BROWNSVILLE
PUBLIC UTILITIES BOARD

PUBCAP Meeting

Wednesday, July 17, 2024

BROWNSVILLE
PUBLIC UTILITIES BOARD

Call Open Meeting To Order

BROWNSVILLE
PUBLIC UTILITIES BOARD

Approval of Minutes

BROWNSVILLE
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Old Business

BROWNSVILLE
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New Business

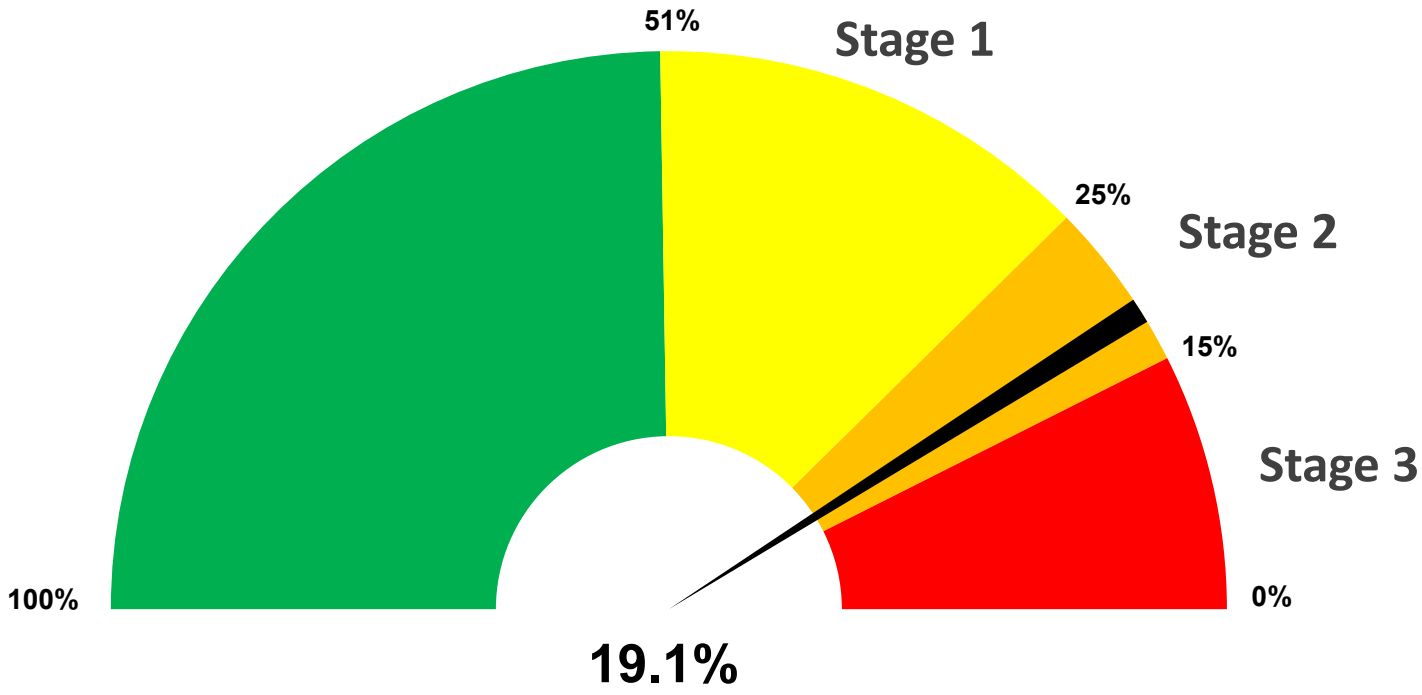
BROWNSVILLE
PUBLIC UTILITIES BOARD

Drought Update

JULY 17, 2024

PUBLIC UTILITIES BOARD CONSUMER ADVISORY PANEL

BPUB Drought Stage Meter



U.S. Combined ownership at Amistad and Falcon Reservoirs
July 6, 2024 = 19.1%

U.S. Combined Ownership at Amistad/Falcon

Previous 3 Readings

19.0%

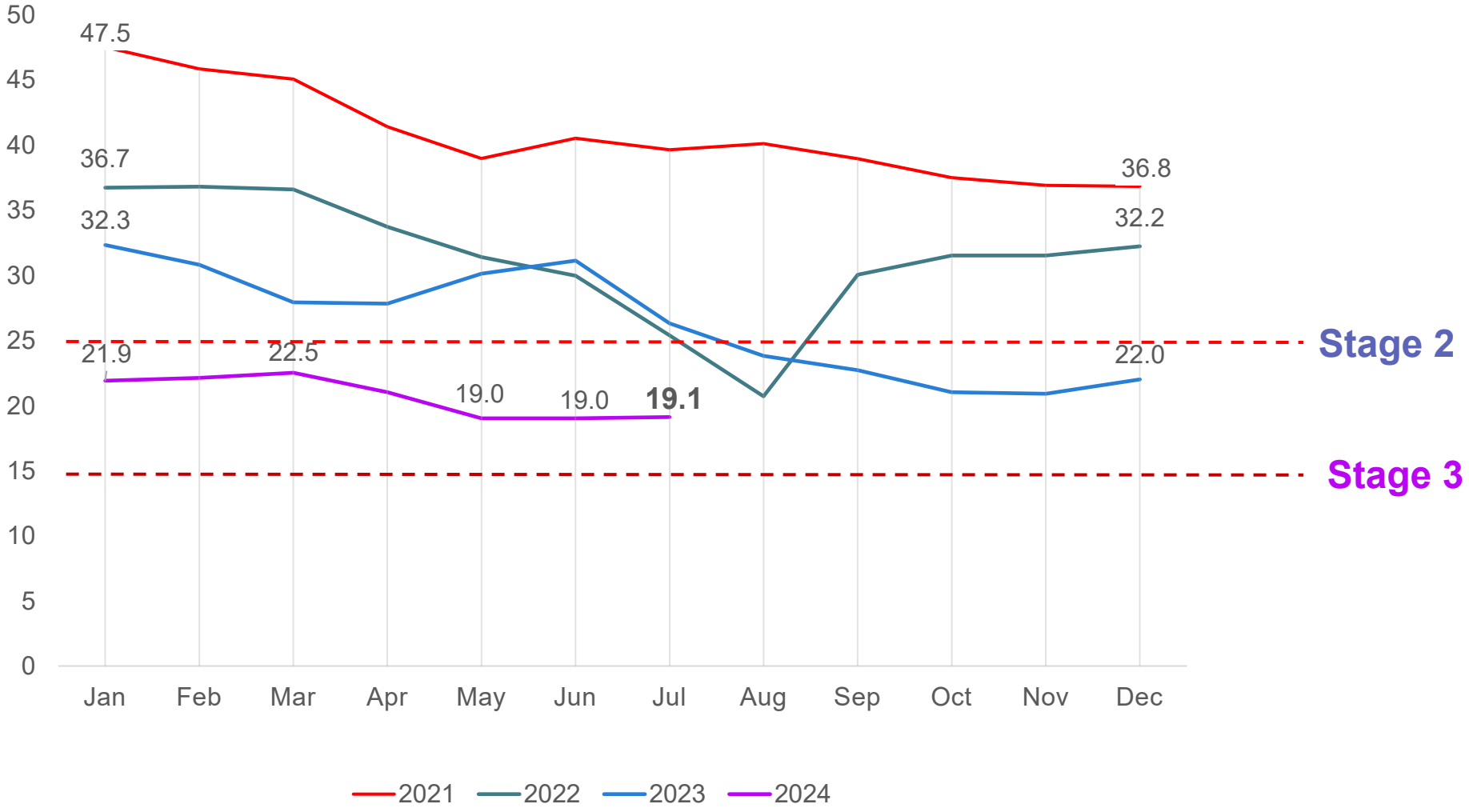
June 29, 2024

18.5%

June 22, 2024

18.2%

June 15, 2024



National Weather Service June to August (Summer) 2024 Outlook: Perspective for the Lower Rio Grande Valley/Deep S. Texas Region

- No Inflows are expected from Mexican reservoirs serving the Lower Rio Grande Watershed.
- Combined share of water in Amistad and Falcon likely to continue well below 25% through July.
- Water Crisis unfolding for agriculture and likely to develop for some municipalities.

