCOT can estimate load reductions of aggregations that include a sufficiently large number of customers, and it is doing so today under the Emergency Response Service program. It would be able to do sufficiently accurate estimates of load reductions at the LSE/aggregation level, and would be able to calculate the appropriate charge to the LSE.

### *2.2.2 LMP- Proxy $G Challenges*

(1) LMP-Proxy $G consists of two elements: (i) the market price (LMP) of energy at the time of the load reduction, and (ii) the customer’s cost of the energy, which is assumed to be a rate that is not based on the variable prices in the ERCOT real time market, but a longer-term price that is fixed for some period. Effectively, this results in the customer being treated as if it purchased the energy at $G and then sold the unused energy back to market, through its agent, the DR Provider, at LMP. The actual benefits that the DR QSE provides to the customer are a matter of contract between them and could include a portion of the payment that the DR QSE receives when its bid is struck, a contractual payment not directly related to the LMP in any particular interval, or equipment that the DR QSE installs in the customer’s home or business.

(2) The LSE is also affected by the pricing scheme in the LMP-Proxy $G approach. A question that may arise is whether the LSE will be facing new charges that it has no ability to recover from customers. The LSE-customer pricing relationship is mostly unregulated, so it is not feasible for ERCOT to address how the LSE deals with a customer that is participating in Loads in SCED through a DR QSE. (Similarly, the PUC is probably also not able to address this issue.) However, the LSE will have the information that will empower it to address the issue. In the first place, if an LSE knows that particular customers are participating in Loads in SCED, it can change its risk mitigation/hedging strategies, if appropriate, to deal with the possibility of receiving ERCOT charges for load reductions related to particular customers. In addition, the LSE has the latitude to adopt prices for customers who participate in Loads in SCED that compensate it for the additional costs and risks involved.

(3) One of the issues with respect to LMP-Proxy $G is whether ERCOT can bill REPs for energy not consumed. The question of whether this is feasible under current rules has not been addressed. Whether or not it is feasible, it is probably an issue of sufficient magnitude that it should be considered by the PUCT prior to adopting this approach.

(4) There are additional issues related to LMP-Proxy $G that are addressed below: how to determine the Proxy $G, and whether there are some customers whose rates are not consistent with the LMP-Proxy $G approach.

#### 2.2.2.1 How to determine Proxy $G?

(1) Conceptually, Proxy $G is the energy portion of a customer’s retail rate. It is the amount that the customer pays for energy in the monthly electric bill. In a robust retail competition environment like ERCOT, with millions of customers taking service on hundreds of different rate plans, one of the challenges is to develop a method for determining Proxy $G that can feasibly be implemented by ERCOT. Whenever a customer or aggregation deploys a demand resource in SCED, ERCOT must include a Proxy $G component in its calculation of payments to DR Providers and charges to REPs, so it must have a clear and specific method for determining Proxy $G. At the same time, DR QSEs and REPs, for financial and customer relations reasons, must have a clear understanding of how Proxy $G is determined. Finally, the method for determining Proxy $G must also be consistent with the economics of the market; it should not provide inappropriate incentives. If the methodology results in a Proxy $G that is too high, the payment to DR QSEs, LMP-G, might be so small that it would stimulate little load participation in SCED. If the methodology results in a Proxy $G that is too low, the payment to DR providers might be larger than appropriate to stimulate load participation in SCED, and it would result in a greater cost to REPs, who are charged LMP-G for their customers’ deployments.

(2) Under current market conditions, the risk of selecting a method that results in a calculation of Proxy $G that is too high or too low seems remote. It seems likely that Proxy $G will be much smaller than the LMPs at which most customers would offer to reduce load. Thus, if most customers would be expected to offer to reduce consumption at a price of $3000 or more, and retail rates are in the $10 to $15 range, doubling or halving the Proxy $G rate would have minimal impact on the LMP-G result.

