Option Submittal Form

Contact Information (optional):

☐ Keep my contact information private

Contact Name: _____ Title: _____

Affiliation: _____

Address _____

Telephone: _____ E-mail Address: _____

Date Option Submitted: 1-26-12

Option Name:

Harnessing solar inputs to major Colorado River reservoirs (or canals) and lowering evaporation rates

Description of Option:

Evaporation rates at Colorado River reservoirs (Powell, Mead, etc.) constitute major losses of water in the Colorado River system - losses that are not put to 'beneficial use', as defined by most water users. In fact, evaporation rates at Lake Powell and Lake Mead (330,000 acre-feet (af) and 740,000 af, respectively) are greater than water amounts transported to Las Vegas and Salt Lake City metro areas (290,000 af and 140,000 af, respectively). Evaporation rates of these two major reservoirs are so high primarily because of the desert environments in which they are located. These environments have high summer temperatures, low relative humidity, and intense solar inputs.

In an effort to reduce evaporation rates at these reservoirs, while also producing clean, renewable energy, the BOR and other land and water management agencies should consider covering many portions of Lake Powell and Lake Mead will solar panels. Solar panels would simultaneously utilize solar inputs to create electricity and prevent evaporation. Electricity produced could be transported by existing lines from Hoover and Glen Canyon Dams. Solar panels could be mounted to dry land and span arms of reservoirs, or could be harnessed on floating 'piers'.

This solution would turn an existing problem (solar inputs and evaporation) into a financial benefit (clean energy) and increase water supplies in the Colorado River Basin. The project would meet the President's goal of create sustainable, clean energy & would meet Colorado River compact users' goals of increasing capacity in the Basin.

Location: Describe location(s) where option could be implemented and other areas that the option would affect, if applicable Attach a map, if applicable

Any reservoir with high evaporation rates. The many arms of Lake Powell would provide adequate land supports to create spanning 'bridges' of solar arrays. Or Lake Mead could support floating piers.

Furthermore, this project could be implemented on any existing canal or delivery system. For years, agencies have known that piping water delivery increases efficiency. If piping isn't financially feasible, simply place solar arrays over the ditches.

Quantity and Timing: Roughly quantify the range of the potential amount of water that the option could provide over the next 50 years and in what timeframe that amount could be available If option could be implemented in phases, include quantity estimates associated with each phase If known, specify any important seasonal (e g, more water could be available in winter) and/or frequency (e g , more water could likely be available during above-average hydrologic years) considerations If known, describe any key assumptions made in order to quantify the potential amount

Water saved - unknown. Would depend on the surface area covered

Seasonal - more water available in summer by reducing evaporation

Additional Information

Technical Feasibility: Describe the maturity and feasibility of the concept/technology being proposed, and what research and/or technological development might first be needed

Solar panel technology is affordable and available. Transmission lines are in place.

Costs: Provide cost and funding information, if available, including capital, operations, maintenance, repair, replacement, and any other costs and sources of funds (e g , public, private, or both public and private) Identify what is and is not included in the provided cost numbers and provide references used for cost justification Methodologies for calculating unit costs (e g , $/acre-foot or $/million gallons) vary widely; therefore, do not provide unit costs without also providing the assumed capital and annual costs for the option, and the methodology used to calculate unit costs

Costs are unknown - would depend on the scale implemented.

Permitting: List the permits and/or approvals required and status of any permits and/or approvals received

highly variable based on location and scope.

Legal / Public Policy Considerations: Describe legal/public policy considerations associated with the option Describe any agreements necessary for implementation and any potential water rights issues, if known

Recreational users and anglers may be opposed, because productivity of reservoirs may decrease and visual resources may be impacted.

However, impacts to endangered species, water users, and historical properties would be low.

Implementation Risk / Uncertainty: Describe any aspects of the option that involves risk or uncertainty related to implementing the option

Mixing of water in the reservoirs may affect the evaporation rates. i.e: Covering 25% of a reservoir may cause a greater or less than 25% reduction in evaporation rate. Modeling would need to determine the effectiveness.

Reliability: Describe the anticipated reliability of the option and any known risks to supply or demand, such as: drought risk, water contamination risk, risk of infrastructure failure, etc

This project would be reliable no matter what the weather. Electricity produced may fluctuate, but shading effects and reduction in evaporation should not.

Water Quality: Identify key water quality implications (salinity and other constituents) associated with the option in all of the locations the option may affect

Reducing evaporation improves water quality by increasing dilution factors

Energy Needs: Describe, and quantify if known, the energy needs associated with the option Include any energy required to obtain, treat, and deliver the water to the defined location at the defined quality

Energy Required	Source(s) of Energy

Hydroelectric Energy Generation: Describe, and quantify if known, any anticipated increases or decreases in hydroelectric energy generation as a result of the option

Location of Generation	Impact to Generation

Recreation: Describe any anticipated positive or negative effects on recreation

Locations	Anticipate Benefits or Impacts
Any reservoir implemented	Reduction in visual resources

Environment: Describe any anticipated positive or negative effects on ecosystems within or outside of the Colorado River Basin

Locations	Anticipated Benefits or Impacts
Any reservoir implemented	Reduction in reservoir productivity (nonnative sportfish)

Socioeconomics: Describe anticipated positive or negative socioeconomic (social and economic factors) effects

Great benefits from developing clean, renewable energy with low impacts. Most solar facilities are disturbing new lands. Putting solar panels on reservoirs or canals would develop the energy on already disturbed lands and prevent evaporation.

Other Information: Provide other information as appropriate, including potential secondary benefits or considerations Attach supporting documentation or references, if applicable