BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Integrate and Refine Procurement Policies and Consider Long-Term Procurement Plans	Rulemaking R.12-03-014 (Filed March 22, 2012)

COMMENTS OF MEGAWATT STORAGE FARMS, INC. ON THE SEPTEMBER 7, 2012 WORKSHOP AND RELATED QUESTIONS

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Thank you for the opportunity to provide comments on the September 7, 2012 workshop and related questions listed in Administrative Law Judge David Gamson's Ruling of September 14 21, 2012.

Background

Megawatt Storage Farms, Inc. ("MegaWatt") is a five-year-old company focused on developing large grid-scale storage facilities and providing advisory services regarding storage on the grid. MegaWatt is storage technology and application agnostic and works with many storage technology manufacturers and storage services customers.

David MacMillan, President and Co-founder of MegaWatt, is also a Charter Member of Energy Storage Advisory Committee and an elected Member of the Climate Prosperity Council, both part of Joint Venture Silicon Valley.

Dr. Ed Cazalet, VP and Co-founder of MegaWatt, is a former Board Member of the CAISO, appointed to a three year term by Governor Schwarzenegger in 2004. Dr. Cazalet is also President and Founder of TeMix, a company providing a software platform for dynamic grid pricing and transactions for end users and distributed resources.

Our comments generally relate to both Track 1 and Track 2. Although we structured our response as individual answers to each question, there is overlap between the questions, so this filing should be taken in its entirety as a response to all six questions. In particular, our comments on Question 1 sets a framework used for many of the subsequent answers, and we answered Question 2 and 3 together.

Question 1

> What changes should be made to the rules governing the Investor-owned Utilities (IOUs') procurement process that would allow all resources (natural gas combined cycle, combustion turbine, storage, demand response, combined heat and power, renewable, etc.) to compete fairly in meeting identified needs? Please provide specific proposals for structuring an all-source procurement process.

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Comments for Question 1:

Currently renewables, fossil facilities and demand response are primarily acquired through separate procurement processes. These resources, and storage, are all sufficiently different that no single procurement can present a fair competition. Separate procurements should be used for each resource type.

For administrative convenience, these separate procurements could be issued and managed in parallel, but they should function as separate procurements, even if their dates are coincident.

Among the resources listed in the question, storage is especially unique in that it has characteristics of generators (by discharging to the grid), transmission (by deferring or eliminating the need for new transmission) and load (by charging off the grid.)

Unlike renewables and fossil plants, storage is not a generator of energy - it can only time-shift energy. Unlike demand response[1], storage can inject energy into the grid and draw additional energy from the grid, rather than just reduce load base for a limited number of events. Thus the services each provides are fundamentally different, even if they might first appear to be the same due to common naming.

As a further example, consider ramping. Storage generally provides 200 MW of dispatchable MW per 100 MW of nameplate rating, because storage can swing from a 100 MW charge to a 100 MW discharge (or any setting in between.) Storage can dispatch instantly. When set to the

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[1] When we say "storage", we mean storage that can both charge and discharge. We consider systems such as hot water heaters and ice storage cooling systems to be a form of demand response because they are dispatchable loads which cannot provide electricity to the grid. They are qualitatively identical to demand response and qualitatively different from storage which can both charge and discharge electricity. As should be evident from our present submission, we believe load management through demand response or even better price responsive tariffs is very important - but let's not pretend it is the same as charge/discharge storage, because it isn't.

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midpoint, it can swing 100 MW either way, yet while at that midpoint, it neither consumes nor delivers energy. In contrast, even a flexible fossil plant will have a minimum operating point of about 50%. Each 100 MW of nameplate fossil generation provides just 50 MW of dispatchability. Hence 100 MW of storage has four times the dispatchable MW of this 100 MW fossil plant. A fair comparison is cost per dispatchable MW, not cost per nameplate MW. Yet even that doesn't provide true equality, because the storage can ramp much faster - more on this in a moment. Also, the fossil plant, when positioned at the midpoint of 75 MW, so it can swing up or down by 25 MW, is actually delivering 75 MW to the grid. It will be typically be running at a higher heat rate than its optimum. It is emitting GHG and the energy may not even be needed, if renewables outputs are high and baseload plants are operating. So the opex profiles of storage and fossil are also very different.

Let's turn back now to the issues of storage being able to ramp faster than fossil, because that has significant implications in terms of what frequency regulation (and potentially ramping) services storage is asked to deliver pursuant to CAISO tariffs. CAISO will deliver materially different dispatch signals to storage and fossil plants for delivery of frequency regulation. Storage is used for fast reaction and potentially for shorter durations, whereas fossil is used for slower reaction and longer durations. Because of the dramatic differences between these dispatch signals, even though storage and fossil are both delivering frequency regulation, the actual characteristics of what each delivers is profoundly different - frankly, it is highly misleading to use the name of frequency regulation to cover both. Moreover, under FERC 755, the compensation each receives will be very different. Finally, if the storage is short duration (i.e. a Limited Energy Storage Device), then CAISO's dispatch signal is not only handling frequency regulation, it is also actively managing the storage system's state-of-charge. No such concept exists for fossil frequency regulation. The assets are different, the services delivered are different, and the way the CAISO interacts with and manages them are different.

There is no way to do the necessary comparisons to allow these asset types to "compete fairly" within a single procurement.

Another key reason for structuring separate procurements for each resource type is that the legal contracts for each type of resource will be materially different. With respect to storage, a tolling contract could be used or each service could be separately contracted. Either way, there should be specific provisions for the overall tolling charges, or for all services, of "mileage-based payments" because the lifetime for most types of storage tends to be reduced by charge-discharge cycles. These payment will require different formulas for each type of storage - some storage types have lifetimes that significantly shortens when deep discharge cycling is encountered (e.g. 2,000 discharge cycles of 80%) versus the equivalent total MWh discharge through shallow cycles (e.g. 20,000 discharge cycles of 8%.) For example, we have seen some technologies that claim far greater than a 10 times difference in battery life when comparing 80% depth-of-discharge cycles to 8% depth-of-discharge cycles.

Ancillary services, and in particular frequency regulation, are important potential sources of revenue for storage. The absence of a long term contract for ancillary services is a major barrier to deployment of storage. The current fossil tolling contracts issued under energy procurement allow the fossil plant to be used by a utility to self-serve ancillary services. The self-serving of ancillary services bypasses the normal market mechanisms, depresses the spot market for ancillary services, and to the degree ancillary services are self-provisioned, excludes storage from participating in that fraction of the market. Unfortunately, that excluded fraction (the self-provisioned portion) can be large.

We advocate that ancillary services be procured separately from energy to allow storage and fossil to compete fairly for the business. From the standpoint of ratepayers and society, having distinct competition for each service provides the greatest degree of competition and the lowest overall costs.

In considering what it takes to meet the "compete fairly" basis for the question, it is informative to keep in mind the many barriers against storage deployment. In a previous AB2514 Energy

Storage Proceeding (R10-12-007) filing[2], MegaWatt identified twenty-five significant barriers to storage. (The relevant portion is attached as Appendix A to this present filing; the entire filing is incorporated by reference.) These twenty-five barriers are listed below in three overall groupings - see the Appendix for a discussion of each.