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EVERY DROP COUNTS!

Learn more about drought at:

brownsville-pub.com/drought-resources

BROWNSVILLE
PUBLIC UTILITIES BOARD

2024 Drinking Water Quality Report
(Consumer Confidence Report – CCR)

PUBCAP Meeting
July 17, 2024

ENVIRONMENTAL COMPLIANCE

Overview

- Background
- Report
- Summary

Background

What are Consumer Confidence Reports (CCR)?

- A CCR, sometimes called an “Annual Drinking Water Quality Report”, summarizes information about the local drinking water, including:

  - ✓ Source of water
  - ✓ Summary of monitoring results of detected contaminants
  - ✓ Description of any violations
  - ✓ Explanations of additional health information

- The Texas Commission on Environmental Quality (TCEQ) requires every community public water system (PWS) to generate and provide a CCR to customers by July 1 of every year.

Background

Additional information:

- Contact Information
- Spanish Statement
- Public Participation Opportunities

Southmost Regional Water Authority
Microbiological Contaminants (Contaminants Detected in Your Water)

Constituent	Highest No. of Positive	MCL	MCLG	Range	Source of Contaminant
Fecal Coliform	0%	No more than 1 sample can be total coliform-positive	0%	None detected	Human and animal fecal waste. Fecal Coliform (mostly E Coli), is a portion of the Coliform bacteria group originating in the intestinal tract of warm-blooded animals that passes into the environment through feces.

Radioactive Contaminants

Constituent	Highest Level Detected	MCL	MCLG	Range	Source of Contaminant
Combined Radium 226/228 *	1.5 pCi/L	5.0 pCi/L	0.0 pCi/L	1.5 pCi/L	Erosion of natural deposits.

** Radioactive monitoring performed in 2018*

Inorganic Contaminants

Constituent	Highest Level Detected	MCL	MCLG	Range	Source of Contaminant
Arsenic**	<0.002 ppm	0.010 ppm	0.0 ppm	0.00 - <0.002 ppm	Runoff from orchards, natural deposits; runoff from glass and electronics production waste.
Copper**	0.0092 ppm	1.3 ppm	1.3 ppm	0.0092 - 0.0092 ppm	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives.
Fluoride*	0.3 ppm	4.0 ppm	4.0 ppm	0.3 - 0.3 ppm	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories.
Lead**	<1.0 ppb	15 ppb	0.0 ppb	0.0 - <1.0 ppb	Corrosion of household plumbing systems; erosion of natural deposits.
Cyanide	<0.01 ppm	0.2 ppm (As Free Cyanide)	0.2 ppm (As Free Cyanide)	0.00 - <0.01 ppm	Discharge from fertilizer use leaching from septic tanks, sewage, erosion of natural deposits.
Chromium**	<10.0 ppb	100 ppb	100 ppb	0.0 - <10.0 ppb	Discharge from steel and pulp mills; Erosion of natural deposits.
Nitrate	<0.05 ppm	10 ppm	10 ppm	0.00 - <0.05 ppm	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits.

** Monitoring performed in 2021. ** Monitoring performed in 2022.*

Disinfection Byproducts

Constituent	Average Level	MCL	MCLG	Range	Source of Contaminant
Total Trihalomethanes	<4.0 ppb	80 ppb	N/A	0.0 - <4.0 ppb	Byproduct of drinking water chlorination.
Haloacetic Acids HAA5	<6.0 ppb	60 ppb	N/A	0.0 - <6.0 ppb	Byproduct of drinking water chlorination.
Chloramines	3.55 ppm	MRDL 4.0 ppm	MRDLG 4.0 ppm	3.17 - 4.03 ppm	Disinfectant used to control microbes.

Southmost Regional Water Authority
Secondary and Other Constituents Not Regulated* (No associated adverse health effects)

Constituent	Average Level	Secondary Limit	Range	Source of Contaminant
Calcium**	24.1 ppm	N/A	24.1 - 24.1 ppm	Abundant naturally occurring element.
Chloride*	416 ppm	300 ppm	416 - 416 ppm	Abundant natural occurring element; used in water purification; byproduct of oil field activity.
Hardness as CaCO3**	77.3 ppm	N/A	77.3 - 77.3 ppm	Naturally occurring calcium.
Nickel**	<0.001 ppm	N/A	0.0 - <0.001 ppm	Abundant naturally occurring element.
Manganese**	0.0027 ppm	0.05 ppm	0.0027 - 0.0027 ppm	Abundant naturally occurring element.
pH	8.39 SU	>7.0 SU	8.28 - 8.53 SU	Measure of corrosivity of water.
Sodium**	293 ppm	N/A	293 - 293 ppm	Erosion of natural deposits; byproduct of field activity.
Sulfate*	67 ppm	300 ppm	67 - 67 ppm	Naturally occurring; common industrial byproduct; byproduct of field activity.
Total Alkalinity as CaCO3*	100 ppm	N/A	100 - 100 ppm	Naturally occurring soluble mineral salts.
Total Dissolved Solids*	896 ppm	1000 ppm	896 - 896 ppm	Total dissolved mineral constituents in water.
Zinc**	0.0073 ppm	5.0 ppm	0.0073 - 0.0073 ppm	Abundant naturally occurring element.

** Monitoring performed in 2021. ** Monitoring performed in 2022.*

The Texas Commission on Environmental Quality (TCEQ) sets minimum water quality standards for public drinking water. These standards include enforceable treatment technique requirements for drinking water. Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses and parasites which can cause symptoms such as nausea, cramps, diarrhea and associated headaches.

Board and Executive Management

Arthur "Art" Rendon
Chair

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Vice Chair

Daisy Zamora, Ph.D
Secretary/Treasurer

Alejandro "Alex" Najera
Member

Gerardo Martinez
Member

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Member

Mayor John F. Cowen Jr.
Ex-Officio Member

Marilyn D. Gilbert
General Manager & Chief Executive Officer

Mark Dombroski
Asst. General Manager & Chief Operations Officer

Miguel A. Perez
Chief Financial Officer

Constanza Miner
Chief Administrative Officer

BROWNSVILLE PUBLIC UTILITIES BOARD

DRINKING WATER QUALITY REPORT

JUNE 2024

BROWNSVILLE PUBLIC UTILITIES BOARD

Public Water Supply
ID No. 0310001

Brownsville Public Utilities Board Provides Safe Drinking Water

When we think of water, I think most of us think of something without measure. It seems like there's so much of it out there that it's limitless. Turn the water knob on, and water comes out. It's always there for us, right? The truth is that water is a finite source and something that must be protected.

Our community depends a lot on the health of the Rio Grande and the reservoirs, Falcon and Amistad, that store our region's drinking water. In the last few years, those reservoirs have seen alarming drops in reserves.

