DRAFT

Application Priorities – Strawman

Date: April 16, 2012

The following application priorities and definitions are based on informal input/discussion between CPUC Staff, CESA, SCE, PGE, SDGE on April 12, 2012.

Basis for Prioritization (of what? Selected application for cost benefit analysis?)

1. Magnitude of societal benefits
2. Magnitude of direct benefits
3. Renewables enablement (key California policy priority)
4. Fit with CPUC jurisdictional control
5. Availability of commercially ready energy storage technologies
6. Ability to be deployed quickly and achieve 'quick wins'

Key Definitions to Standardize in our Language:

1. End Use = 'operational use (SCE)' = specific targeted operational use for a resource in the field, may result in capture of one or more benefits. Some end-uses would be secondary to the primary targeted end uses.
2. Benefit = a single value or revenue stream captured by a resource. A stream of benefits come from solving the identified problem and providing additional end-uses that result in providing value or capturing revenue. The cost-benefits for different solutions should be evaluated separately and the net benefits should be compared.
3. Application = combination of end uses (and benefits) that an energy storage system may capture when sited at a specific place and managed in a particular way (consistent with SCE and CESA's definition)

Proposed Next Steps:

1. Obtain informal feedback from IOUs and CPUC staff on this document (Basis for Prioritization, Key Definitions, Application Priorities) – target another informal group meeting/conference call end of April/early May 2012 to discuss
2. Procedural next steps – CPUC can consider issuing an Assigned Commissioner's Ruling to formally close out Phase 1 and kickoff Phase 2 – target by ????
3. Conduct public workshop introducing application framework, basis for prioritization, definitions and strawman application priorities) – target by end of May???
4. Complete Phase 2 ASAP! Certainly sooner than what is called for in AB 2514 (October 2013) especially given that the CPUC made this OIR a priority by launching efforts a year ahead of schedule!

DRAFT

Application Priorities – Strawman

#	Application (use case)	Description/ Problem Solving	Likely Compensation or Ownership	Likely Siting & Scale (C x hr)	Energy Storage Solution (Solution, Benefit, Cost)	Conventional Solutions (Solution, Benefit, Cost)	Energy Storage Case Study Example
1	Distribution Deferral (or Equip-ment# Life Extension) (or, aka simply Distributed Storage?)	Load growth within a region requires increasing capacity. ES can provide deferral of upgrades.	• Ratebased (IOU ownership)	• At or down-stream from overloaded equipment • Substation • Circuit • >1? MW x 4 hr	**Solution:** Energy storage technology, capacity, hours **Benefits:** *Primary* • Solves the problem • Upgrade Deferral* • Replacement Deferral* *Secondary* • ??Electric Supply* • ??Ancillary Services* **Costs** function of technology & size	**Solution:** Upgrade wire or transformer **Benefits:** *Primary* • Solves the problem *Secondary* • TBD **Costs:** Function of components installed •	• Raleigh, NC (TAS Energy) • SDG&E primary distribution storage

DRAFT
Application Priorities – Strawman

2	Community Energy Storage[@]	Integration of distribution intermittent renewables Voltage control Improve local service reliability. In-lieu of peaking electric supply resources. Avoid/defer adding distribution capacity	• Ratebased(IOU owned) • Expensed (Third Party under power sale contract to LSE) • Customer savings (if community uses to self-supply own load)	• Adjacent to loads, on utility 'easement' • >25 kW x 2 hr	**Solution:** Energy storage technology, capacity, hours **Benefits:** *Primary* • Solves the problem *Secondary* • D Deferral* • Electric Supply* • Ancillary Services* **Costs** TBD • Service Reliability* •	**Solution:** Capacitor, Transformer, or whatever the sol'n is **Benefits:** *Primary* • Solves the problem *Secondary* TBD **Costs** TBD •	• AEP CES • Detroit Edison CES • SMUD Solar Smart RES/CES Project • SDG&E secondary storage projects