(3) As described above, Proxy $G represents the rate at which the retail customer would have purchased the electricity. The LRISv2 Subgroup discussed various ways to calculate Proxy $G such as using Real-Time Settlement Point Price (RTSPP) averages, Power to Choose rates, and POLR rates. It was recognized that RTSPP averages would exclude important components of the retail rate such as risk premium. The use Power to Choose prices would require increased complexity to incorporate these prices into ERCOT systems and would require selection of a single rate out of many. The LRISv2 Subgroup found that the use of POLR rates to determine Proxy $G would be optimal since POLR rate structures are well vetted at the PUCT, transparent and formulaic, and updated on a regular basis. The LRISv2 Subgroup discussed whether to calculate Proxy $G for each Load Zone. Since POLR rates are calculated by TDSP territory, there is not a direct overlap of a POLR value to a Load Zone. In addition, since Proxy $G is only intended to estimate an average retail customer’s risk adjusted rate, it will never be precise and a single ERCOT-wide Proxy $G would be appropriate given the unnecessary complexity of calculating a zonal value. A single ERCOT-wide $G could be calculated as the simple average of POLR rates for each TDSP.

#### 2.2.2.2 Proxy $G Customer Eligibility

(1) The principle of LMP-G requires that a customer cannot benefit from their DR capability more than once. In ERCOT’s robust retail market, customers are offered numerous types of retail products from REPs which provide the customer compensation for DR capabilities. Therefore, in order to implement LMP-Proxy $G in ERCOT, a set of eligibility rules must be established which ensure that the customer isn’t already receiving benefit from their REP for their DR capability. The vast majority of customers in ERCOT are on fixed price retail contracts and those customers would be eligible for DR QSEs to register for participation in SCED. Multiple complexities exist with an eligibility check.

(a) The first complexity lies in designing a mechanism to identify each customer’s rate that has been submitted by a DR QSE to perform the eligibility check. Customer rates are not disclosed on retail transactions and are subject to frequent change as customers switch REPs and rate plans.

(b) The second complexity is to determine whether the retail rate provides the customer DR compensation that would conflict with the principles of LMP-G. For example, many customers are on Time Of Use (TOU) rates in ERCOT but these rates are behavioral DR which encourage long-term changes in a customer’s usage patterns. A customer may still have DR capability to respond to event driven DR events and therefore should be eligible for a DR QSE to solicit service. However, REPs are constantly designing new rate structures based on customer demands and it would be difficult accurately track new rate products and evaluate whether each new rate compensates a customer for DR capability in a way that violates the principles of LMP-G.

(2) The consequence of not performing the eligibility check accurately is severe. If the eligibility check misses customers already receiving benefit on a REP rate, the customers are incentivized to over-provide their DR capability when it is not truly economic for them to do so and REPs which serve those customers will see unexpected load applied to their settlement at times when prices are high causing unmanageable financial harm.

(3) Due to the complexity and importance of the LMP-Proxy $G eligibility check, the LRISv2 Subgroup examined numerous options for how it could be implemented and discussed the pros and cons of each approach. The following section explains those options.

### *2.2.3 LMP-Proxy $G Eligibility Check Options*

#### Option 1: All Residential Exemption

1. Under this option, all residential customers would be exempted from a Proxy $G eligibility check, and the eligibility check would thus be limited to the non-residential classes. The premise behind a residential exemption is that the vast majority of residential customers pay fixed prices for their electricity, consistent with the POLR-based Proxy $G calculation, and accordingly the “double payment” to the customer for a SCED instruction to reduce Load is avoided.
2. True *indexed* pricing is indeed extremely rare within the residential class. For example, in 2014 only 288 residential ESI IDs — less than one ten-thousandth of 1 percent of the total residential ESI ID headcount — were reported by REPs to ERCOT as being on “Real-Time Pricing” offerings.[[3]](#footnote-3) Zero residential ESI IDs were reported on “Block and Index” price offerings. Additionally, the subgroup reached consensus that Time of Use price offerings such as Free Nights or Free Weekends — which data shows are increasingly popular among residential customers — should not be considered as “indexed” since the hours of dynamic pricing are fixed and known in advance and do not track real-time wholesale market price fluctuations.
3. A more problematic price offering, however, is the Peak Time Rebate. ERCOT’s data collection project for 2014 revealed that more than 400,000 residential customers were reported by REPs as eligible for peak-time rebates. Under this type of price offering, customers do pay a fixed price for their electricity at all times, but may be rewarded financially for a load reduction taken in response to a notification by the REP of a “peak time event.” Event triggers, reward levels, and testing policies may vary wildly across the REP community, and potentially even within an individual REP’s offering; ERCOT’s data collection project does not include a mechanism for determining these levels of detail. Based on anecdotal responses to bilateral questions from ERCOT, during the summer of 2014, only a small fraction of these 400,000+ customers were subject to an “event,” and an even smaller number (if any) were actually paid a peak rebate award. It should be noted here that the summers of 2012 through 2014 have notable for their lack of the type of sustained high-price events that would typically trigger a peak-event notification. Nevertheless, more common sustained price spikes would have the potential to produce peak rebates for a significant percentage of the ERCOT residential ESI ID population, and peak rebates could meet the definition of a double payment to the customer.
4. Because of the potential for double payments to customers on Peak Time Rebate price offerings, the subgroup was unable to achieve consensus in favor of the All Residential Exemption option.