This is why BPUB and so many other water utilities in the area are under drought restrictions. While we might have enough to serve our needs today, what about tomorrow? Or more crucially, what about next year? Without significant rainfall in the areas near those reservoirs, we might get faced with very difficult choices in the future.

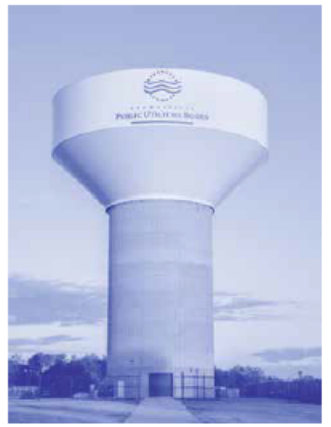
But you can help. Be mindful of your water use. Start trying to reduce your water consumption in any small ways that you can. Learn more about BPUB's drought contingency plan and follow the current drought restrictions. Make sure to spread the word to friends and family.

This is not something that any one of us can solve alone. We must all act together to make an impact. It will require us learning to change our relationship to water and how we use it, but we can start today by making every drop count.
If you would like to learn more, please check out the drought resources on the BPUB website or contact our Customer Service team at 956-983-6121.

Sincerely,

Marilyn D. Gilbert
General Manager and CEO

Este reporte incluye informacion importante sobre el agua para tomar. Para asistencia en español, favor de llamar al telefono (956) 983-6100.



We Welcome Your Comments

Public participation and education are important elements of our water quality effort. To find out more information about your drinking water, you are invited to the next meeting of our Public Utilities Board Consumer Advisory Panel (PUBCAP).

Note: PUBCAP meetings are typically on the third Wednesday of every month. The BPUB Board of Directors meets the second Monday of every month. Please check the BPUB website for agendas and meeting details: www.brownsville-pub.com.

Date: July 17, 2024
Time: 5:30 PM
Location: Board Room
Annex Building
1425 Robinhood Drive
Brownsville, Texas 78520

Or

Contact the Communications and Public Relations Department at (956) 983-6271.

All Drinking Water May Contain Contaminants

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants in the water does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at (800) 426-4791.

Secondary constituents such as calcium, sodium or iron, which are often found in drinking water, can cause taste, color and odor problems. These secondary constituents are regulated by the state of Texas, not the EPA. The constituents are not causes for health concern. For more information, please call the BPUB Analytical Lab at (956) 983-6100.

Special Notice for the elderly, infants, cancer patients, people with HIV/AIDS or other immune problems:

You may be more vulnerable than the general population to certain microbial contaminants, such as Cryptosporidium, in drinking water. Infants, some elderly, or immunocompromised people, such as those undergoing chemotherapy for cancer, those who have undergone organ transplants, those who are undergoing treatment with steroids, and people with HIV/AIDS or other immune system disorders can be particularly at risk for infections. You should seek advice about drinking water from your physician or health care provider. Additional guidelines on appropriate means to lessen the risk of infection by Cryptosporidium are available from the Safe Drinking Water Hotline (800) 426-4791.

Source Water Susceptibility Assessment

Our drinking water is obtained from surface water sources (Rio Grande, WTP 1 – 94 13th St., WTP 2 – 1425 Robinhood Rd.) and groundwater sources (well field located west of Town of Rancho Viejo - SRWA). A Source Water Susceptibility Assessment for your drinking water sources is currently being updated by the Texas Commission on Environmental Quality. The report will describe the susceptibility and types of constituents that may come into contact with your drinking water source based on human activities and natural conditions. The information contained in the assessment allows us to focus our source water protection strategies. For more information about your sources of water, please refer to the Source Water Assessment Viewer available at the following URL: https://www.tceq.texas.gov/gis/swaview. Further details about sources and source-water assessments are available at Drinking Water Watch at the following URL: http://dww2.tceq.texas.gov/DWW/. For more information on water assessment and protection efforts at our system, please contact the BPUB's Environmental Services Department at (956) 983-6100.

State Water Loss Audit

In the water loss audit submitted to the Texas Water Development Board for the time period of January through December 2023, our system lost an estimated 824,373,990 gallons (10.96%) of water through main breaks, leaks and other causes. If you have any questions about the water loss audit, please call 956-983-6684.

About the Tables

The following tables contain a listing of the chemical contaminants which were detected in small amounts. In addition to the contaminants listed in the attached tables, the Brownsville Public Utilities Board tested for 141 other contaminants, including mercury and silver, that were NOT detected in your drinking water.

This data is taken from 2023 monitoring results, except where indicated. Most of the contaminants detected and listed in the table on the following page are from natural deposits.

Contaminants that may be present in source water before treatment include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.
- Radioactive contaminants, which can be naturally occurring or the result of oil and gas production and mining activities.

The following list is provided to indicate the smallness of the units used to measure contaminants:

- Inorganic contaminants, such as salts and metals, which can be naturally occurring result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- Pesticides or herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff and septic systems.
- 1 part per million (ppm) is the equivalent of one packet of artificial sweetener sprinkled into 250 gallons of iced tea.
- 1 part per billion (ppb) is the equivalent of one packet of artificial sweetener sprinkled in an olympic-sized swimming pool.

Brownsville Public Utilities Board

Monitoring Period (June 2021)

Residential LEAD AND COPPER RULE MONITORING

Constituent	90th Percentile	50 sites tested, Number exceeding action level	Action Level	Likely Source of Contaminant
Lead	0.0ppb	None	15.0 ppb	Corrosion of household plumbing systems; Erosion of natural deposits.
Copper	0.336 ppm	None	1.3 ppm	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives

Lead and Copper monitoring at residential sites is performed on a tri-annual basis. Analysis performed in 2021.

Comments: In addition to the contaminants listed in the attached tables, the BPUB tested for 141 other contaminants that were not detected.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The Brownsville Public Utilities Board is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Constituents DETECTED In Your Water

DEFINITIONS:

Maximum Contaminant Level (MCL) – The highest level of contaminant in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
Maximum Contaminant Level Goal (MCLG) – The level of a contaminant in drinking water below which there is not known or expected health risk. MCLGs allow for a margin of safety.
Maximum Residual Disinfectant Level (MRDL) – The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
Maximum Residual Disinfectant Level Goal (MRDLG) – The level of drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
Action Level – The concentration of a contaminant that, if exceeded, triggers treatment or other requirements that a water system must follow.
Level 1 Assessment – Study of the water system to identify potential problems and determine (if possible) why total coliform bacteria have been found in our water system.
Level 2 Assessment – Detailed study of the water system to identify potential problems and determine (if possible) why an E. coli MCL violation has occurred and/or why total coliform bacteria have been found in our water system multiple occasions.
Treatment Technique – A required process intended to reduce the level of a contaminant in drinking water.
Nephelometric Turbidity Units (NTU) – A measure of turbidity (amount of silt and particulates in water).
pCi/L – Picocuries per liter (a measure of radioactivity)
N/A – Not Applicable

MICROBIOLOGICAL CONTAMINANTS

Constituent	Highest No. of Positive	MCL	MCLG	Range	Likely Source of Contaminant
T. Coliform	1.55%	Presence of bacteria in 5% of monthly samples	0%	0 - 1.55%	Naturally present in Environment
Fecal Coliform	0%	A routine sample and repeat sample are total coliform positive and one is also fecal coliform or E. Coli positive	0%	0%	Human and Animal fecal waste. Fecal Coliform (mostly E. Coli), is a portion of the Coliform bacteria group originating in the intestinal tract of warm-blooded animals that passes into the environment as feces.

RADIOACTIVE CONTAMINANTS *

Constituent	Highest Level Detected	MCL	MCLG	Range	Likely Source of Contaminant
Gross Beta	7.1 pCi/L	50 pCi/L	0.0 pCi/L	4.8 - 7.1 pCi/L	Decay of natural and man-made deposits
Radium 228	<1.0 pCi/L	5.0 pCi/L	0.0 pCi/L	<1.0 - <1.0 pCi/L	Decay of natural and man-made deposits

INORGANIC CONTAMINANTS

Constituent	Average Level	MCL	MCLG	Range (Min - Max)	Likely Source of Contaminant
Arsenic	<0.002 ppm	0.010 ppm	0.0 ppm	< 0.002 - <0.002 ppm	Runoff from orchards; natural deposits; run off from glass and electronics production waste
Copper	0.00735 ppm	1.3 ppm	1.3 ppm	0.0073 - 0.0074 ppm	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Barium	0.0846 ppm	2.0 ppm	2.0 ppm	0.0824 - 0.0867 ppm	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Cyanide	<0.01 ppm	0.2 ppm (As Free Cyanide)	0.2 ppm (As Free Cyanide)	<0.01 - <0.01 ppm	Discharge from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Nitrate	0.73 ppm	10 ppm	10 ppm	0.36 - 1.09 ppm	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Fluoride	0.64 ppm	4.0 ppm	4.0 ppm	0.55 - 0.72 ppm	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories

DISINFECTION BY-PRODUCTS

Constituent	Average Level	MCL	MCLG	Range (Min - Max)	Likely Source of Contaminant
Total Trihalomethanes	14.9 ppb	80 ppb	N/A	7.6 - 26.3 ppb	By-product of drinking water chlorination
Haloacetic Acids HAA5	13.3 ppb	60 ppb	N/A	7.0 - 21.0 ppb	By-product of drinking water chlorination
Chloramines	3.60 ppm	MRDL 4.0 ppm	MRDLG 4.0 ppm	0.10 - 6.60 ppm	Disinfectant used to control microbes
Chlorine Dioxide	48 ppb	MRDL 800 ppb	MRDLG 800 ppb	10 - 720 ppb	Disinfectant used to control microbes
Chlorite	0.39 ppm	1.0 ppm	MRDLG 0.8 ppm	0.01 - 1.00 ppm	By-product of disinfection with chlorine dioxide

TOTAL ORGANIC CARBON

The percentage of Total Organic Carbon (TOC) removal was measured each month and the system met all TOC removal requirements set,unless a TOC violation is noted in the violation section.

Turbidity (NTU) - State Regulations: Turbidity must stay below 0.3 NTU 95% of the time

Constituent	Average	MCL	MCLG	Range (Min - Max)	Likely Source of Contaminant
Turbidity	0.05 NTU	0.30 NTU	N/A	0.02 - 0.18 NTU	Soil runoff

Brownsville Public Utilities Board

Secondary and Other Constituents Not Regulated

(No associated adverse health effects)

Constituent	Average Level	Secondary Limit	Range (Min - Max)	Likely Source of Contaminant
Aluminum	<0.05 ppm	0.05 - 0.2 ppm	<0.02 - <0.02 ppm	Erosion of natural deposits; residual from some surface water treatment process.
Calcium	77.4 ppm	N/A	70.4 - 84.3 ppm	Abundant naturally occurring element.
Chloride	161 ppm	300 ppm	140 - 182 ppm	Abundant naturally occurring element; used in water purification; byproduct of oil field activity.
Hardness as CaCO3	394 ppm	N/A	267 - 321 ppm	Naturally occurring calcium.
Nickel	0.0021 ppm	N/A	0.0018 - 0.0023 ppm	Abundant naturally occurring element.
pH	8.0 SU	>7.0 SU	7.9 - 8.1 SU	Measure of corrosivity of water.
Sodium	135 ppm	N/A	125 - 145 ppm	Erosion of natural deposits; byproduct of oil field activity.
Sulfate	239.5 ppm	300 ppm	234 - 245 ppm	Naturally occurring; common industrial byproduct; byproduct of oil field activity.
Total Alkalinity as CaCO3	136.5 ppm	N/A	120 - 153 ppm	Naturally occurring soluble mineral salts.
Total Dissolved Solids	753.5 ppm	1000 ppm	676 - 831 ppm	Total dissolved mineral constituents in water.
Zinc	0.0065 ppm	5.0 ppm	<0.005 - <0.0065 ppm	Abundant naturally occurring element.

* All Values reported were below detection Limits

Summary

06/03/2024
03:06:01

Texas Commission on Environmental Quality
DWW Water System Summary Sheet

PWS ID	PWS Name	Central Registry RN
TX0310001	BROWNSVILLE PUBLIC UTILITIES BOARD Superior	RN101397164

Organization/Customer *	Central Registry CN
BROWNSVILLE PUBLIC UTILITIES BOARD	CN601658651

*Regulatory mail will be addressed to this organization/person

TCEQ - Water Systems List (texas.gov)

Summary

TCEQ Superior System Program

The BPUB is exceeding the standards for operating a water system. These standards include:

- Protecting public health.
- Ensuring reliable operations and water supply.
  - ✓Capacity requirements for production
  - ✓Total storage capacity
  - ✓Service pump capacity
  - ✓Pressure maintenance
- Overall compliance (e.g. bacteriological records for the previous 24 months period shall indicate no violations).

2024 Drinking Water Quality Report

QUESTIONS?

ENVIRONMENTAL COMPLIANCE

BROWNSVILLE
PUBLIC UTILITIES BOARD

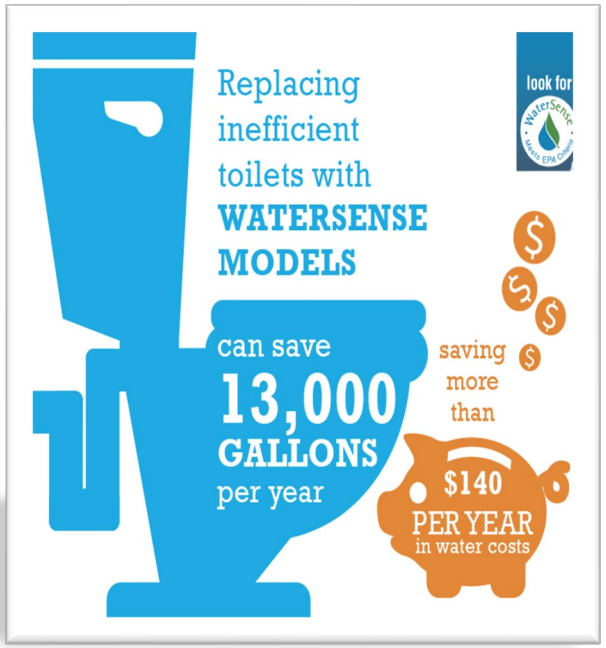
Toilet Rebate Summer Promotion

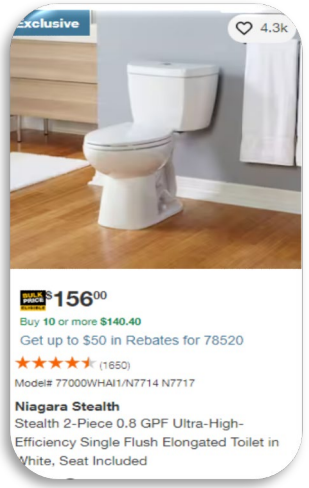
PUBCAP July 17, 2024

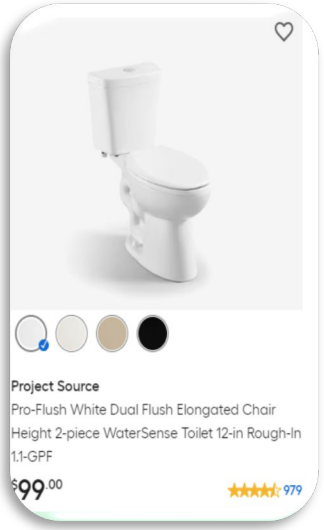
Every Drop Counts

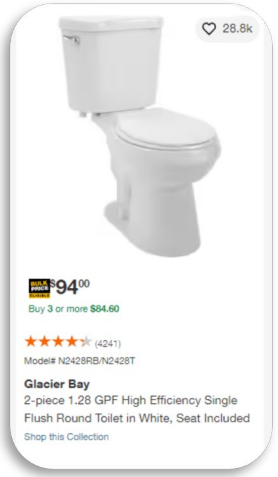
Bathrooms are the largest use of water in the home, using more than 50 % of all indoor water.

Toilets are the home's main source of water use, accounting for almost 30 % of an average home's indoor consumption.



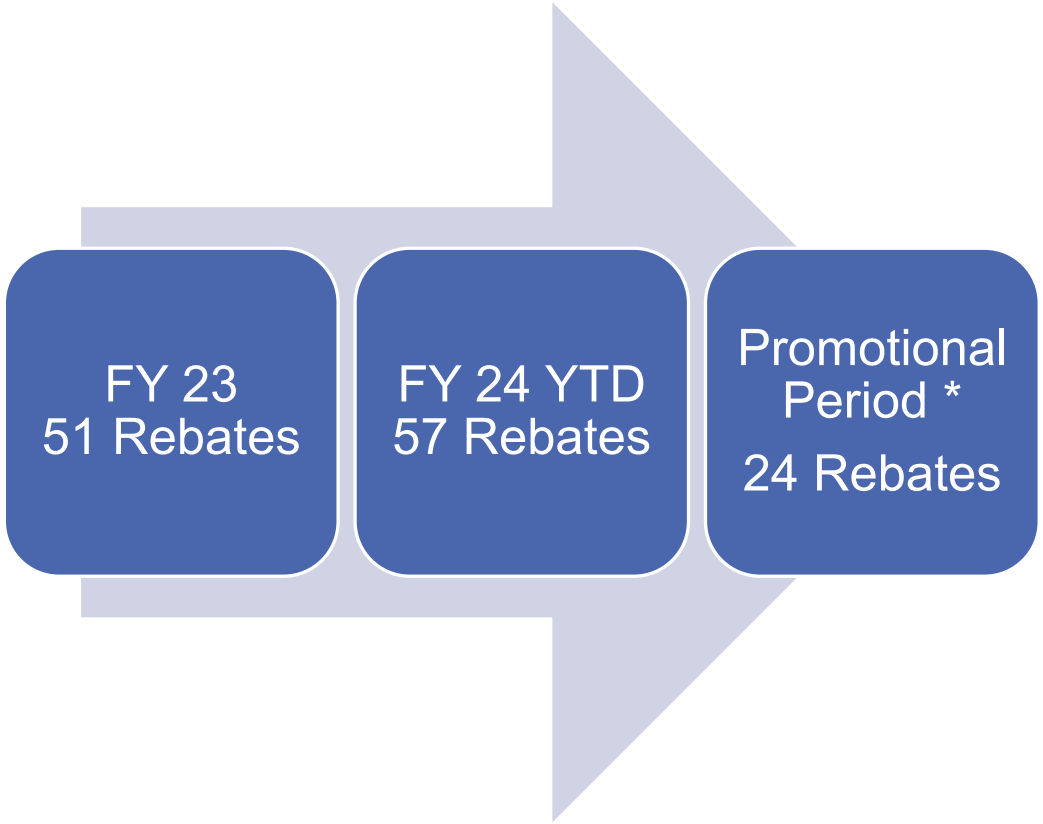






Toilet Rebate Summer Promotion

Promotion Update



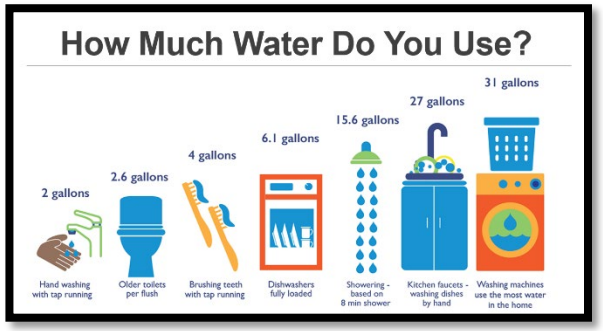
Potential water conserved due to Toilet Summer Promotion Rebates.

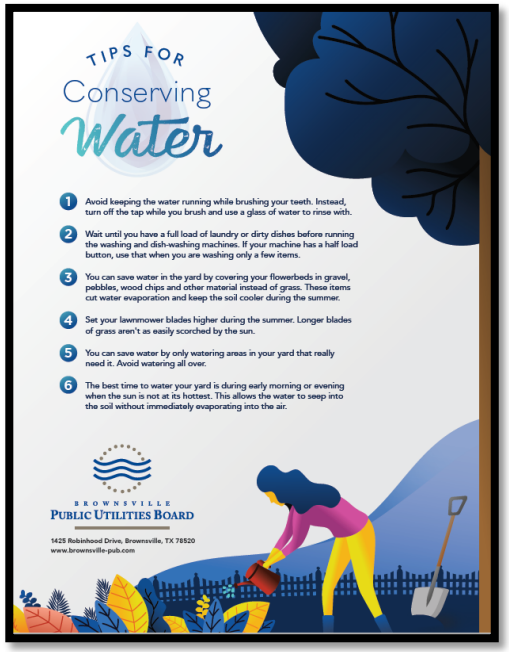
312,000 Gallons

* As of June 30, 2024

Community Outreach

1. Social Media
2. Community Events
   - COB Events
   - Farmer's Market
   - Big Box Stores
     - Home Depot
     - Lowe's





Future Water Conservation Efforts

WATER ECO- KIT

Item	Description
N3610CH	TRIMAX AERATOR NEEDLE SPRAY
N3210BBN-PC-TU	1.0 GPM Bubble Brushed Nickel Aerator Dual Threaded 6PK Tube ($7.85 6 PK)
N2615CH	TRI-MAX SHOWERHEAD 1.5 GPM CHR
SS010-S-BL	DARK BLUE STOP IN TIME SHOWER TIMER
N3140	Leak Detection Dye Tablets, 2 tablets per packet, English/ Spanish instructions on outer packet
62018-I	HOSE TIMER, mechanical, 2hrs or manual, equipped for water pressure between 14-113psi
MM071	MOISTURE METER, Green
N3137	Toilet Tank Bank

REBATES UNDER CONSIDERATION

- High Efficiency Washer Rebate
- Irrigation System Rebate
- RainWater Collection Rebate
- Xeriscaping

