

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking Pursuant to Assembly Bill
2514 to Consider the Adoption of Procurement Targets
for Viable and Cost-Effective Energy Storage Systems.

R.10-12-007
Filed December 16, 2010

**OPENING COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE
TO ADMINISTRATIVE LAW JUDGE'S RULING ENTERING INITIAL
STAFF PROPOSAL INTO RECORD AND SEEKING COMMENTS**

Donald C. Liddell
DOUGLASS & LIDDELL
2928 2nd Avenue
San Diego, California 92103
Telephone: (619) 993-9096
Facsimile: (619) 296-4662
Email: liddell@energyattorney.com

Counsel for the
CALIFORNIA ENERGY STORAGE ALLIANCE

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Pursuant Rules 1.4(a) and 6.2 of the California Public Utilities Commission’s (“Commission’s”) Rules of Practice and Procedure, and *Administrative Law Judge’s Ruling Entering Initial Staff Proposal Into Record and Requesting Comments*, issued December 14, 2012 (“ALJ’s Ruling”) the California Energy Storage Alliance (“CESA”)¹ hereby submits these comments to the ALJ’s Ruling.

I. INTRODUCTION.

First of all, CESA applauds the excellent work undertaken by the Staff in preparing the Initial Staff Proposal.² It is thoughtful and comprehensive. CESA responds here to the direction provided in the ALJ’s Ruling by organizing these comments in three parts. The first part of these comments generally addresses the four major topic categories that are listed the ALJ’s Ruling as comprising the approach to analysis of energy storage taken by Staff in the Initial Staff Proposal: regulatory framework, cost-effectiveness, procurement objectives, and energy storage roadmap. The second part of these comments speaks directly to the specific subject areas where parties’ comments are requested by Staff, namely Section 4.2 of the Initial Staff Proposal. The third part

¹ The California Energy Storage Alliance consists of A123 Systems, Bright Energy Storage Technologies, CALMAC, Chevron Energy Solutions, Debenham Energy, Deeya Energy, East Penn Manufacturing Co., Inc., EnerVault, Fluidic Energy, Greensmith Energy Management Systems, HDR Engineering, Inc., Ice Energy, LG Chem, LightSail Energy, Inc., Powergetics, Primus Power, Prudent Energy, RedFlow Technologies Ltd., RES Americas, Saft America, Inc., Samsung SDI, SANYO Energy Corporation, Seeo, Sharp Labs of America, Silent Power, Sumitomo Electric, SunEdison, SunVerge, TAS Energy, and Xtreme Power. The views expressed in these Comments are those of CESA, and do not necessarily reflect the views of all of the individual CESA member companies. <http://www.storagealliance.org>.

² *Energy Storage Framework Staff Proposal*, issued December 12, 2011, identified as Attachment A of the ALJ’s Ruling.

of these comments discusses the remaining schedule for this proceeding that is proposed for revision by the ALJ's Ruling.³

CESA is heartened by the bottom line conclusions set forth in the Executive Summary of the Initial Staff Proposal that: "Staff believes that the creation of a Resource Adequacy value and development of other rules allowing storage providers to participate more effectively in the utilities' procurement programs will mitigate many of the identified barriers. This effort will need to be coordinated with the California Independent System Operator (CAISO) to encourage policies and define products to enable electric energy storage systems to participate in its markets similar to other generation facilities. In parallel, the CPUC will continue to evaluate electric energy storage to make a determination whether or when an energy storage portfolio standard could be adequate." (p. 3).⁴

On the other hand, as discussed below, CESA is very concerned that the Interim Staff Proposal does not convey a sense of urgency or any real detail as the specific steps and milestones that the Commission should spell out for the remainder of this proceeding.

II. CESA AGREES WITH THE FOUR-PART ANALYTIC FRAMEWORK SET FORTH IN THE INITIAL STAFF PROPOSAL AND THE ALJ'S RULING.

A. Regulatory Framework.

Staff have correctly focused on the critical importance of basic changes in the regulatory framework at the national level and in California, but state that "monitoring" of Federal Energy Regulatory Commission ("FERC") dockets, "monitoring and participating" in stakeholder processes at the California Independent System Operator ("CAISO") "collaboration" with the California Energy Commission ("CEC") are the appropriate kind of Commission actions that may be helpful:

“ . . . the CPUC will monitor and participate in the CAISO “Pay for Performance” stakeholder initiatives, including CAISO’s current proceeding, Renewable Integration: Market and Product Review (Phase 2), which addresses renewable integration policies such as Pay for

³ ALJ's Ruling, at p. 2.

