Appendix D. OWRB Green Project Reserve Checklist

Green Project Reserve Components

Rev-04/15

Oklahoma Clean Water State Revolving Fund
Green Project Reserve (GPR)
Checklist

Purpose

The Oklahoma Water Resources Board (OWRB) Clean Water State Revolving Fund (CWSRF) loan program's GPR checklist is a tool to aid loan applicants and consultants in determining the green components of any given project, identifying both green performance targets and submittal materials that will be used for the implementation of the green components. It is also a tool to aid OWRB staff in tracking the implementation of the GPR throughout Oklahoma.

How to Use the Checklist

The following checklist is provided as a resource for CWSRF loan program applicants and consultants. The CWSRF loan program may accept components and technologies other than those listed in the attachment EPA CWSRF GPR Specific Guidance upon OWRB staff review and approval. Applicants are encouraged to introduce additional innovative green technologies in the proposed projects.

How to Submit the Checklist

It is the applicant's responsibility to obtain the necessary approvals and permits, and to properly design, build and effectively operate and maintain the proposed facilities covered in the Engineering Report (ER) or planning document. Loan applicants should include a completed copy of the checklist with their ER. The completion of the Checklist is equally valuable for projects that do not meet the GPR, since it will help OWRB staff to track the implementation of the various features within the GPR.

Contact for more Information: Jennifer Wasinger, Assistant Chief, FAD or Your OWRB project engineer @405-530-8800

I. CWSRF Loan Applicant Information

Loan Number (if assigned):_____
Applicant Name: _____
Project Name/Location: _____
Latest date this list was last updated by the Applicant: _____

II. Categories

Please mark, from the categories below, all the GPR components that are proposed for the project.

1. Energy Efficiency Components:

Definition: *Energy efficiency is the use of improved technologies and practices to reduce the energy consumption of water quality projects, use energy in a more efficient way, and/or produce/utilize renewable energy.*

Projects that achieve a 20% reduction in energy consumption are categorically eligible for GPR, energy savings < 20% requires a business case. (Sample business cases are in attachment)

N/A	Yes	
( )	( )	a. Site plan for facilities includes sustainable building components.
( )	( )	b. The design includes an energy reduction plan with at least a 20% reduction goal
( )	( )	c. The Treatment Facility participates in EPA energy star program[1]
( )	( )	d. Project utilizes high efficiency fixtures, energy star components in heating, ventilating, and air conditioning (HVAC) equipment, Power Smart technology
( )	( )	e. Project utilizes a SCADA system to reduce overall energy consumption by 20% and enhance process control. (Please show in business case the energy and cost saved in $numbers)
( )	( )	f. Use of renewable energy alternatives (e.g., geothermal, solar, off grid, Hydro Wind) (Categorical)
( )	( )	g. Project proposes to use high efficiency pumps (achieve 20% reduction in energy consumption) (categorical-documentation required)
( )	( )	h. Infiltration/Inflow (I/I) correction projects that save energy from pumping and reduced treatment costs and are cost effective. Projects that count toward GPR cannot build new structural capacity. These projects may, however, recover existing capacity by reducing flow from I/I (business case required)
( )	( )	i. Collection system Infiltration/Inflow (I/I) detection equipment (Categorical)

1. For more information on energy star see http://www.energystar.gov/index.cfm?c=government.wastewater_drinking_water

2. Water Efficiency Components:

Definition: *EPA's WaterSense program defines water efficiency as the use of improved technologies and practices to deliver equal or better services with less water. Water efficiency encompasses conservation and reuse efforts, as well as water loss reduction and prevention, to protect water resources for the future.*