#### Option 2: DR Provider of Record (REP/DR QSE Administered)

(1) The subgroup also explored the option of creating a system that tracks a Demand Response Provider of Record (DRPOR) for individual ESI IDs in ERCOT. We envisioned this system working similarly to the TX SET system currently in use to track the REP of Record responsible for serving each ESIID. Any entity (a DR QSE or a REP) who wished to enroll a customer in an ALR would have to be registered as that customer’s DRPOR. Customers can freely switch DRPORs at any time. The REP or the DR QSE who wishes to become the customer’s DRPOR would simply submit a switch transaction. The customer’s current DRPOR, if that customer has a registered DRPOR, would be notified, as REPs are notified of switch transactions in TX SET today, and the current DRPOR would have three days, for example, to undo the transaction with the customer’s permission. This gives the current DRPOR the opportunity to alert his customer if he or she, by moving to another DRPOR, has violated a term of his agreement with his current DRPOR or is subject to a termination fee.

(2) REPs could, but would not be required to, use the DRPOR system in conjunction with customers whom they put on DR rates (e.g., peak time rebates, real time pricing, etc.). Since the REP would presumably not want to offer these types of rates if a customer were simultaneously enrolled in an ALR, the REP would likely want to become the customer’s DRPOR when it places them on such rate, so that the REP will be notified if the customer attempts to join an ALR. The REP can then take whatever action it chooses or that its contract with the customer allows—collect a termination fee, revert the customer to a flat rate, warn the customer that it will be switched to a different rate, etc.

(3) This option preserves many of the benefits of the previous option—customers can freely choose their DR QSE, ERCOT does not need to maintain a list of “DR Rates” that prohibit a customer from joining an ALR, etc. But it also adds a layer of protection for both REPs and DR QSEs that allows them to have more control and visibility into when customers are joining and leaving their ALRs or DR rate plans. This system can also be used to resolve registration conflicts for ALRs in ERS, which is an issue the DSWG is seeking to resolve.

(4) Further study will be required to evaluate the cost of developing a DRPOR system and the administrative burdens that its use will place on DR QSEs and REPs. PUCT rules may also be required to ensure that REPs and DR QSEs don’t engage in anti-competitive behavior, taking advantage of customer ignorance of DR concepts to insert contractual provisions that limit a customer’s flexibility in choosing his or her DR QSE.

#### Option 3: DR Provider of Record (ERCOT verifies non-DR retail rates)

(1) Stakeholders considered in-house REP validation of demand response participation of as an alternative to the potentially costly Demand Response Provider of Record solution. Specifically, this solution would require that ERCOT and REPs perform a validation to ensure that ALR participants are not simultaneously enrolled in a retail electric rate that also encourages demand response (potentially conferring a double-payment.)

(2) ERCOT currently performs validations on ALRs by their ESI ID. This option would add a step, where ERCOT would, potentially in an automated process, verify with the retailer that ALR participants were not on a demand response rate. If that customer were on a demand response rate, then they would be ineligible for participation in the ALR. If the DR QSE wanted to retain this customer in their aggregation, it would be the responsibility of that DR QSE to inform their customer of the incompatibility of the products. If the customer still wanted to participate in the aggregation, then that customer would be responsible for contacting their REP and changing their plan to a rate that is compatible with LMP-Proxy $G participation. Thereafter, the customer and or DR QSE would have to re-initiate the validation process for that (those) customer (customers.)