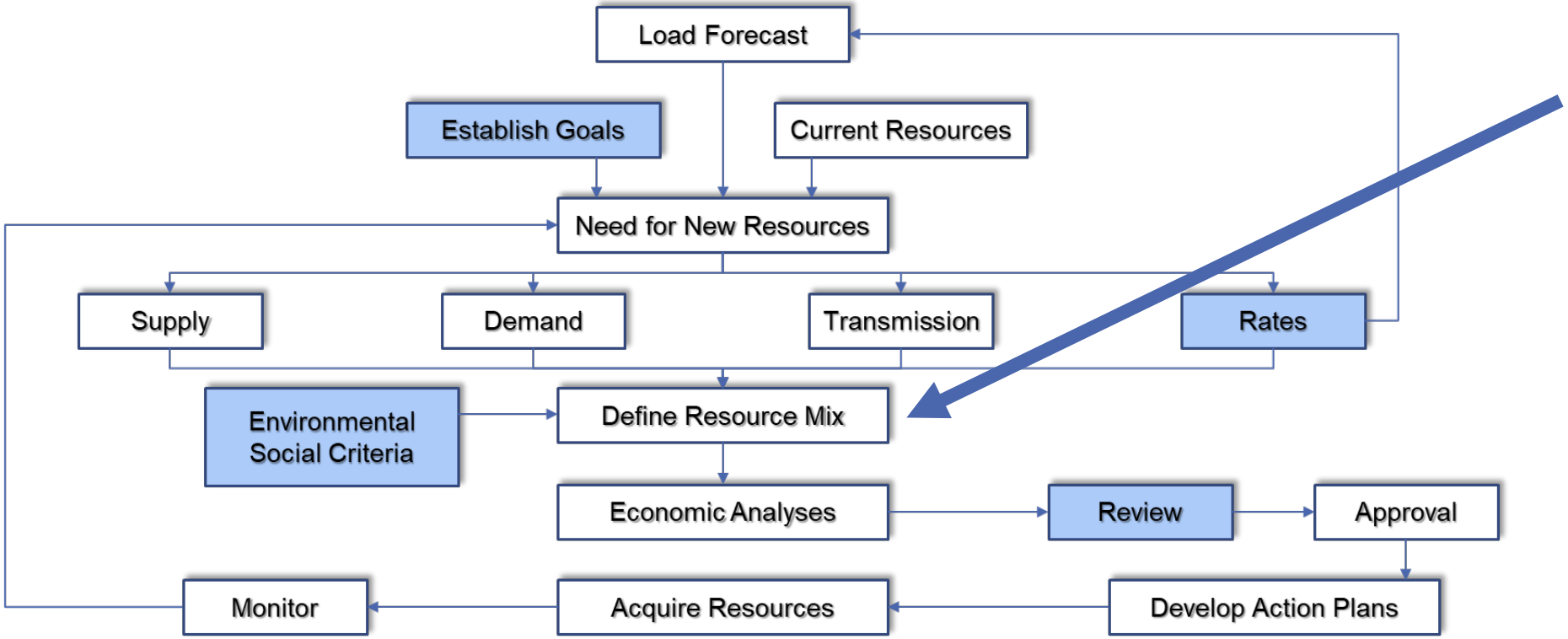

Questions?

BROWNSVILLE
PUBLIC UTILITIES BOARD

Candidate IRP Resource Options

JULY 17, 2024

Integrated Resource Planning Flow



BPUB's resource planning process includes economic analysis of candidate resources.

Cost of Common Resource Types

Independent Statistics and Analysis
U.S. Energy Information Administration

March 2023

Cost and Performance Characteristics of New Generating Technologies, *Annual Energy Outlook 2023*

These tables are also published in the Electricity Market Module chapter in our *Annual Energy Outlook 2023* (AEO2023) Assumptions document. Table 1 includes our estimates of development and installation costs for various generating technologies used in the electric power sector. Typical generating technologies for end-use applications, such as combined heat and power or roof-top solar photovoltaics (PV), are described elsewhere in the Assumptions document. The costs in Table 1, except as noted below, are the costs for a typical facility for each generating technology before adjusting for regional cost factors. Overnight costs exclude interest accrued during plant construction and development. Technologies with limited commercial experience might include a technological optimism factor to account for the tendency to underestimate the full engineering and development costs for new technologies during technology research and development.

Cost to build the plant

Costs to operate the plant

Technology	First available year[a]	Size (MW)	Lead time (years)	Base overnight cost[b] (2022$/kW)	Techno-logical optimism factor[c]	Total overnight cost[d,e] (2022$/kW)	Variable O&M[f] (2022$/MWh)	Fixed O&M (2022$/kWy)	Heat rate[g] (Btu/kWh)
Ultra-supercritical coal (USC)	2026	650	4	$4,507	1.00	$4,507	$5.06	$45.68	8,638
USC with 30% carbon capture and sequestration (CCS)	2026	650	4	$5,577	1.01	$5,633	$7.97	$61.11	9,751
USC with 90% CCS	2026	650	4	$7,176	1.02	$7,319	$12.35	$67.02	12,507
Combined-cycle—single-shaft	2025	418	3	$1,330	1.00	$1,330	$2.87	$15.87	6,431
Combined-cycle—multi-shaft	2025	1,083	3	$1,176	1.00	$1,176	$2.10	$13.73	6,370
Combined-cycle with 90% CCS	2025	377	3	$3,019	1.04	$3,140	$6.57	$31.06	7,124
Internal combustion engine	2024	21	2	$2,240	1.00	$2,240	$6.40	$39.57	8,295
Combustion turbine—aeroderivative[h]	2024	105	2	$1,428	1.00	$1,428	$5.29	$18.35	9,124
Combustion turbine—industrial frame	2024	237	2	$867	1.00	$867	$5.06	$7.88	9,905
Fuel cells	2025	10	3	$6,771	1.08	$7,291	$0.66	$34.65	6,469
Nuclear—light water reactor	2028	2,156	6	$7,406	1.05	$7,777	$2.67	$136.91	10,447
Nuclear—small modular reactor	2028	600	6	$7,590	1.10	$8,349	$3.38	$106.92	10,447
Distributed generation—base	2025	2	3	$1,915	1.00	$1,915	$9.69	$21.79	8,912
Distributed generation—peak	2024	1	2	$2,300	1.00	$2,300	$9.69	$21.79	9,894
Battery storage	2023	50	1	$1,270	1.00	$1,270	$0.00	$45.76	NA
Biomass	2026	50	4	$4,996	1.00	$4,998	$5.44	$141.50	13,500
Geothermal[i, j]	2026	50	4	$3,403	1.00	$3,403	$1.31	$153.98	8,881
Conventional hydropower[j]	2026	100	4	$3,421	1.00	$3,421	$1.57	$47.06	NA
Wind[e]	2025	200	3	$2,098	1.00	$2,098	$0.00	$29.64	NA
Wind offshore[i]	2026	400	4	$5,338	1.25	$6,672	$0.00	$123.81	NA
Solar thermal[i]	2025	115	3	$8,732	1.00	$8,732	$0.00	$96.10	NA
Solar photovoltaic (PV) with tracking[e, i, k]	2024	150	2	$1,448	1.00	$1,448	$0.00	$17.16	NA
Solar PV with storage[i, k]	2024	150	2	$1,808	1.00	$1,808	$0.00	$32.42	NA

Data source: Sargent & Lundy, Cost and Performance Estimates for New Utility-Scale Electric Power Generating Technologies, December 2019; Hydroelectric: Oak Ridge National Lab, An Assessment of Energy Potential at Non-Powered Dams in the United States, 2012, and Idaho National Engineering and Environmental Laboratory, Estimation of Economic Parameters of U.S. Hydropower Resources, 2003; Geothermal: National Renewable Energy Laboratory, Updated U.S. Geothermal Supply Curve, 2010.

Note: MW=megawatt, kW=kilowatt, MWh=megawatthour, kWy=kilowattyear, kWh=kilowatthour; Btu=British thermal unit

[a] The first year that a new unit could become operational.

[b] Base cost includes project contingency costs.