N/A	Yes	
( )	( )	a. The project utilizes on site stormwater management/rain harvesting (e.g., green roof, permeable paving, on-site drainage, rain garden) (Categorical)
( )	( )	b. Recycling and water reuse projects that replace potable sources with non-potable sources, Extra treatment costs and distribution pipes associated with water (Categorical)
( )	( )	c. The project incorporates water use reduction measures (e.g., low consumption fixtures, grey water systems, and stormwater irrigation measures) (Categorical)
( )	( )	d. The Treatment Facility participates in EPA's water sense program.
( )	( )	e. Gray water, condensate and wastewater effluent reuse systems (where local codes allow the practice) (Categorical)
( )	( )	f. Installing any type of water meter in previously unmetered areas (i) If rate structures are based on metered use (ii)Can include backflow prevention devices if installed in conjunction with water meter (Categorical)
( )	( )	g. Replacing existing broken/malfunctioning water meters, or upgrading existing meters, (Categorical) with: (i) Automatic meter reading systems (AMR), for example Advanced metering infrastructure (AMI), Smart meters (ii) Meters with built in leak detection (iii)Can include backflow prevention devices if installed in conjunction with water meter replacement
( )	( )	h. Water efficient landscaping (e.g., drought resistant and/or native plantings, use of non-potable water for irrigation, high efficiency irrigation

3. Green Infrastructure Components:

Definition: *Green infrastructure includes a wide array of practices at multiple scales that manage wet weather and that maintains and restores natural hydrology by infiltrating, evapotranspiring and harvesting and using stormwater. On a regional scale, green infrastructure is the preservation and restoration of natural landscape features, such as forests, floodplains and wetlands, coupled with policies such as infill and redevelopment that reduce overall imperviousness in a watershed. On the*

local scale green infrastructure consists of site- and neighborhood-specific practices, such as bioretention, trees, green roofs, permeable pavements and cisterns.

N/A	**Yes**	
( )	( )	a. Implementation of green streets (combinations of green infrastructure practices in transportation right-of-ways), for either new development, redevelopment or retrofits including: permeable pavement[2], bioretention, trees, green roofs, and other practices such as constructed wetlands that can be designed to mimic natural hydrology and reduce effective imperviousness at one or more scales. Vactor trucks and other capital equipment necessary to maintain green infrastructure projects. (Categorical)
( )	( )	b. Wet weather management systems for parking areas including: permeable pavement[2], bioretention, trees, green roofs, and other practices such as constructed wetlands that can be designed to mimic natural hydrology and reduce effective imperviousness at one or more scales. (Categorical)
( )	( )	c. Offsite reuse of either treated wastewater or a bio solids treatment process Significantly reduces residuals disposal.
( )	( )	d. The project provides enhanced waste diversion facilities (e.g., on-site recycling, on-site composting) (Categorical)
( )	( )	e. Establishment or restoration of permanent riparian buffers, floodplains, wetlands and other natural features, including vegetated buffers or soft bioengineered stream banks (Categorical)
( )	( )	f. The project beneficially utilizes recycled materials. (Categorical)
( )	( )	g. Low-impact development (LID).
( )	( )	h. Downspout disconnection to remove stormwater from combined sewers and storm sewers (Categorical)

4. Environmentally Innovative Project (EIP) Component

Definition: *Environmentally innovative projects include those that demonstrate new and/or innovative approaches to delivering services or managing water resources in a more sustainable way.*

( )	( )	a. Utility Sustainability Plan consistent with EPA's SRF sustainability policy.
( )	( )	b. Greenhouse gas (GHG) inventory or mitigation plan and submission of a GHG inventory to a registry (such as Climate Leaders or Climate Registry) (i). EPA Climate Leaders: http://www.epa.gov/climateleaders/basic/index.html (ii). Registry: http://www.theclimateregistry.org/
( )	( )	c. Construction of US Building Council LEED certified buildings or renovation of an existing building on POTW facilities.
( )	( )	d Decentralized wastewater treatment solutions to existing deficient or failing onsite wastewater systems

2.For more information on LEED (Leadership in Energy and Environmental Design) certification see http://www.usgbc.org/LEED/LEED_main.asp

Total Present worth Cost Analysis Component:

To properly evaluate a project's long-term costs, a Total Present Worth (TPW) cost analysis of feasible alternatives is strongly recommended. TPW cost for each alternative includes Construction Cost, Non construction Cost (e.g., Engineering, Inspection, Legal, Land, Easements, Soils/Foundation Testing, Permits, O& M Manual and Other cost), estimated annual operation and maintenance (O&M) costs during the service life (for example 20 years) discounted to its present value and added to the Construction & Non construction Cost together known as TPW*. The resulting TPW allows participants to assess the true cost of construction projects. **Prepare a comparison of the selected alternative for the project with and without the proposed GPR components.**

**SRF Loan Programs will provide the participant/applicant an estimated interest rate to be used in the life- cycle analysis*.