(3) The advantages to this approach are as follows:

1. Increased transparency and improved hedging opportunities;

*This approach provides the REP insight into what customers are participating or would like to participate in a demand response program. Astute REPs could aggregate customers participating in DR QSE programs and improve their ability to hedge for customer behavior that may be inconsistent with other customer populations (as a result of participation in a DR QSE program.) Additionally, REPs would have the benefit of targeting customers with an interest in demand response and provide focused retail-product offerings.*

(b) Minimal or no impact to Texas SET;

*Modifying Texas SET creates costly changes, which all retail market participants must bear. Rather than implement extensive changes to facilitate a Demand Response Provider of Record (including switches, move-in, move-out, change of DR rate, etc) individual retailers could implement their own solutions to track customer participation in DR rates (and may already be doing so.) Retailers that do not offer demand response rates could easily communicate to ERCOT that all customers within their retail portfolio are eligible for participation in DR QSE aggregations. REPs with extensive DR QSE participation within their retail book could implement more elegant solutions best tailored to their practices.*

(c) Increased Accuracy .

*Creating a requirement for ERCOT and retailers to perform a review of all customers participating in a DR QSE aggregation would presumably increase accuracy and reduce the possibility of a “double payment” to customers inadvertently participating in both an aggregation and a DR Rate.*

(4) The disadvantages of this process are as follows:

a) Identification of real-time rates that confer a “double payment”;

*If ERCOT and REPs are to be responsible for verifying compatibility between rates and ALR participation eligibility, then it must be abundantly clear which rates are considered to be related to demand response. The competitive ERCOT retail market has produced tremendous diversity in rate plans. Unfortunately, this diversity of rate plans creates a challenge: there is no ‘one-size-fits all’ when characterizing what rates provide demand response. The PUCT would likely have to create clear cut rules about what constitutes a demand response rate. Thereafter, ERCOT, or another neutral DR QSE, would have to apply this rule to each and every rate plan. Additionally, this may be a going concern. As customers switch rate plans, they would need to be re-verified for eligibility to participate in a DR QSE aggregation. This could be an arduous task and place an undue burden on the ALR qualification process. This concern may not be unique to this option, as evidenced elsewhere in this paper.*

(b) Potential for anti-competitive behavior;

*Demand Response providers expressed concerns that REPs may attempt to block participation in a DR QSE aggregation by designating all of their customers on a real-time rate. This is yet another reason clear rules must be established and enforced when classifying rate plans as eligible for participation in a DR QSE aggregation. This is not to be confused with REP actions to competitively retain a customer’s demand response services. Today, when a REP receives a notification that a customer intends to switch their electricity provider, the REP may engage in an effort to retain that customer with enhanced pricing and/or product offerings. Similarly, if a REP learns that a customer intends to bring their demand response business to a competitor, that REP may attempt to retain that customer with demand response offerings.*

(c) Increasing volume of transactions/switches may overwhelm REP/ERCOT resources.

*As evidenced with the tremendously successful ERCOT retail markets, customer switches are a sophisticated daily routine with high volume. This option may only be suitable as an interim solution. As customers switch REPs, their participation in an ALR may become unreasonable for a DR QSE to track eligibility. Further, the competitive actions between REPs and DR QSEs may result in high volume of transactions, also placing an undue burden on ERCOT, DR QSEs, and REPs.*

# Other Details

## ALR Disaggregation and Minimum Size Requirements

(1) The principal challenge in designing a LMP-G model has been preserving the concept of LMP- G while accommodating DR QSEs in the Real-Time Market.

(2) Under the proposal for LMP- VG, ERCOT would settle a REP’s QSE as if the REP’s customers actually had purchased the curtailed energy. This would be accomplished by adding a calculated estimate of the curtailed MWs back to the REP’s Load in Settlement at the ESI ID level, effectively directly assigning the DR value to the individual customer. (The customer’s REP would then have the data necessary to bill customer for that [unused] energy at retail rate.) In concept, since DR values would be calculated at the ESI ID level, REPs of Record would be irrelevant and ALRs spanning multiple REPs would be on equal footing with ALRs in which all members are served by the same REP.

(a) This approach was deemed unachievable for many Load Resource types, especially Aggregate Load Resources (ALR) comprised of large aggregations of residential or small commercial customers. In such cases, the task of calculating ESI ID-level load reductions would be unworkable for several reasons:

(i) The ESI ID-level load modeling would be extremely burdensome on the ERCOT ISO;

(ii) The accuracy of ESI ID-level modelling would be unacceptable. While large aggregations of small, homogeneous loads tend to have relatively smooth and predictable load shapes, individual loads within such aggregations tend to be spiky and unpredictable; and

(iii) The inaccuracy of ESI ID-level modelling likely would lead to numerous disputes.

(b) The Loads in SCED v2 Subgroup ultimately recommended abandoning development of the “Volumetric G” solution for ALRs, except for certain ALRs that may consist of small numbers of highly predictable and measurable individual loads.