⁴ Similar conclusions appear later in the Interim Staff Proposal, e.g. "The end goal of this proceeding is to determine what procurement targets, if any, should be established for energy storage. Also to be considered in this proceeding are the policies to encourage cost effective energy storage." (p. 14). See also, Public Utilities Code §2836.4. "(a) An energy storage system may be used to meet the resource adequacy requirements established for a load-serving entity pursuant to Section 380 if it meets applicable standards."

Performance, load-following, and daily market settlements. . . . Commission Staff will also *monitor* a current FERC Notice of Inquiry that addresses third party sales of ancillary services and accounting and financial reporting requirements for increased transparency of cost allocation for energy storage. . . . The CPUC will *collaborate with* the CEC to ensure that energy storage policy from this proceeding is in alignment with the Integrated Energy Policy Report.” [Emphasis added]. (pp. 5-6).

The statement in the Initial Staff Proposal that: “CPUC Staff will continue to participate in CAISO’s stakeholder processes to encourage policies and market design that is technology neutral” (p. 6) suggests the potential for much more meaningful affirmative and specific advocacy that is called for on the part of the Commission.

CESA notes the encouraging statements that: “The RA treatment for energy storage is preliminary in the scope of R.11-10-023. . . Staff anticipates *close coordination* between R.10-12-007 and R.11-10-023 regarding the RA rules for energy storage [Emphasis added].” (p. 7). Instead, however, energy storage is relegated to Phase 2 in the Scoping Memo for this proceeding⁵, and Staff have made no mention at all of energy storage during two days of workshops in the RA Proceeding held just last week. This is a very disappointing turn of events that can only be remedied by affirmative advocacy and immediate concrete action by the Commission, before the RA proceeding progresses in an extremely unproductive and uncoordinated way in relation to this proceeding.

B. Cost-Effectiveness.

In the Initial Staff Proposal, Staff states that: “Phase 2 of this proceeding will consider the appropriate methodology for evaluating costs and benefits of energy storage. The Commission has utilized cost-benefit tests in previous energy efficiency, distributed generation, and demand response proceedings. The Commission will seek general consistency with these decisions, while recognizing that modifications to these methodologies will be required to reflect the unique attributes of energy storage.” [Footnotes deleted]. (p. 7). CESA completely disagrees with the notion of deferring detailed examination of cost-effectiveness evaluation methodology to Phase 2 of this proceeding. As discussed in greater detail below, the Commission will not make any meaningful progress toward achieving the objectives of this

⁵ *Phase 1 Scoping Memo and Ruling of Assigned Commissioner and Administrative Law Judge*, issued December 27, 2011; and *See, Phase 1 Proposal of CESA*, filed in the RA proceeding, R.11-10-023, on January 13, 2012.

proceeding without addressing cost-effectiveness - so cost effectiveness needs to come first.

On the virtually “outcome determinative” interconnection component of a cost-benefit analysis Staff states in the Interim Staff Proposal that: “The storage rulemaking should defer the consideration of distribution-level energy storage interconnection issues to R.11-09-011 (which includes the Rule 21 Working Group). For transmission level interconnection issues, the CPUC remains an active participant in the CAISO’s Generation Interconnection Procedures initiative.” (p. 9). It should be noted that it is *very, very* difficult for third parties to determine the locational benefits of energy storage due to lack of transparency especially in the age, planned upgrades and types of existing distribution network equipment. This barrier is, of course, the subject of discussion in a new CAISO stakeholder process.⁶ What is needed is a more robust, richer, holistic framework for assessing alternatives on the basis of benefit and cost rather than seeking the “lowest cost adequate” resource. The same point applies to energy storage generically and all distributed resources including distributed Generation (“DG”), geographically targeted energy efficiency (“EE”) and demand response (“DR”). If energy storage, EE and DR resources were deployed in a more geographically informed way – based on a robust benefits assessment process -- the benefit could be significantly higher than if they are “shot-gunned” without regard to location-specific benefits. Investor owned utilities (“IOUs”) are not currently - but should be - empowered to use the ‘best’ alternative including smaller, more modular and more distributed resources. That requires some combination of (a) regulatory permission to own and use distributed storage and generation and (b) mechanisms for IOUs to ensure cost recovery.