Simple Cycle Frame Gas Turbine

Pros
- Efficiency
- Dependability

Cons
- Larger
- Requires fuel
- Emissions

Wind Farm

Pros
- Low total cost per unit of energy produced
- Do not require fuel
- No emissions

Cons
- Not dependable – may not produce energy when most needed
- Land use issues

Solar

Pros
- Do not require fuel
- No emissions

Cons
- Not dependable – may not produce energy when most needed
- Land use

Battery Storage

Pros
- Do not require fuel
- No emissions

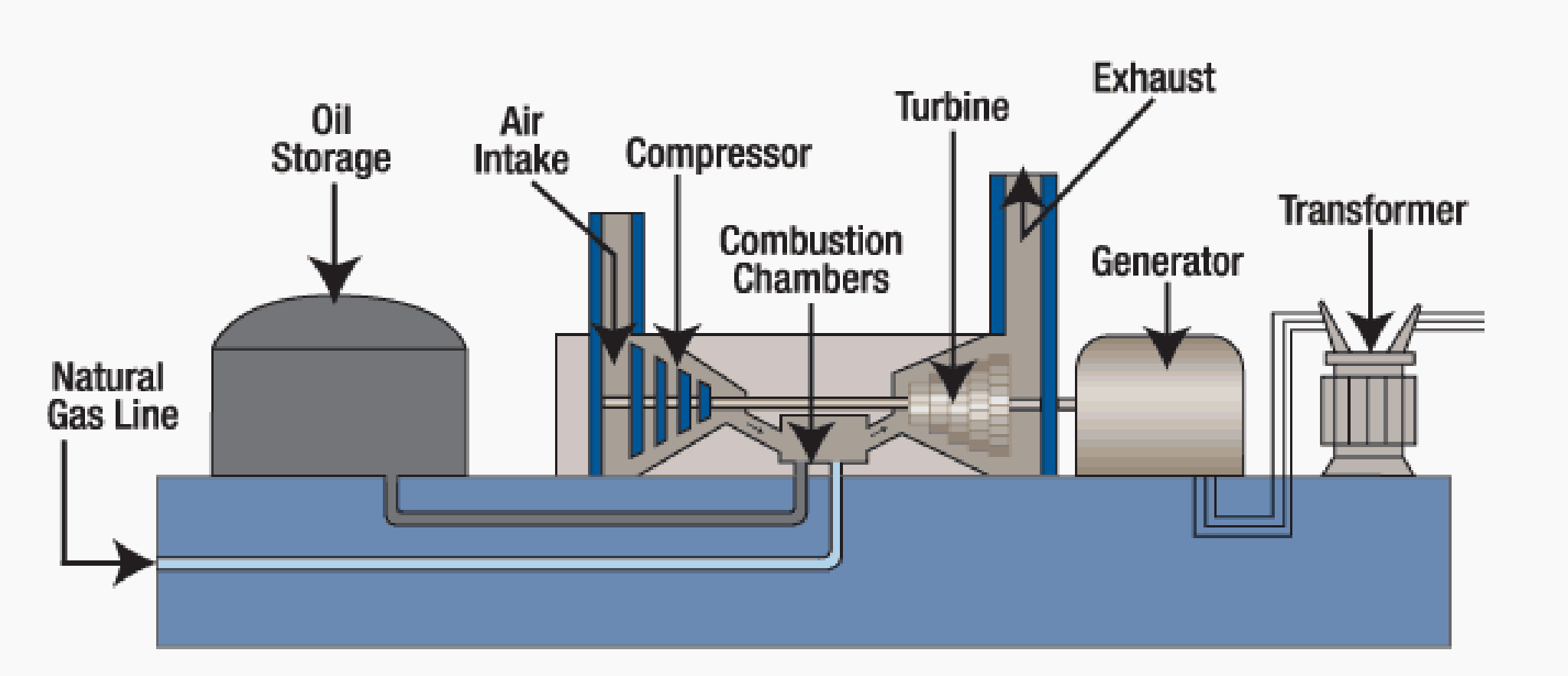
Cons
- Requires power from the grid to charge the batteries ahead of time
- Limited output time (typically rated for 4 hours)
- Complexity of new technologies
- Fire risk
- High land use for short duration output

Simple Cycle Aero-Derivative Gas Turbine

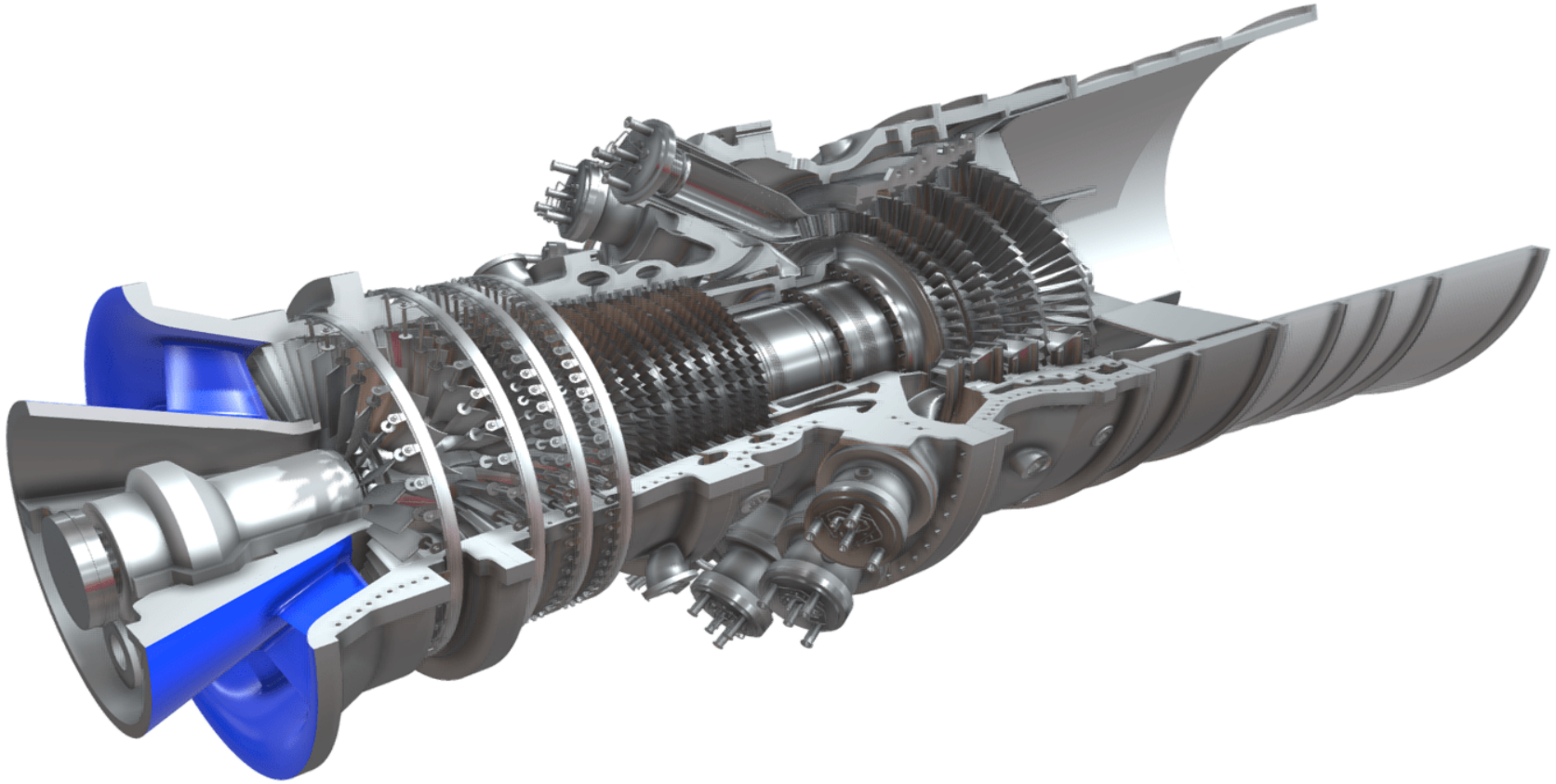
Pros
- Can be added in small sizes
- Dependability
- Operating flexibility