(3) The subgroup envisions that basing the LMP -G transaction in dollars (Proxy $G) rather than megawatts will avoid the Volumetric G pitfall. However, Proxy $G as it would apply to ALRs brings different but similar challenges, including potential conflicts with PUCT customer privacy rules.

### *3.1.2 ALR Served by a single REP*

(1) In cases where all ESI IDs in an ALR are served by the same REP, ERCOT would perform the following steps, eliminating the task of allocating volumetric DR values to each member of the ALR:

(a) Qualify the ALR in part by verifying that it is of sufficient size (i.e., consists of a sufficient number of ESI IDs) to enable ERCOT to accurately model the load[[4]](#footnote-4);

(b) Calculate the DR quantity at the ALR level;

(c) For settlement purposes, add the DR quantity onto the REP load to treat the REP as if its customers had not reduced their load; and

(d) Multiply the DR quantity by Proxy $G for each interval, and pay the REP, to treat the REP as if its customers had paid their bills and the REP was “made whole” by Proxy $G.

(2) Establishing a requirement for all members of an ALR to have the same REP, however, would be problematic. The third-party DR QSE would need to know each customer’s REP of Record before it could enroll the customer in its ALR, and a systematic way of doing this does not exist. Acquiring such information from the customer would obviously be subject to reporting error and would be complicated by the need to communicate any customer migration from the REP of Record. Enabling such a relationship and transaction system would likely require a PUCT rulemaking.

### *3.1.3 ALR Served by multiple REPs*

(1) In cases where ESIIDs in an ALR are served by multiple REPs, ERCOT would:

(a) First, verify that each REP portfolio within the ALR is of sufficient size to enable accurate load modeling[[5]](#footnote-5). If a REP portfolio within an ALR is too small to meet this standard, those ESI IDs would need to be removed from the ALR. This would necessitate a transaction from ERCOT to the DR QSE;

(b) Calculate the DR quantity for each REP at the REP portfolio level within the ALR;

(c) For settlement purposes, add the REP-specific DR quantity onto the REP load to treat each REP as if its customers had not reduced their load;

(d) Multiply the REP-specific DR quantity by Proxy $G for each interval, and pay each REP, to treat the REP as if its customers had paid their bills and the REP was “made whole” by Proxy $G; and

(e) Aggregate all ESIIDs to the ALR level and calculate the Resource-level DR quantity to determine the LMP - Proxy $G payment due to the DR QSE.

(2) For this case, ERCOT would have to ensure that disaggregating the Resource-level DR quantity down to the REP-level would be sufficiently accurate for all participating REPs. If the DR quantity for a REP is found to not be sufficiently accurate, all ESI IDs for that REP would be removed from the Aggregated Load Resource.

## Non-Opt In Entity Territory Considerations

(1) SCED participation is open to Load Resources located within the service territories of Non-Opt In Entities (NOIEs), consisting of municipally owned utilities and electric cooperatives that have not opted into customer choice. NOIE QSEs representing their own Controllable Load Resources are already eligible to participate in SCED (Loads in SCED v1), via submissions of bids to buy power “up to” their specified strike price[[6]](#footnote-6). The “bid to buy” approach produces outcomes fully consistent with the concept of LMP- G, since there are no third parties involved and no dollars exchanged other than through normal real-time market energy transactions.

(2) However, under current market rules it is possible for a third-party DR QSE to recruit Loads within a NOIE service territory and, in theory, to combine some NOIE Loads (designated as “unique meter identifiers,” or UMIDs) with ESI IDs from competitive choice areas in the same ALR — so long as all of the participants are located within the same Load Zone. In such cases, the “bid to buy” approach — which requires the DR QSE to also be the Load-Serving Entity QSE — would be unworkable since third-party QSEs cannot serve load in a NOIE territory.

(3) Pursuant to NPRR 534, which was approved by the ERCOT Board in May 2013, NOIEs must provide written permission for such third-party QSEs to recruit participants in their territories. To date, with respect to loads’ participation in Ancillary Services or ERS, some NOIEs have elected to provide such permission, while others have declined to do so.