5. Cost Estimate for Green Project Components:

Provide a cost estimate for the green infrastructure project or components. (Add pages if necessary)

(Description)	(GPR Component)	(Cost $$)
i._____	_____	_____
ii._____	_____	_____
iii._____	_____	_____
	Total:	_____

6. Please describe the problems with the existing system and explain the technical and financial benefits of using green components included in the project. (Please add pages if necessary)

1

(Attachment-2)

Sample calculation for energy and cost savings for SCADA control:

Project #	LS #	kWh Consumption for Current Run Times/yr	Energy Cost/yr	Excessive kWh Consumption/yr	kWh Consumption/yr after SCADA	Energy Cost/yr	Cost Savings	Energy Savings	Eligible Costs	
E1	20	111,521	$ 104,829.74	7,806	103,715	$ 97,491.66	$ 7,338.08	7%	$ 4,500.00	Efficiency Calc:
E4	48	50,093	$ 47,087.42	1,503	48,590	$ 45,674.80	$ 1,412.62	3%	$ 4,500.00	
Sub 1	82	3,335	$ 3,134.90	200	3,135	$ 2,946.81	$ 188.09	6%	$ 4,500.00	(Total Run Hours - Excess Run Hours)/Total Run Hours
	109	35,292	$ 33,174.48	706	34,586	$ 32,510.99	$ 663.49	2%	$ 4,500.00	
Sub 4	17	4,792	$ 4,504.48	144	4,648	$ 4,369.35	$ 135.13	3%	$ 4,500.00	
Sub 5	27	15,570	$ 14,635.80	1,246	14,324	$ 13,464.94	$ 1,170.86	8%	$ 4,500.00	
Sub 6	64	170,718	$ 160,474.92	8,536	162,182	$ 152,451.17	$ 8,023.75	5%	$ 4,500.00	
Sub 8	8	113,280	$ 106,483.20	3,398	109,882	$ 103,288.70	$ 3,194.50	3%	$ 4,500.00	
Sub 9	49	24,749	$ 23,264.06	990	23,759	$ 22,333.50	$ 930.56	4%	$ 4,500.00	
	61	27,594	$ 25,938.36	1,656	25,938	$ 24,382.06	$ 1,556.30	6%	$ 4,500.00	
	74	6,693	$ 6,291.42	67	6,626	$ 6,228.51	$ 62.91	1%	$ 4,500.00	
	76	27,213	$ 25,580.22	816	26,397	$ 24,812.81	$ 767.41	3%	$ 4,500.00	
Sub 9b	68	39,127	$ 36,779.38	2,739	36,388	$ 34,204.82	$ 2,574.56	7%	$ 4,500.00	
Sub 11	34	18,015	$ 16,934.10	1,081	16,934	$ 15,918.05	$ 1,016.05	6%	$ 4,500.00	
	36	19,590	$ 18,414.60	1,763	17,827	$ 16,757.29	$ 1,657.31	9%	$ 4,500.00	
	42	12,440	$ 11,693.60	871	11,569	$ 10,875.05	$ 818.55	7%	$ 4,500.00	
System-Wide		**680,022**	**$**	**47,602**	**632,420**	**$**	**$**	**7%**	**$**	

TOTALS			**639,220.68**			**607,710.50**	**31,510.18**		**72,000.00**				
LS #	Total Run Hours	Excess Run Hours	% Excess										
20	7708	572.1	7%										
48	4645	154	3%										
82	1967.8	119	6%										
109	4961.5	78	2%										
17	584.3	15.9	3%										
27	2574.8	207.5	8%										
64	4984.2	234.2	5%										
8	3022.4	87.1	3%										
49	4419.6	173.1	4%										
61	3986.9	229.4	6%										
74	790.6	6.4	1%										
76	5407.5	169.6	3%										
68	2923.1	211.9	7%										
34	6837.3	411.8	6%										
36	4058.2	356.2	9%										
42	4069.2	283.5	7%										
NOTES:													
Project specs call for SCADA units to consist of:													
	Siemens Intralink LC150 (or similar)												
	MDS iNET900 Data Transmission Unit												
Estimate cost per SCADA unit = $4,500 per correspondence from local Distributor													
(Municipal Pump & Control)													