C. Procurement Objectives.

Staff states in the Initial Staff Proposal that: “This proceeding should consider how storage applications across different grid functions can inform cost recovery policy that falls within the Commission’s ratemaking jurisdiction (distribution service and energy commodity procurement).” (p. 8). Staff also states that: “. . . the Commission will also ensure that the Smart Grid Deployment Plans currently under review adequately incorporate energy storage.” (p. 9). Apart from the Long Term Procurement (“LTTP”) proceeding⁷ and this one. Further, CESA is unaware of any active Commission proceeding that addresses rate basing and cost

⁶ See, *Resource Adequacy for Distribute Generation Issue Paper and Straw Proposal*, December 12, 2011.

⁷ R.10-05-006, filed May 6, 2010.

recovery of energy storage assets by Commission-jurisdictional electric utilities. The IOUs have included no mention of energy storage at all in their Smart Grid Deployment Plans despite being specifically required to do so by the Commission.⁸

Regarding cost recovery, a long-term contracting mechanism, which is now under discussion at the CAISO, will certainly enable energy storage project development. This mechanism should be pursued immediately to accelerate development and overall project and performance experience. Cost responsibility and ownership structure should be defined concurrently but neither should be considered at this time in order to move forward with long term contracting mechanisms. Cost recovery and ownership structure will also become clearer as the end uses are further explored because many ownership models may apply to the end use framework. Staff recommends that in the LTPP proceeding, the Commission should consider whether energy storage technologies could address future needs. LTPP may not be the best, and certainly not the only, forum for determining operational needs. There is a need to first characterize storage with respect to what it can do (applications and end uses), or there may be weak basis for matching storage capabilities with “needs.” Consideration also needs to be given to energy storage along with transmission and distribution applications in a comprehensive, integrated manner.

CESA strongly agrees with the pressing need for an appropriate RA value assigned to energy storage. Such an RA value should be forward procurable, over many (*i.e.*, more than five) years and from as many ‘end-uses’ identified in the Commission’s framework as possible.

D. Energy Storage Roadmap.

As discussed below, CESA agrees with Staff’s identification of a need in the Interim Staff Proposal for a policy framework to guide how energy storage should fit into each layer of the electric system value chain irrespective of how specific market products are ultimately defined. CESA also agrees with the need for technology neutrality, as well as the need to look broadly and expansively at the many places within the electric power system where energy storage may be utilized to improve system efficiency. A good example of this kind of “out-of-the-box” thinking includes generation-side energy storage which includes thermal storage integrated into fossil fueled plant operations to improve plant efficiency on peak.

⁸ See, *Flexible Capacity Procurement Issue Paper*, January 27, pp. 19-20.

The four-part model depicted in the Interim Staff Proposal is a good start, but Staff forthrightly states that:

“Notably, there are issues that fall outside of these four main categories. As our analysis progresses, these issues will either be addressed as part of these four focus areas or the framework will be adjusted to accommodate them. For example, assessing engineering and operations implications of introducing a significant amount of energy storage to the distribution network currently do not fall into any of the categories, as it remains to be seen to what extent this question needs to be addressed in this proceeding.” (p. 15).

III. CESA PROVIDES THE FOLLOWING RESPONSES TO THE SPECIFIC QUESTIONS SET FORTH IN SECTION 4.2 OF THE INITIAL STAFF PROPOSAL

A. CESA Recommends Expansion of the Storage Barriers Regulatory Matrix and Suggests Several Ways in Which Energy Storage Should be Addressed in Proceedings Other than those of the Commission.

1. CAISO.

The Commission should call on the CAISO to accelerate the proxy demand response, and regulatory energy management ancillary service programs that are in early stages of implementation. Longer term, efforts to actively collaborate could focus on development of pay for performance, or “mileage-based” long term contracts to provide capacity, energy and ancillary services. Such services can and should be provided from many types of energy storage resources, sited both on the utility-side and the customer-side of the meter. This is already being done in other parts of the country today, such as PJM’s balancing area.