(4) So, participation by NOIE loads represented by third-party DR QSEs under a Proxy $G scenario could take one of two forms: 1) an ALR consisting entirely of NOIE UMIDs, or 2) an ALR consisting of a combination of NOIE UMIDs and competitive ESI IDs, in which each LSE’s portfolio within the ALR meets or exceeds the minimum portfolio size threshold established by ERCOT. In either case, the following would apply:

(a) The NOIE TDSP or Meter-Reading Entity (MRE) must assign a permanent UMID to each participating premise consistent with the requirements detailed in the Other Binding Document (OBD) entitled “Requirements for Aggregate Load Resource Participation in the ERCOT Markets”[[7]](#footnote-7);

(b) To support telemetry validation and event performance measurement & verification, each participating premise must have 15-minute interval metering read by the NOIE TDSP or MRE; and

(c) Both the 15-minute interval meter data sets and all transactions related to ALR population maintenance would be submitted by the NOIE TDSP, MRE and/or QSE using the market interface developed for Loads in SCED v1[[8]](#footnote-8) and the processes described in the ALR OBD.

(5) Timely Settlement would require prompt submissions of the transactions described in paragraph (4) above.

(6) In cases where an ALR is comprised of Loads served by both NOIEs and REPs, ERCOT would evaluate the performance of each LSE portfolio separately within the ALR (as described earlier), and would then combine the portfolios to the ALR level for settlement under the Proxy $G methodology. In this scenario, NOIEs and REPs are treated equally in settlement, as LSEs.

## Management of Bounce Back Issues

(1) The LRISv2 Subgroup discussed an additional technical issue regarding LMP-G settlement between DR QSEs and REPs that would occur upon recall of a SCED deployment. Once SCED recalls a DR deployment, weather sensitive loads such as residential A/C loads may briefly consume more electricity than what they would’ve consumed if a deployment had not occurred. This “bounce back” effect results from need of the A/C system to “catch up” to the pre-deployment cooling setting.

(2) Without a proper assignment of the consumption quantities related to DR bounce back, the REPs which own the deployed customers will incur financial harm by having to purchase unhedged and unexpected load at the RTSPP which was the direct result of curtailment by a DR QSE. See Appendix B for an example of the bounce back issue.

# APPENDIX A – Discussion on Full LMP

In accordance with FERC Order 745, many ISOs around the country have implemented a “full LMP” system of compensation for demand response resources participating in energy markets. Under this market design, DR QSEs are compensated at the prevailing LMP as long as such payment passes a “net benefits test.” In contrast to the LMP-VG approach described elsewhere in this concept paper, under the full LMP approach, load-serving entities (LSEs) are not required to bill customers for load that never materialized as a result of the dispatch of DR.

The net benefits test is designed to ensure that (1) the reduction in total cost savings resulting from the dispatch of a mix of DR and generation resources instead of an equivalent quantity of generation-only resources exceeds (2) the reduction in revenue collected by the ISO as a result of the reduction in system load created by the dispatch of DR. In other words, the net benefits test ensures that DR is only used when non-participating loads are made unequivocally better off by its dispatch.

The implementation of the net benefits test varies by ISO, but it typically relies on the ISO (1) creating a model supply curve prior to each month of operation, (2) identifying the point on that curve at which supply becomes inelastic (i.e., the point at which elasticity of supply is equal to one), and (3) designating that price point as the threshold above which LMP must lie in order for the net benefits test to be passed. This procedure ensures that benefits of the reduction in market clearing price resulting from the dispatch of DR exceeds any additional costs that are allocated to load to compensate DR. For a more technical explanation of the net benefits test, see [insert cite].

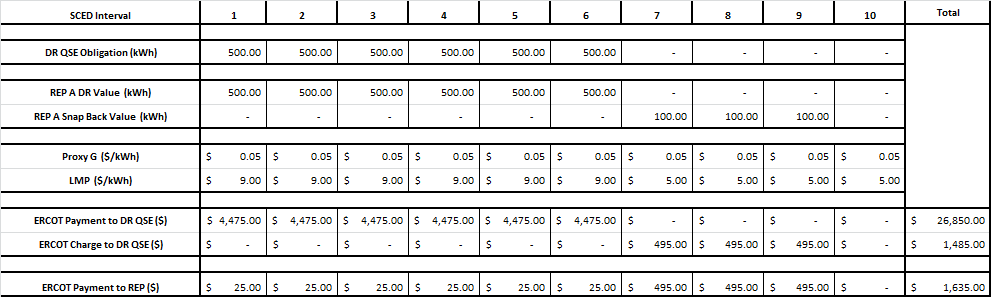
The full LMP approach has been criticized for creating a “double payment” to DR participants and for creating an imbalance in payments that the ISO must resolve by charging an uplift-like payment to non-DR-participating load on top of the standard LMP settlement The “double payment” issue arises out of the fact that customers can both receive LMP compensation for curtailing and also avoid paying their retail rate for that same level of curtailment. For example, if a customer is charged 10 cents per kWh by their REP, and LMP during a curtailment event sits at $1 per kWh, then that customer would receive $1.10 of gross benefits by reducing their consumption by one kW for one hour. This may create unwanted incentives for customers to engage in DR when it is not economically efficient. See [reference to economists’ brief] for more detail.

The imbalance-of-payments issue arises from the fact that when DR is dispatched under a Full LMP arrangement, the quantity of “supply” MWs purchased (including DR) exceeds the quantity of demand MWs that are being billed. Suppose during a particular hour-long period on a hypothetical uncongested and lossless grid, system demand were 100 MW and LMP were $1000/MWh when the ISO clears the market using 100 MW of generation resources. This would result in a $1,000 \* 100 = $100,000 total charge to load and an equivalent payment to generation. If, instead, the ISO used 90 MW of generation resources and 10 MW of DR resources, reducing the LMP to $800/MWh, it would now owe $800 \* (90 MW + 10 MW) = $80,000 to generation and DR resources, but it would only collect $800 \* 90 MW = $72,000. The missing $8,000 would need to be collected from load outside of the usual LMP-based settlement process.

Note that in this example, the non-DR-participating loads are better off, even with an “uplift “-type payment of $8,000. In the all-generation scenario, the 90 MW of non-DR customers were billed $1000 \* 90 = $90,000. In the DR-dispatched scenario, they are billed $72,000 + $8,000 = $80,000. The net benefits test is used to ensure that this is *always* the case whenever DR is called upon. If the price impact of using DR had been lower and a net benefits test was not applied, it would be possible to have a scenario where non-DR-participating loads would prefer that DR *not* be dispatched.

The primary benefits of the full LMP system lie in its simplicity of implementation when compared to an LMP-G system and in its potential to avoid legal disputes around billing issues. LSEs need not be billed for load that didn’t materialize; customer eligibility for the LMP-$G settlement approach need not be monitored; and DR is treated on a comparable basis to generation resources. FERC evaluated the merits of Full LMP and LMP-G in issuing its Order 745 and determined that Full LMP was the appropriate compensation method. [Any cites to add?] The DC Circuit Court of Appeals disagreed with FERC, but spent very little time exploring this issue in its decision to overturn Order 745, instead focusing primarily on FERC jurisdictional issues. The Supreme Court of the United States has agreed to hear this case and will explicitly address the question of whether the Full LMP compensation system is fair and just.

# APPENDIX B – Bounce Back Example



1. Neither the ERCOT Board, nor the PUCT has voted on the issue of Full LMP versus LMP-G, however. Additionally, not all members of the LRIS subgroup agree that LMP-G is the best approach to DR in SCED. Nevertheless, this paper addresses possible methods for LMP-G settlement based on the TAC concept presented. The fact that the LMP-G concept was endorsed by TAC in 2011 and this concept paper is being written in 2015 underscores the complexity of settlement under an LMP-G construct. The PUCT should consider opening a rulemaking to address these policy issues, including whether LMP or LMP-G is the appropriate settlement mechanism. [↑](#footnote-ref-1)
2. <http://www.hks.harvard.edu/fs/whogan/Economists%20amicus%20brief_061312.pdf> [↑](#footnote-ref-2)
3. Result reported by ERCOT from its 2014 DR data collection project. Snapshot date was Sept. 30, 2014. [↑](#footnote-ref-3)
4. A recommendation for minimum ALR size has not been established by the subgroup. As an example, the minimum size of a residential aggregation for Weather-Sensitive Emergency Response Service is 500. [↑](#footnote-ref-4)
5. The minimum portfolio size threshold may be the same as the ALR size threshold described above. [↑](#footnote-ref-5)
6. See NPRR 555. [↑](#footnote-ref-6)
7. <http://www.ercot.com/services/programs/load/laar/index> [↑](#footnote-ref-7)
8. PR 117-01, Requirements for Data Submission to Support Aggregate Load Resource Participation in the ERCOT Markets [↑](#footnote-ref-8)