Barrier Group A - A Bias Towards Study, Not Action

1. Lack of architectural leadership or vision

2. Too many studies rehashing the same material

3. Repeated false statements that storage isn't yet cost effective or proven, resulting in misguided policy decisions

4. Unreasonable expectation that cost of storage will dramatically drop (leading to waiting)

5. Too many demos

6. Excessive focus on large installations like pumped hydro and CAES.

Barrier Group B - A Lack of Pro-Storage Planning, Policy and Markets

7. Storage is not in the Loading Order

8. Storage does not need to be considered as an alternative

9. Utilities do not know how to evaluate storage and are afraid they won't recover costs

10. Urgent reliability needs require CPUC decision on storage now

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[2] http://docs.cpuc.ca.gov/PublishedDocs/EFILE/CM/158845.htm

11. No market for ramping services

12. No long term market for frequency regulation.

13. Five minute energy markets are not suitable support for storage

14. Storage not viewed as primary grid asset by CAISO planning process

15. CAISO Relies on Outside Source for Transmission Planning and They Do Not Plan For Storage

16. Right of first refusal of incumbent when storage is transmission asset

17. No clear mechanism for independent to deploy storage on the distribution grid

18. Storage is not a natural monopoly; storage should not be owned and operated by existing monopolies

19. Behind the meter storage costly; impractical to deploy GWs

20. Storage deployed for generation can't be used for transmission, and vice versa

Barrier Group C - Financing and Deployment

21. Project funding is challenging for storage

22. Warranty terms, performance guarantees and 'deep pocket' guarantors

23. Lack of standard product for some storage technologies

24. Incentives not carefully targeting storage. Confusion between storage and demand response.

25. Manufacturing capacity

We note also that there are countless subtle biases against storage. For example, the framing of question 1 seeks a level playing field so each resource type can "compete fairly". In contrast to this, the framing of question 6 is based on the unwarranted premise that the 20 year life of fossil plants is the right life for any acquired asset and Question 6 strives to find a way to force-fit other resource types into this arbitrary constraint of a 20 year life being optimal. The type of subtle fossil-centric bias exhibited by Question 6 permeates the structure of the entire industry and constrains one's ability to envision and construct the optimal future grid for California. Question 3 also has a fossil-centric, current bias, which we address in that section.

Ratepayers are not served well by this fossil-centric myopia.

The fair competition goal addressed in Question 1 cannot be achieved unless the twenty-five barriers to storage are each eliminated. The best way to do this is with a separate storage procurement, based on a storage portfolio target, which immediately sweeps away many of the barriers. That was the legislature's intent in passing AB2514.

Specific Proposals for Overall Structuring of the Procurements

To create these procurements, start first at the architectural level. This requires consideration of how storage and other new types of resources (including renewables and demand response) can enable a new grid that serves ratepayers better than the status quo, taking into account factors such as reliability, cost, climate change, clean healthy air and other benefits (both grid-specific and societal.) Once this grid is envisioned, the process of transitioning from the current grid to the new grid can be developed.

As part of that transition, setting portfolio standards for major resource types is the best way to sidestep barriers standing in the way of the new resources. This was the approach taken for renewables (the 20% RPS and then the 33% RPS), for demand response (5%), and is also the optimal approach for storage. From those high level portfolio decisions, separate procurements can then be crafted to optimally acquire each resource type in the specified amounts.

To the best of our knowledge, no concentrated effort has been made by the CPUC, CAISO or CEC to model this new grid. The Use Cases being developed under Phase 2 of the AB2514 Proceeding (R10-12-007) proceeding are a microscopic examination, not a high level architectural vision. At the CPUC, CAISO and CEC, this 2020 architectural vision is conspicuous by its absence.

This long term architectural planning should be done now before the 33% RPS forces the issues upon us, because 33% of our energy coming from renewables will change the grid in profound ways that the Use Case and other analyses do not address. The characteristics of generation, transmission, distribution and loads will each undergo dramatic changes when we achieve 33% RPS, and the collective effect is greater than the sum of the changes, especially in relation to grid management and long term planning.

Specifically, the current grid is operated as a just-in-time delivery system characterized by:

- predictable generation,
- unmanaged transmission and distribution flows (wires), and
- unmanaged loads that fluctuate with significant random changes.

In contrast, the new, green smart grid, (including renewables, storage and demand management) will have:

- significant fluctuating generation (from intermittent renewables),
- the potential for manageable and schedulable transmission and distribution flows (via storage), and
- significant amounts of managed and schedulable loads (via storage and real-time pricing).

Figure 1 - Changes in Generation, Transmission and Load

	Generation	**Transmission & Distribution**	**Loads**
Current Grid Just in Time	Predictable & Managed	Unmanaged flows	Unmanaged, significant random changes
New Grid with Storage	Highly fluctuating, random intermittency	Potential for manageable and schedulable flows	Manageable and schedulable

Furthermore, the new grid requires a different type of management focus and different types of resources to provide that manageability.

With reference to Figure 2, under the current grid, the ISO's focus is ensuring sufficient energy is provided by scheduling a few large, centralized generators through wholesale pricing signals. In the new grid, the ISO's primary focus will be chasing renewables fluctuations to ensure grid stability, with pricing used to manage demand levels.

Currently end users manage their cost primarily by reducing demand. In the new grid, cost management techniques for end users will include deploying PV, using net metering, deploying storage and responding to dynamic retail pricing signals to shift load to periods of low cost.

These changes require a different planning methodology. The planning for the current grid is focused on meeting peak demand. In the future grid, the primary focus needs to be chasing the intermittency of renewables and managing the shoulders (morning load ramp and evening load falloff). The shoulders are where rapid changes in load, PV and wind are most likely to coincide, thereby introducing maximum uncertainty. Planning needs to ensure sufficient responsiveness exists to handle this uncertainty, and that includes ensuring there is a sufficiently large portfolio of storage resources deployed.

As a result of the above, the management focus on undesired events also changes. Currently, load shedding is a primary focus. Going forward, insufficient ramping with consequential widespread grid instability needs to be the primary focus for ensuring a reliable grid. Insufficient energy resulting in load shedding continues to be of high importance, but without primary attention being directed to managing ramping, the energy issue is moot. Curtailment of renewables is undesirable because it results in the 33% RPS not being met, which negates the whole point of deploying the new grid. (As discussed in the Appendix, the frequent curtailment of renewables is likely to create systemic financial stresses that make affordable achievement of 33% RPS impossible - the issue is far bigger than just a little energy being lost by the occasional curtailment.)

Figure 2 - Changes in Grid Management

Entity	Current Grid	New Grid
ISO	Scheduling a few big generators is primary method for balancing grid Focus: Generation that matches load Just in time delivery model Primary pricing impact - on generation via wholesale prices	Fewer big plants to schedule Focus: chasing renewables Scheduling & dispatching storage and pricing are primary methods available for balancing and stabilizing the grid Primary pricing impact - on retail demand
End Users	Reduction in demand main cost control method for users	PV generation, storage, and dynamic pricing each offer cost control
Focus of planning & procurement	Peak energy needs	Chasing intermittency - ramping, frequency regulation, voltage stability The shoulders are the primary problem, not the peak (solar helps meet peak needs) Ensuring sufficient storage exists to provide necessary range of control for balancing and stability
Undesired events	Inadequate energy -> load shedding	Insufficient ramping -> sudden loss of stability across wide region Inadequate energy -> load shedding Curtailment of renewables

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Storage can be the primary grid asset that enables the smooth transition from the current just-in-time model to the emerging new grid with high renewables.

The 2000-01 CA electricity energy crisis was provoked partly due to bad policy which provided insufficient incentives for deployment of new generation and flat, capped retail pricing to meet peak demand. Despite the foresight this experience should provide, we appear to again be headed to a crisis, this time due to inadequate ramping due to lack of incentives for storage deployment.

Architectural Vision and Target

The LTPP and AB 2514 provide the primary means for California to implement procurements to ensure deployment of adequate storage resources to implement this new grid.

An architectural vision and a storage portfolio target are essential steps in this procurement. So here is our recommendation for that vision and target.