The primary issue facing grid-level energy storage today is the lack of long term, financeable revenue streams for energy storage assets. As the Interim Staff Proposal points out, RA is a very promising potential source of revenue for energy storage assets, and, they may be more attractive than the day ahead markets administered by the CAISO. While IOUs can and do purchase ancillary services under contracts on a similar time frame of less than 10 years – this is still an insufficient term for convincing equity and debt investors to invest in energy storage projects. What will still be required are longer term contracts and “mileage payments” which CESA expects to be addressed during the Second Phase of the CAISO’s Renewable Integration and Market and Product Review. Ideally, energy storage system operators may contract with IOUs or the CAISO for 20 years or longer as is currently employed in existing renewable

portfolio standard (“RPS”) procurement. Allowing energy storage located on the customer side of the meter to participate in ancillary services markets will also help project deployment, as in these cases, additional value streams (e.g. time of use energy and demand management) that accrue to the host customer may also be used to create sufficient financeable cash flows.

2. CEC.

The Commission should unambiguously propose to the CEC that it should follow the Commission’s example and begin implementation of AB 2514 *now* by merging it with the process of developing regulations to implement SB 2 (1x) that is currently underway, so that the 33% RPS and this proceeding would be directly interconnected. It is not too late to graft an energy storage element into the CEC’s regulatory process that is already underway. In any event, though, the Commission should at least propose that the CEC should begin the separate and presently distinct regulatory process that is mandated by AB 2514 as it applies to local publicly owned utilities.

In addition the Commission should propose that the CEC should open a separate rulemaking proceeding, in conjunction with the Commission’s tariff approval process, to develop load management standards and associated tariffs that incentivize deployment of energy storage technology. The CEC has inexplicably refrained from exercising the very broad standard-setting authority it has under the Warren-Alquist Act, doubtless in part at least because the process of developing implementing regulation would be lengthy. While true, the challenge should be embraced rather than deferred indefinitely because of the crying need to creating an impetus for dynamic pricing needed to incent deployment of energy storage technologies and improve the efficiency of grid utilization overall.

B. CESA Recommends That the Commission Use its Initial Framework, and Proposes an Alternative to Use of the Cost-Effectiveness Evaluation Methodologies Used in the Standard Practice Manual .

1. Use of the Initial Framework.

CESA’s essential recommendation to the Commission on cost-effectiveness is to *not wait*. Do this first. As Staff correctly notes, determining a cost-effectiveness methodology for energy storage will not make sense unless specific applications, with defined benefit streams are the starting point. The cost-effectiveness test for Permanent Load Shifting (“PLS”) under development in the Commission’s Proposed Decision on the 2012-1014 DR Programs of the

IOUs (“Proposed DR Decision) should be the starting point for the basic elements of a new cost-effectiveness methodology for energy storage.⁹ This methodology can be adapted for the purposes of the Storage OIR concurrently to the identification and prioritization of energy storage end-uses or applications.

The four cost-effectiveness tests are the Total Resource Cost (“TRC”) test (which measures cost-effectiveness from the point of view of society as a whole), the Program Administrator Cost (“PAC”) test (which measures cost-effectiveness from the point of view of the utility), the Ratepayer Impact Measure (“RIM”) test (which measures cost effectiveness from the point of view of ratepayers) and the Participant Test (which measures cost-effectiveness from the point of view of a program participant). However, it appears from the Proposed DR Decision that the Commission may be ready to depart from the Standard Practice Manual and move to an analysis that also takes account of unquantifiable factors for energy storage.

“PLS refers to the shifting of energy usage from one time period to another on a recurring basis. Generally speaking, PLS involves storing electricity produced during off peak hours and using the stored energy during peak hours to support loads. Examples of PLS technologies include battery storage and thermal energy storage. Thermal energy storage uses electricity during off peak hours to store thermal energy in ice, chilled water or eutectic solution that can be used during the day to cool buildings.” (Proposed DR Decision, p. 149). The Proposed DR Decision notes the omission of a qualitative analysis is problematic for PLS programs when evaluating the TRC, since there are customer-perceived non-energy and monetary benefits of PLS.

The Proposed DR Decision states that: “The Commission is apparently not convinced at this point that the TRC ratio as calculated by the Utilities is the appropriate test to evaluate the cost-effectiveness of a program where large capital investment is required on the part of the customer, such as for PLS and other energy storage systems. While customer benefits are difficult to quantify, the Protocols¹⁰ provide the IOUs with the option to estimate a value for difficult-to-quantify inputs and require that the IOUs include a qualitative discussion of those

⁹ *Revised Proposed Decision Adopting Demand Response Activities and Budgets for 2012 through 2014*, issued January 20, 2012.

¹⁰ See, D.08-04-050, issued April 24, 2008, approving load impact protocols for DR programs; *and see* D.10-12-024, issued December 21, 2010, approving a cost-effectiveness methodology for DR programs.

unquantifiable inputs. The proceeding evaluates the reasonableness of program and portfolio design in terms of cost-effectiveness, track record, future performance, cost, flexibility and versatility, adaptability, locational value, integration, consistency across the Utilities' applications, simplicity, recognition, environmental benefits and consistency with general Commission policies and policies affecting revenue allocation." (Proposed DR Decision, p. 8).

C. CESA Recommends that the Commission Develop the Information Needed to Adopt Procurement Objectives.

CESA strongly agrees with Staff that utilities should obtain more operating experience through tests and pilots'... however, limiting such tests and pilots to just the smart grid deployments and ARRA funding is insufficient. CESA suggests that the Commission allow the utilities to explore more tests/pilots as soon as possible, particularly for priority end uses and innovative new contracting mechanisms. It is important to explore as broadly as possible, the end uses that can provide RA value. For example a third party aggregator can aggregate and sell RA from many distributed behind the meter installations as effectively as a standalone centralized energy storage system or energy storage system coupled with centralized fossil generation.

D. CESA Recommends that the End Use Framework Should be Supplemented by Adding Certain Consistent Concepts and Analysis.

CESA appreciates the thoughtful framework introduced at page 12 of the Initial Staff Proposal, although CESA would like to add several storage "end-uses" as described below. The term "end-uses" appears to be used synonymously with "application." This would appear to be the same definition of "application" proposed by Southern California Edison Company ("SCE"), namely: "the collection of benefit streams that are possible from a single storage asset sited at a single location and operated in a specific way."¹¹ Under this definition, an energy storage application could include various combinations of benefit streams. CESA concurs with SCE's definition as far as goes, but is of the view that the Commission can, and should, go a step further. Any specific end use or application will likely have a "primary" or "anchor" benefit stream, and a collection of "secondary" or "additive" benefit streams level applications of energy storage. CESA's rationale for adding the following proposed "multiple-benefit stream"

¹¹ *Comments of SCE Moving Energy Storage Concept to Reality* from SCE's August 29, 2011, quoted in the Initial Staff Proposal at p. 11

applications (new end uses) is that these end uses are technically viable today and there are storage technologies that are commercially available that can provide these benefit streams. Further, by explicitly combining benefit streams the full functionality and flexibility of energy storage assets can be fully utilized by the electric power system for maximum benefit and least cost.

1. Generation

- a. Generation side storage – using thermal energy storage located at on-site gas power plants (combined cycle or simple cycle) to provide peaking power. Off-peak electricity is stored in the form of chilled water for use to chill the intake air of the gas turbine for increased capacity during on-peak hours. This is an energy storage and peak shaving technology.
- b. Centralized peaking and ancillary services - using electrical storage to provide peaking power, supply capacity, and assorted ancillary services (spinning reserve, ramping, regulation) from a centralized footprint, similar to a natural gas peaking power plant
- c. Distributed peaking and ancillary services - using electrical storage to provide peaking power, supply capacity, and assorted ancillary services (spinning reserve, ramping, regulation) from a distributed footprint.

2. Transmission/Distribution

- a. Transmission support –this involves high power, lower energy equipment used to increase the throughput of a transmission line via power oscillation damping, dynamic voltage stability, tie line control, under-frequency load shedding reduction, circuit breaker reclosing and sub-synchronous resonance damping.
- b. Transmission and Distribution Life Extension or upgrade deferral. For life extension, storage (and other distributed resources) reduce peak load on the T&D equipment to a level where degradation of the equipment is reduced to an acceptable level, to reduce operating temperature and in some cases to reduce/avoid ground

faults. This is especially compelling for the aging fleet of underground cables which are somewhat-to-much more expensive to replace than overhead lines. Energy storage assets used for this purpose can also provide an array of ancillary services benefits

3. Customer
 - a. Behind the meter distributed renewable integration in combination with time-of-use (“TOU”) energy and demand cost management and ancillary services.
 - b. Ancillary services provided from behind the meter resources, can also be aggregated over multiple locations and combined with TOU energy cost management.
 - c. Electric Vehicle (“EV”) charging, especially high voltage fast charging potentially in combination with ancillary services and behind the meter distributed generation.
 - d. PLS – for example, using thermal energy storage for owners with packaged air conditioning, or large chilled water cooling systems (ability to shift 0.5 MW or greater from peak to off-peak). Commercially available thermal storage systems are available today to do achieve this ‘permanent’ load shifting benefit.
4. CAISO Markets (Ancillary Services)
 - a. Fast Area Regulation – energy storage can be used to provide a much faster and more beneficial form of frequency regulation; fast frequency regulation. This is due to the ability of many types of energy storage to respond much more quickly than fossil generation.
 - b. Frequency Response – Frequency Response involves storage (and load) that responds to actual frequency excursions (from the fundamental 60Hz) quite rapidly (*i.e.*, in just a few cycles, less than one second)

CESA agrees entirely that the end-use framework proposed by Staff - with the following suggested additions above - will be an excellent framework with which to examine further

barriers, technologies, value proposition and roadmaps. Additionally, by looking at end uses, the combinations of such end uses can also be explored as well as the many potential ownership and financing models. What CESA expects to find is verification that there are many end uses that could have multiple combinations of such benefits. A very good example could be behind the meter energy storage used for TOU cost management *and* power quality *and* backup power *and* renewable resource integration and smoothing *and* providing ancillary services *and* EV fast charging support.

CESA also agrees with Staff's proposal to prioritize energy storage issues on the basis of systems needs and technology maturity. Based on this, CESA recommends that *as a first step*, a few end uses and applications should be prioritized for evaluation within *each* category (CAISO market, Transmission, Distribution, Generation, Customer), and the selected priority applications should then be evaluated using Staff's proposed "four-category approach". CESA agrees with SCE that the application and the envisioned benefit streams that will be captured from each selected application should be considered first, because those applications will dictate how the energy storage asset being examined should be treated in relevant jurisdictions in each of the following proposed four categories:

1. Regulatory framework
2. Cost effectiveness
3. Procurement objectives
4. Energy storage roadmap

E. CESA recommends that the Roadmap Include Firm Milestones.

Primary milestones should include the following

1. Determine priority applications (end uses) to focus on by June 2012.
2. Develop cost-effectiveness methodology for selected applications by December 2012.
3. Identify long term procurement mechanism for energy storage by December 2012.
4. Determine RA value for energy storage by June 2013.
5. Authorize additional utility pilots to test priority applications, ownership models, and procurement mechanisms by January 2014.

There may also be addition and more granulate or secondary milestones to add to the list and CESA will propose them as they come to the fore in this proceeding.


IV. THE COMMISSION SHOULD ADOPT THE SCHEDULE PROPOSED IN THE ALJ'S RULING MODIFIED TO INCLUDE THE TIMELINES IN THE ROADMAP PROPOSED BY CESA.

CESA's view is that the schedule proposed in the ALJ's Ruling can be improved by (i) accepting CESA's recommendation that cost-effectiveness should be addressed in Phase 1 of this proceeding, and (ii) incorporating the milestones included in CESA's proposed roadmap timeline as part of the official proceeding schedule. In other words, the schedule for the regulatory process proposed in the ALJ's Ruling appears generally realistic, and can be readily supplemented with specific progress milestones that should be agreed upon and published concurrently.

V. CONCLUSION.

CESA appreciates this opportunity to respond to submit comments to the ALJ's Ruling and the Initial Staff Proposal, and looks forward to working with the Commission and parties throughout the remainder of this proceeding.

Respectfully submitted,



Donald C. Liddell
DOUGLASS & LIDDELL

Counsel for the
CALIFORNIA ENERGY STORAGE ALLIANCE

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