CWSRF Cost and Effectiveness Analysis Guidance

SRF loan recipients with projects submitted for SRF scoring and ranking after October 1, 2015 are required to certify that the recipient has examined and evaluated the cost and effectiveness of the project for which SRF financial assistance is being received. The Cost and Effectiveness (C&E) Analysis must be completed and determined as valid for the project by the SRF Section before CWSRF assistance is provided for construction.

The 2014 Amendments to the Federal Water Pollution Control Act (FWPCA) set forth the requirement for C&E analysis by adding section 602(b)(13) to the FWPCA. Section 602(b)(13) requires that a cost and effectiveness analysis involve, at a minimum:

- *the study and evaluation of the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is sought under this title; and*
- *the selection, to the maximum extent practicable, of a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account—*
    - *the cost of constructing the project or activity;*
    - *the cost of operating and maintaining the project or activity over the life of the project or activity; and*
    - *the cost of replacing the project or activity.*

While there is no established right or wrong way to complete the C&E analysis, a suggested procedure is included below. Other methodologies may be employed, as long as the resulting analysis considers water and energy efficiency in addition to other expected benefits. The C&E analysis should be included in the Preliminary Engineering Report.

Preliminary Engineering Report Alternatives Analysis: Evaluation of Cost and Effectiveness, Incorporating Water and Energy Conservation to Maximum Extent Possible

1. Establish a "Baseline" project. This would be the most conventional way to go about solving the problem. This would NOT be the no-action alternative.

2. Develop some alternatives to the baseline. Ask questions such as: Are there water conservation or reuse options available? Where can energy savings be realized? Are there alternative materials or equipment that could be used that could result in additional benefits? At least one and hopefully two or more viable alternatives should be proposed.

3. Develop a project lifecycle cost estimate for each alternative using the longest estimated life of the different alternatives as the evaluation period. Costs that should be considered include the total capital costs (engineering, land, construction), annual operation and maintenance costs, *and replacement cost where the alternatives have different useful lives* (e.g., if one alternative has a 20 year life and one has a 50 year life, the first alternative will have to be replaced at least once to give a fair comparison). Adjust future costs back to present values for comparison.

$$P=F\times(1+i)-n$$

Where: P = Present Value
F = Future Value
i = rate of inflation
n = number of years between F and P

4. Include any non-monetary costs/benefits that are important to the City. The Exhibit below shows some non-monetary factors that could be taken into consideration.

Exhibit 13. Comparison of non-monetary benefits and costs for green and gray infrastructure alternatives for increasing stormwater capture

	Green infrastructure alternative	Gray infrastructure alternative
Increased recreational opportunities	5	3
Increased local employment	3	2
Community aesthetics/livability	5	1
Reduced urban heat island affect	2	0
Improved habitat[a]	3	0
Energy savings	3	0
Reduced carbon footprint	3	0
Improved air quality	4	0
Climate resiliency	5	1
Construction/traffic disruption	-3	-1
Flexibility[b]	4	-4
Total	34	2

5. Lastly, compare each alternative based on monetary and non-monetary rankings, assigning points and summing together for a total project score, as in the example below. Obviously, you assign points to the various costs/benefits in alignment with the City's priorities (e.g., capital cost may be worth up to 50 points, while downstream water quality impacts may only be worth up to 10 points). The selected alternative should be the one that ends up with the highest Total Score.

	Alternative 1 (baseline)	Alternative 2	Alternative 3
Financial			
Capital cost			
Periodic replacement costs			
O&M costs			
Avoided costs of baseline projects			
Social			
Increased water supply reliability			
Local/neighborhood impact – visibility, noise, etc.			
Change in perceived public health impact			
Organization and business integration issues			
Agricultural benefits			
Environmental			
Meet discharge requirements			
Energy use/greenhouse gas emissions			
Environmental amenities associated with the project			
Downstream water quality impacts			
Groundwater impacts			
Constraints			
Regulatory			
Additional funding availability/financing			
Water rights			
Public opinion/acceptance			
Political leadership			
Total project score			

Exhibit 14. Example decision framework for water reuse project alternatives.