Deployment of storage on the CA grid, in successive steps leading to 4 GW by 2020, is the most cost-effective way to support renewables integration and achievement of the 33% RPS. This storage needs to be clean (i.e. not consume natural gas or other fossil fuels, so this excludes conventional CAES) and deep (multi-hour - although some of the 4 GW could be shorter duration, such as 15 minute storage.) The storage should be electricity-in and electricity-out to achieve maximum grid benefits and flexibility from the investment. It should be located primarily in the load centers, with roughly 1 GW in the San Francisco Bay Area, 2 GW in the Los Angeles basin and surrounding areas, and 1 GW in the San Diego load center.

California has the opportunity to provide world leadership in these changes (as it has in many other environmental areas), thereby creating jobs and economic growth as it simultaneously meets the legislature's objective of 33% RPS and support the Governor’s goal of 12 GW of distributed generation. California's success can be used as a showcase by California industries to sell similar renewables-friendly grid solutions around the world. California has a tremendous opportunity to build a massive new industry around future grid operating models using the LTPP, AB 2514 and other policies to help enable this success.

Further Recommendations on Structuring the Procurement(s)

We briefly list here eight further recommendations on structuring the procurements. For each numbered item, detailed discussion is in the last part of Appendix A, said Appendix being incorporated herein by reference. (Item 4 related to the pre-legislated form of AB2514 - as indicated above, we continue to support a 4 GW storage deployment by 2020. Item 10 was specific to the SmartGrid activities and so is not applicable.)

1. Formally confirm that deployment and use of storage is a form of energy efficiency and explicitly require that storage be ranked in the first category of the CA Loading Order under all CPUC jurisdictional actions.

2. Require that storage be explicitly evaluated as an alternative to new generation, transmission, distribution and demand/response. Require that storage be treated as a primary resource in all grid plans (including all smart grid plans mandated by SB17).

3. Require that evaluation of storage options must include all storage-related benefits, including explicit calculation of its optionality value.

5. Require that procurement of storage and storage services be done through open procurement processes. Require that both storage and storage services be allowed to compete for all opportunities that could use storage.

6. Require that storage be separately procured through open, competitive processes, and not be included as part of other projects..

7. Require explicit accounting for the greenhouse gases emitted by use of fossil plants when used for renewables integration.

8. Require explicit accounting of the emissions of storage (if any).

9. Require that storage be allowed to connect to the grid under existing protocols and standards.

Question 2

> What amendments, if any, would be necessary to the most recent long-term Request for Offers issued by Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric (SDG&E), and Southern California Edison (SCE) to ensure that all resources are eligible to compete in meeting future Request for Offers (RFO)? Are there any changes specific to meeting Local Capacity Requirements (LCR)?

Comments for Question 2

See our response for Question 3.

Question 3

> What specific characteristics or attributes must any resource -- including demand-side, energy storage, or distributed -- provide in order to meet future procurement needs? In the absence of a Net Qualifying Capacity, what methodology should be used to determine a proxy capacity value for resources lacking a Net Qualifying Capacity for use in LCR capacity accounting? How can these characteristics or criteria be turned into criteria to evaluate resources bid into a Request for Offers to meet LCR or other needs? How should those criteria be weighted?

Comments for Question 3

The California grid is in good shape on capacity. There is a localized issue on retirement of OTC generation. On the other hand, there are existing plants like Sutter that may not be needed,

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especially if new capacity is added to meet LCR. Overall, the capacity numbers look to be in good shape, especially if 4 GW of storage (8 GW of flexibility) is deployed by 2020.

We've stated elsewhere in this filing that a high level architectural vision needs to be the starting point for assessing issues such as those raised in Question 3. Developing that vision should include analyzing whether some number of hours of storage, say in the Southern CA areas with LCR problems, could resolve many LCR issues. That would allow existing plants outside the LCR area, such as Sutter, to run at high utilization levels.

We contrast this with a plan that installs new fossil plants in the troubled LCR areas, and the excess capacity then results in more distant fossil plants becoming underutilized or stranded assets. Those assets will then look for subsidies to keep running - now we have new fossil plants running in an Air Quality problem area, and remote fossil plants on subsidy.

A proper comparison of these two options would compare a) the cost of storage against b) the total of both the cost of the new fossil plants plus the cost of the subsidies to the underutilized remote plants. A proper comparison would also consider the ramping value of the storage (2 MW for every nameplate MW, due to the ability to charge and discharge) versus the fossil plants (typically 0.5 MW per nameplate MW, due to minimum operating point limits.) A proper comparison would also take into account that the fossil plant has to run to provide fast dispatch ability, and this energy (since CA has no overall capacity problem) is often unwanted, as is the resulting pollution and GHG. A proper comparison would account for the additional wind and solar energy spilled or sold out of state at low or negative prices because fossil plants must be kept online for local reliability, ramping, spinning reserve and frequency regulation. A proper comparison would account for the savings in transmission and distribution investment and losses from locating storage close to end use. A proper comparison would account for the environmental and air pollution effects of local fossil fuel plants versus negligible environmental effects of storage.

CA has no capacity problem overall, just some ramping and localized LCR problems. Storage can address these problem areas. It can be deployed quickly, wherever needed, whenever needed, in precisely the correct amounts needed (in both MW and hours duration). That leads to a further cost savings because you only deploy what you need, when you need it. Phased deployments to the 4 GW level are entirely reasonable. This results in significant time-value-of-money savings compared to the alternative of building massive new transmission of fossil plants.

Furthermore, most storage can be relocated. That is tremendous flexibility and optionality - far more than fossil. Deploying 4 GW of storage by 2020, in conjunction with 33% renewables, distributed generation and price responsive tariffs would address most or all of the LCR and OTC issues.

Net Qualifying Capacity was a good metric when the issue was managing the peak. See Figure 2 in our comments on Question 1. But looking forward, it is probably not the key metric. Solar PV will take care of the peak, especially in Southern California.

CA's big problem is ramping, especially during the shoulders. Net Qualifying Capacity doesn't really address that. We believe Question 3 is framed in a fossil-centric, current grid mindset because it focuses on Net Qualifying Capacity, not ramping. We encourage consideration of the architecture of the grid in 2020, 2025 and 2030, including what key performance metrics might be most important in that timeframe, and whether fossil plants, storage or price responsive retail tariffs would best serve those new metrics. Note that any fossil plant procured in the current proceeding is unlikely to be energized until 2017, so from that standpoint the needs of 2020 are just a few years away, and even 2025 isn't that far out. And with California;s stringent long term greenhouse gas goals, deploying any fossil fuel plant for a long horizon should be done with extreme caution.

Question 4

4. What are the pros and cons of the following procurement methods with regard to: 1) local procurement considered in Track 1 of LTPP, and 2) operational flexibility and general system procurement considered in Track 2 of LTPP?

A. Continuation of current practices for procurement with minor clarifications;

B. A "portfolio approach" that allocates, based on strategic/portfolio considerations, the total quantity of new flexible resources among various eligible resources (for example, how could/should the allocations be adjusted periodically based on current or expected conditions?).

a. SCE provided two proposed alternatives to filling any LCR need at the September 7, 2012 workshop, one with flexibility for SCE in procuring resources via two separate tracks, and another approach using an all-source RFO. Is there some way to blend these approaches? If so, how, and should the Commission attempt to do so?

C. Establishing a set of minimum criteria for operational flexibility characteristics for all acquired resources;

D. A "strong showing" requirement that the utility must demonstrate that its procurement process was substantially open to all resource types and appropriately considered all of the values discussed above and that the resulting portfolio of resources is an optimal solution.

E. Adjusting existing procurement mechanisms, such as the Renewable Auction Mechanism, to focus on the physical locations with needs that can be met by that programmatic resource.

Comments for Question 4

As we presented in Question1, the CPUC should set specific portfolio goals and then authorize separate procurements for each resource type. For the SCE case, this should be two separate procurements.