DRAFT
Application Priorities – Strawman

3	Distributed Peaker[@] (Load Modifier)	Distribution Substation level Energy cycling to address peaking needs (½ year operated by utility, ½ year operated by CAISO)	• Market revenue (if 3rd party owns and sells product to market) • Ratebased (if IOU owns)	• Subtransmission • Substation • >25 MW x 4 hr	**Solution:** TBD **Benefits:** *Primary* • Electric Supply* • Ancillary Services* *Secondary* • D Deferral* **Costs** • Service Reliability* •	**Solution:** TBD **Benefits:** *Primary* TBD *Secondary* TBD **Costs** TBD •	• Modesto Irrigation District

DRAFT
Application Priorities – Strawman

4	VER-sited (renewables)	On-site firming or shaping of intermittent generation Variable RE Generation Integration	• Expensed by LSE (if third party owns and sells higher value power to LSE) • Ratebased (If IOU owns and pairs with generation)	• At or near RE Generation ✓ Subtransmission ✓ Substation ✓ Distribution • Size?	**Solution:** TBD **Benefits:** *Primary* • Resource adequacy?? • Energy time-shift • TBD *Secondary* TBD **Costs** TBD ✓ ramping ✓ Volt/VAR	**Solution:** TBD **Benefits:** *Primary* TBD *Secondary* TBD **Costs** TBD • -	• SMUD Solar Smart RES/CES Project • Xtreme Power - various • Bulk Solar Thermal • Generation Storage (molten salt) • Solar Reserve or Brightsource

DRAFT
Application Priorities – Strawman

5	Bulk Generation	Resource located at generation the provides resource adequacy, ancillary services, and energy	• Ratebased + market revenues (If IOU owns) • Expensed (If Third Party owns and sells services to CAISO or sells dispatch rights to LSE)	• Transmission • >100 MW x 6 hr	**Solution:** TBD **Benefits:** *Primary* • Resource adequacy • Ancillary services • Energy • *Secondary* TBD **Costs** TBD •	**Solution:** TBD **Benefits:** *Primary* TBD *Secondary* TBD **Costs** TBD •	• Utility-owned Pumped Hydro-electric • Alabama CAES • TAS Energy Generation Storage case study

6	Demand Side Manage-ment	Resource located at customer site for bill management	• Customer ownership to obtain bill savings [Note: There can be confusion about who captures savings and benefits. The SPM can be useful here] • Expensed (If third party owns and sells service to CAISO or dispatch rights to LSE) •	• Customer-side of Meter	**Solution:** TBD **Benefits:** *Primary* • TOU Energy Cost Management • Demand Charge Management • Reliability (back-up power) • Power Quality *Secondary* TBD **Costs** TBD • Ancillary Services *	**Solution:** TBD **Benefits:** *Primary* TBD *Secondary* TBD **Costs** TBD •	• Alameda County Santa Rita Jail • Various SGIP funded projects • Tesla/ Solarcity projects

7	Demand Side Manage-ment (or, Behind the Meter Community Energy Storage)	Service Reliability/ Quality	• Same as Example #6	• Customer-side of Meter	**Solution:** TBD **Benefits:** *Primary* TBD *Secondary* TBD **Costs** TBD • Electric Supply* • Ancillary Services* • Service Reliability* • D Deferral* • T Congestion*	**Solution:** TBD **Benefits:** *Primary* TBD *Secondary* TBD **Costs** TBD • *Conventional Generation (CT, CC)* • *PPA* • *DR* • *Critical Peak Pricing (CPP)* • *EE* • State-of-the-art L/A • Advanced L/A • NiMH • LIon • Various flow batteries	• SCCPA (Ice Energy)

DRAFT
Application Priorities – Strawman

						Above-ground CAES	
8	Transportable	Locational Issues	• Ratebased	• Substation • >1 MW x 4 hr	**<u>Solution:</u>** TBD **<u>Benefits:</u>** *Primary* TBD *Secondary* TBD **<u>Costs</u>** TBD • Electric Supply* • Ancillary Services* • Service Reliability* • D Deferral* • T Congestion*	**<u>Solution:</u>** TBD **<u>Benefits:</u>** *Primary* TBD *Secondary* TBD **<u>Costs</u>** TBD • *None* • Various chemistries	• ??

Notes
[#]Heavily loaded transformers and underground cables with slow or no load growth.
*Responds to utility and/or ISO signals.
[@]Includes resource adequacy in the form of supply capacity and reserves.