(Attachment-2)

Guidance on Energy Efficiency Business Case for Wastewater Pumping Systems for Green Project Reserve

Modifications, retrofits or replacement of existing wastewater pumping systems that achieve a 20% increase in energy efficiency will categorically qualify for the Green Project Reserve (GPR) Projects that do not achieve a 20% increase in energy efficiency can also count towards the GPR if they have a business case showing how the project significantly improves energy efficiency. Information to be included in a business case for wastewater pumping stations is provided below.

Business cases for wastewater pumping systems must include information that demonstrates that energy efficiency is the primary goal of the project. They should clearly show that: 1) the most energy efficient equipment is being used in the project, 2) that energy efficient design and operational considerations and practices are followed, 3) the percent increase in energy efficiency and KWH saved, and 4) why further energy efficiency improvements cannot be achieved.

1) Energy Efficient Equipment : The business case shall demonstrate that selected equipment is of the highest efficiency suitable for the project. The following are examples of standards or guidelines to be met:

- Selection of new or replacement electrical equipment should meet or exceed energy efficiency standards set forth by professional engineering and manufacturers associations such as the National Electrical Manufacturers Association (NEMA).

- If it is not possible to select new electrical equipment that can meet or exceed energy efficiency standards then applicants must provide acceptable evidence of why this could not be achieved, with rationale for selecting alternate equipment if the goal of energy efficiency is to be achieved.

2) Energy Efficient Design Practices and Considerations: The business case shall demonstrate that all energy efficient design practices and considerations suitable for the project were used. The following are general examples of design considerations where energy efficiency could be demonstrated:

- Pumping systems should be designed to operate in their most efficient zone. Pumps should be selected to operate close to the Best Efficiency Point (BEP) on a pump curve defined as the point with maximum efficiency of the pump. Choose pumps that result in the lowest friction head loss and ensure that pumps are properly sized for the pumping system.
- Pumping systems should be designed to reduce flows to be pumped where possible.
- Reduce pipe friction and lower head losses to reduce the energy needed for pumping. Note that repair and replacement of the collection system piping does not qualify as “green” except in the most dramatic infiltration/inflow cases.

- Where appropriate for energy efficiency purposes, use distributed control systems to operate the most efficient combination of pumps, and at the proper pump speeds, for needed flow rates and pressures.

3) Energy Savings: Comparing the energy requirements of the existing system with the energy requirements of the proposed upgrades yields the increase in energy efficiency. Business cases for energy efficient wastewater pumping projects should calculate the increase in energy efficiency as follows:

$$\frac{\text{kWh/year used prior to the upgrade} - \text{kWh/year used after the upgrade}}{\text{kWh/year used prior to the upgrade}}$$

The answer is expressed as a percentage improvement. The business case should clearly report the kWh/year saved by the project.

4) Energy Saving Justification: Business cases that demonstrate significant energy efficiency improvements will utilize all practical opportunities to improve energy efficiency. Consequently, each business case should discuss why the project cannot achieve a higher level of energy efficiency. One possible answer is that prior energy efficiency improvements have elevated the operation to a point where the remaining gains represent a smaller improvement.

Demonstrating Energy and Cost Savings for Pumps		
Pump Parameter	Comparison Pump	New Pump (Proposed Pump, Spec)
Maufacturer		
Voltage/ Phase	240/3	
Motor Efficiency, %	89	
Pump Efficiency	72.5	
Power usage, Kw-Hr/Yr	283,021	
Power Cost, $/Yr	0.09	
Operational Cost, $/Yr	25472	
Savings, $/Yr	N/A	
Base Standard Efficiency, %	77	0

New Standard Grade Efficiency: Pumps -72.5%; Motors-89% : 0.725*0.89=0.65

Adding 20% efficiency to the standard grade Efficiency:

Base Std. Efficiency, %	77

Sample Calculation for energy and cost savings for Pumps: