For Information and Discussion:

Utility Comments Accompanying Proposed Revisions to Matrix Strawman Proposals.

Staff Note: Not all of these were incorporated in Revised Matrix attached. May be reconsidered for discussion and further refinements.

Southern California Edison:

Main revisions from the original distribution of the Matrix

- The General Description has been moved into the first column under the Application name
- A new Operational Plan(s) column indicates one or more plans for daily operation. When multiple plans are listed, they are mutually exclusive, meaning additional detail is required specifying when (hours/days/seasons) each plan is active.
- All "end uses" have been rewritten to align with the "end uses" identified in the Staff Proposal
- The end use column now contains "primary" and "potential additional" end uses. The primary end uses dictate the operation of the device and accordingly map directly to the Operational Plan. The additional end uses are possible "extra" benefits that may result from operating the device in service of the primary end uses.
- Additional comments follow the matrix for each application
- **We began to address some of the ambiguity surrounding the distribution/reliability applications, but, as discussed below, there is further need to clarify these applications.**
- **We have created simplified versions of multifunction applications. As discussed below, we suggest that the simpler applications are a more logical starting point for prioritized applications; multifunction applications should be considered subsequently.**

Clarifying Distribution/Reliability Benefits

Many applications include benefits related to deferring distribution upgrades and providing reliability. In order to develop a framework to analyze these benefits, it is necessary to specify exactly what the problem is and exactly what distribution upgrade is being deferred.

For example, the reliability problems being addressed most likely fall into two broad categories: (1) peak load growth leading to circuit overloads, and (2) distributed PV leading to voltage fluctuations and other operational problems. The traditional solutions to these problems might include some combination of reconductoring circuits, replacing/adding transformers, or replacing/adding additional voltage regulation equipment (capacitors, etc.). To evaluate the cost-effectiveness of a storage device deferring one of these upgrades, it will be necessary to define the specific *type* of the problem, the specific *location(s)* of the problem (single circuit, substation and circuit, etc.), the specific *upgrades* being deferred, and how the battery will be operated to mitigate the problem. The analysis should also include an estimate of the expected number of these specific opportunities throughout the system.

In addition, SCE recommends that for these distribution/reliability applications, we should assume that, in general, the device will follow either a fixed schedule or automatic operation. Moving to a system in which distribution operators actively manage charging and discharging to provide reliability would represent a much larger shift with much greater challenges, both practical and regulatory.

Single function v. multifunction devices

SCE recognizes that the OIR represents an opportunity to consider “multifunction” applications that provide both generation services (i.e., participating in ISO markets) and reliability services (i.e., deferring a distribution investment.) Such applications, however, introduce a huge degree of complexity into the analysis. SCE recommends initially prioritizing the development of “single-function” applications. By “single-function,” SCE means that all benefits should be in the generation/market category or all benefits should be of the distribution/reliability category. Applications could still have multiple end uses, but they would all be in the same category. Once the operations and economics of single-function applications have been successfully analyzed, some of these applications can potentially be combined to create multifunction applications.

For a multifunction application, assumptions would need to be made about what hours, days, or seasons the device would be constrained to be available for reliability purposes, rather than being bid into the markets. Most reliability concerns are by their nature unpredictable. For example, it would be difficult to accurately predict how many days during the year SCE would have voltage problems on a particular circuit resulting from cloudy weather causing excessive PV ramping. As an initial goal, SCE believes it makes more sense to assume that a battery device procured to solve this type of problem would be available to meet the needs of this problem at all times. As discussed above, evaluating the operations and benefits of storage devices providing reliability functions is already complex and raises many challenging issues, without introducing the additional complications of attempting to allow the device to function as a market player at certain times.

Once stakeholders are confident that we have developed effective analytical frameworks to evaluate the operations, costs, and benefits of single-function applications, it will make sense to start exploring logical combinations of applications. Furthermore, the analysis conducted to evaluate the benefits of the single-function applications will support our efforts to assess which applications may realistically be combined into a multifunction application.

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Pacific Gas & Electric

We have included revised changes to the strawman matrix and provided 3 general comments below.

1. **Application description:** We think the most important initial task is to develop a very clear

description of the application and the problem that is being solved. This may include identifying a real world problem to illustrate that problem that is being solved for that specific application.

2. **Cost Benefit components:** It is very easy to overlook parts of a cost-benefit and have confusion with the methodology. We're proposing, as noted in the strawman Application Priorities Matrix, to clearly bucket the benefits, costs, and different alternatives (both energy storage and non-energy storage). In this case we could compare the net benefits or net costs of each alternative to determine cost-effectiveness. Having avoided costs as a benefit muddles the analysis at an early stage and makes it easy to leave out benefits.

	(ES)	(Non-ES)
(or Net costs)		

For each alternative, we could clearly include the technology cost, size of resource, lifetime, and other resource valuation components as line items under either benefits or costs.

3. **Number of priority applications:** We now have 8 applications. To be more successful, we should focus on the first 5 applications (distribution, VER-sited, & bulk) initially. Transportable will be easier once a method has been established for the distribution and generation. The DSM resources have a long history of cost-effectiveness through DR and SGIP that can be leveraged.

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San Diego Gas & Electric

As previously stated in different phases of R.10-12-007, SDG&E believes that electricity storage can create a number of benefits, each of which has economic value. In some cases, electricity storage is the most cost-effective approach to address reliability and power quality issues in grid operations, and will be procured by utilities to meet these needs. In other cases, electricity storage can create benefits that could create economic value for third party investors, but adequate price signals that would allow potential investors to realize that value may not exist. For example, today, many electric utility customers receive electricity storage, reliability and standby services from their utility for free after they install distributed generation. A customer that receives electricity storage services for free, or at a deeply subsidized rate, will not be willing to pay the actual value of electricity storage services to for distributed storage technologies that are offered by non-utility providers. This lack of an accurate unbundled utility price signal for electricity storage stifles innovation, chills the potential development of retail electricity storage markets, and results in significant cross-subsidies.

SDG&E respectfully submits that the straw man proposal appears to ignore this issue in favor of a listing of priorities that appear solely focused on guiding utility investments in electricity storage. As SDG&E demonstrated in the request we made for authority to pursue electricity storage investments in our pending General Rate Case, there is no need for additional direction to encourage utilities to pursue electricity storage investments where they are the most effective way to address operational issues such as renewable integration. There is, however, a need for the Commission to re-evaluate the existing electricity utility market structure and to consider whether this structure, which was designed to accommodate the technologies on which we have depended for the past century, needs to be updated to support the new technologies that are entering the market today such as electricity storage. This should be the Commission's top priority.

The existing electricity market structure is a huge barrier to growth in electricity storage markets. These issues were correctly noted in the final Energy Storage Framework Staff Proposal. SDG&E recommends that while the Commission moves forward with Phase 2 of this rulemaking, it also considers whether changes to the existing electricity market structure are necessary to promote new technologies such as electricity storage services and smart inverter technologies in parallel with Phase 2 of this rulemaking. The cost effectiveness analysis for energy storage applications should be conducted with a goal of pursuing market based solutions rather than the status quo.

Furthermore, SDG&E has several additional comments to the straw man proposal:

- Basis for Prioritization: energy storage applications should be prioritized based on the primary functions that the devices would be used for such as mitigating reliability issues, operational needs and supporting compliance with energy policy. The cost effectiveness tool should take into consideration these elements. Energy storage applications should be utilized where the specific storage technology is appropriate, effective, and a selection of least-cost best-fit for the uses and functions it is to serve.

- Technology: SDG&E believes that the use cases or application should be agnostic to different types of existing technologies. The characteristics of each energy storage technology are expected to change in the future as well as the functionality; therefore, we recommend focusing more on the solution needs of each use case rather than the existing available technology.

- Benefits: energy storage applications include economic (quantifiable) and non-economic (non-quantifiable) benefits. Economic benefits can include reduced costs, avoided costs or deferral costs. Revenue opportunities are also examples of economic benefits. Some of the societal and environmental benefits would be possible to quantify and others not, but we do not believe that investments pursued strictly to achieve societal investments should be funded through utility rates. SDG&E recommends leveraging existing work conducted by several institutions such as Sandia and EPRI in this area as well as the California Standard Practice Manual and the E3 Calculator.

In terms of priority of the use cases, SDG&E has the following perspective:

- Short Term: VER-sited (DG), Community Energy Storage, Demand-side, Distributed Peaker
- Med/Long Term: Distribution Deferral, Bulk Generation, Transportable

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