Alternative A. is not feasible for the reasons outlined in Question 1, including the twenty-five barriers against storage, and the ease with which fossil-centric, current grid biases can creep in, as evidenced in the discussions regarding the framing of Questions 3 and 6..

Alternative D. is not feasible because:

- there are significant differences between each resource type (see discussion under Question 1),
- the utilities are not experienced or skilled in making the tradeoffs between different resource types or in evaluating storage against fossil or other resources, but are quite experienced in crafting "strong showing" arguments, which makes any "strong showing" filing questionable as to whether it displays true "strong showing", or just the great argumentation skills of utilities counsel, and
- the CPUC should proactively set much stronger guidelines on what is needed than just looking for a "strong showing" reactive filing. Indeed, the CA Legislature mandated a proactive approach in AB2514, and the AB2514 Proceeding is looking to the 2012 LTPP for that guidance. Hence there is a statutory requirement that the CPUC be proactive, not reactive.

Alternative C. - specifying minimum flexibility criteria for each resource - is OK, but the different resource types should still be acquired under separate procurements. Whether certain minimum requirements are the same or different for each resource type can be decided as each procurement is created. We expect the optimal ratepayer benefits will result if the minimal criteria for each resource type are crafted for the nature of that resource, and not artificially constrained to match some very different resource's minimum criteria. But who knows - there may be some cases where they are aligned.

What should not happen is for the CPUC to set certain minimum requirements and then attempt to acquire multiple resource types under a single procurement, enforcing the same minimum requirements across very different resource types, under the assumption that a few minimal criteria somehow leads to a well-reasoned grid architecture.

We made extensive comments under Question 1 regarding the fundamental differences between different resource types (storage, DR, fossil, etc.) and fundamental differences in like named services when provided by different resource types (frequency regulation from storage vs. fossil; ramping from storage vs. fossil.) We also explained why 1 MW of nameplate storage has very different capabilities from 1 MW nameplate of fossil. Trying to force such different resource types into a common spec just isn't feasible.

That would be like FedEx trying to set certain minimum specs across all its transportation vehicles - planes, trucks, cars - and then running a single procurement. When viewed in this light, it is clearly preferable to choose the architecture (FedEx - long haul aircraft and local & medium distance trucking) and then the portfolio of resources to implement that system architecture (X number of planes, Y number of trucks), and then run separate procurements for each resource type.

The ratepayers are much better served if the CPUC establishes the portfolio of each type of resource to be acquired. The alternative opens a quagmire because the CPUC would have to leaving that critical portfolio decision until bid approval time, or abdicate making the decision at all, and just let the chips fall where they may.

At bid approval time, a wide range of issues would surface if trying to do apple-orange-pear comparisons across a mishmash of resource types, constrained only by a few minimum specified criteria.

If the CPUC is having difficulty making the high level decision of what portfolio objectives it has at an architectural level, prior to the procurement, we can only imagine the utter confusion

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that would result in trying to simultaneously make that portfolio decision buried under a mountain of competing bids, all demanding fair and equal treatment, with billions of dollars on the line.

At the end of the day, the portfolio decision must be made. It is easiest to do it up front. It could be made arbitrarily by simply letting the chips fall where they may using some other criteria like "whatever is cheapest." It is hard to see how that is likely to provide the best benefits to ratepayers, given then the grid is undergoing dramatic change.

The CPUC should use the Wayne Gretzky trick of skating where the puck will be, not where it is. In other words, the CPUC should look at its future grid architecture and acquire the resources that will be needed and are most suitable looking forward, not just what happens to be ideal for today or what happens to arbitrarily line up absent a clear CPUC portfolio directive.

Finally, under AB2514, it is the law. At least with respect to storage, the CPUC is required to make a decision on a storage portfolio target. We recommend it for all resource types.

Alternative E - An auction is an interesting idea. Some type of auction mechanism might work for storage, although storage is not as fungible as wind or solar. This is worth further investigation by the CPUC and stakeholders.

Question 5

> At the September 7th workshop, some parties discussed retrofits to existing generation assets as a potential source of incremental capacity. What, if any, changes would need to be made to the most recent long term RFO issued by PG&E, SDG&E, and SCE to allow for incremental capacity associated with retrofits to existing generation to compete to meet Local Capacity Requirements? Are there any differences in payment streams that should be given for existing capacity, as opposed to upgraded capacity?

Comments for Question 5

No comment. We reserve the right to make reply comments on this question when we see what others think.

Question 6

> At the September 7th workshop, both SCE and Enernoc raised concerns that it would be difficult to procure demand response resources that match the online dates (2017 to 2020) and duration (e.g., 20 years) of the conventional generation that is being contemplated as a source of LCR capacity. How could a demand side program be authorized through this LCR procurement process that delivers an on-line date and a duration that is comparable to conventional generation? What additional values are currently attributed to demand response resources in other markets that are currently not accounted for in California, and that might be taken into account as part of an LCR procurement process?

Comments for Question 6

We see no reason why resources need to be procured under the extended delivery schedule (2017 to 2020) and for the long durations (e.g. 20 years) of fossil plants. The question is fossil-centric in its view of the options. A far better question is why we should even consider deploying fossil, given that it takes years to deploy, tends to get tangled up in lawsuits, and once bought, we are stuck with it at that location for 20 years or more, with increasingly restrictive greenhouse gas standards, air emission standards, and potentially high natural gas prices..

What should be prized by the CPUC is optionality, especially given the high uncertainty on how the 33% RPS will be met - whether by wind, or PV, or remote solar, as well as where these resources will be located. Far more valuable is a resource that can be acquired and deployed in a few months, and moved as needed. Movement is especially valuable if the resource has a long life because movement provides flexibility to adapt to changing grid needs. Or if the resource is like demand response, its uptake by end users can be adjusted by shifting sales efforts to different geographies as needed. In that sense, transportable or short-lived resources give the CPUC and utilities maximal flexibility.

Note that on a really hot day, a demand response resource under contract may decide they'd rather leave the lights and air conditioning on, and pay the penalty, rather than respond to the DR dispatch. If enough DR resources made that choice, then a much higher cost could be incurred if the entire region experienced a grid failure. The decision is asymmetric - the DR resources suffer a small penalty but if they all decide to pay the penalty and keep using the electricity, the region suffers an enormous penalty. It is a situation with very asymmetric benefits and penalties, and hence inherently unstable.

Storage has no such quandary. If the storage is procured, it is there to serve the grid. There are no divided loyalties. On the other hand, storage does need a long term revenue flow to balance its long lifetime. For some storage, this can run out 15 years or more. However there are also storage options with 5 to 7 year life under moderately heavy usage. Battery refurbishment can extend the life in 5 to 7 year increments, if needed. Storage can generally be relocated. These options provide flexibility, and that optionality is valuable because it reduces the risk of ending up with long-life stranded resources.

Summary

As outlined above, there are substantial barriers to deploying storage using the existing deployment models. For that reason, MegaWatt has been advocating a storage portfolio standard. We applaud Governor Jerry Brown, Representative Nancy Skinner, former Governor Schwarzenegger and the CA Legislature for their foresight in drafting and approving AB 2514,

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which has a statutory requirement for the CPUC to proactively determine a storage portfolio standard. The AB2514 proceeding is looking to the LTPP for storage-related guidance. We look forward to the CPUC, through both the AB2514 and LTPP proceedings, delivering an implementation plan that will prove to be visionary and pro-storage, which will prove to be pivotal in CA meeting its 33% RPS and will continue California's world leadership in providing a clean, green grid.

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Dated October 5, 2012

Respectfully submitted,

________/s/_________

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List of Attachments:

Appendix A - Extract from AB2514 Proceeding (R10-12-007) filing of MegaWatt Storage Farms

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