Cons
- Requires fuel
- Emissions

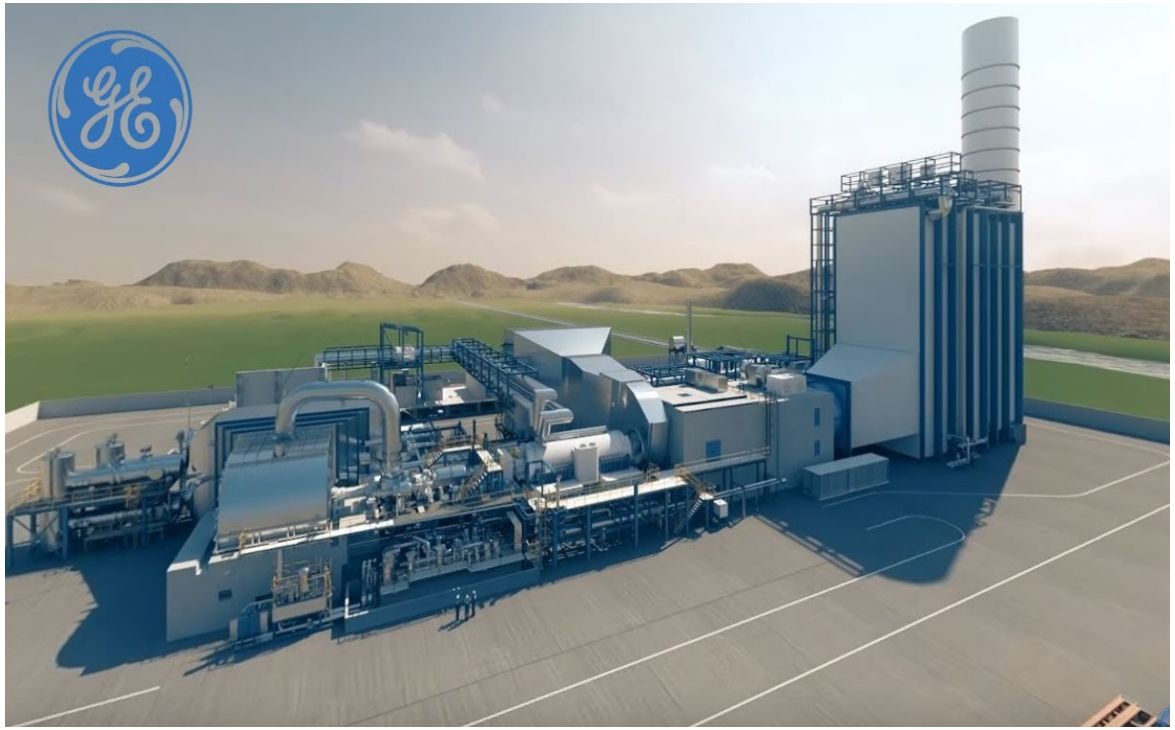
Simple Cycle Combustion Turbine- Similar to SR Unit 10 (LM 6000)



Simple Cycle Combustion Turbine- Similar to SR Unit 10 (LM 6000)



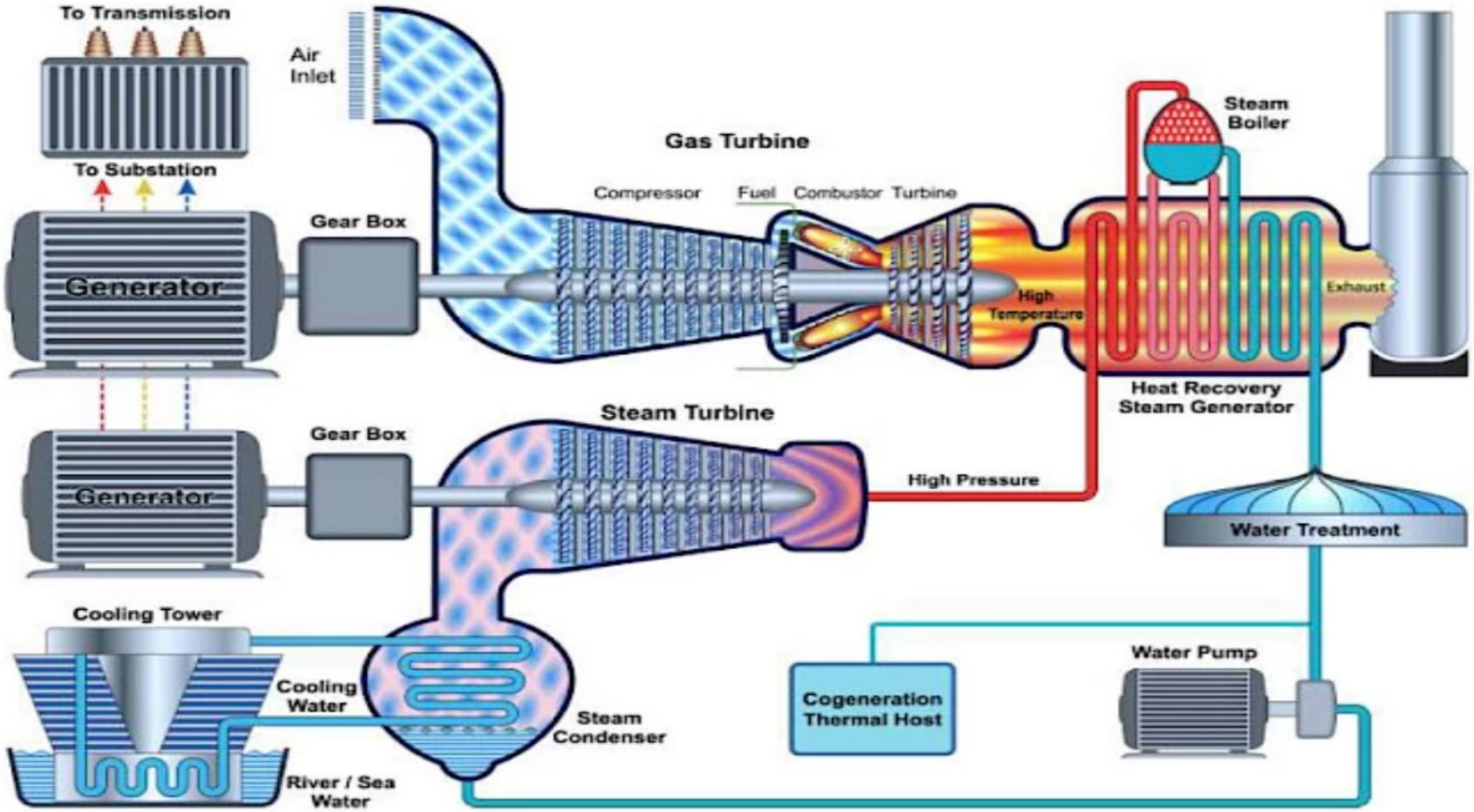
Combined Cycle Gas Turbine



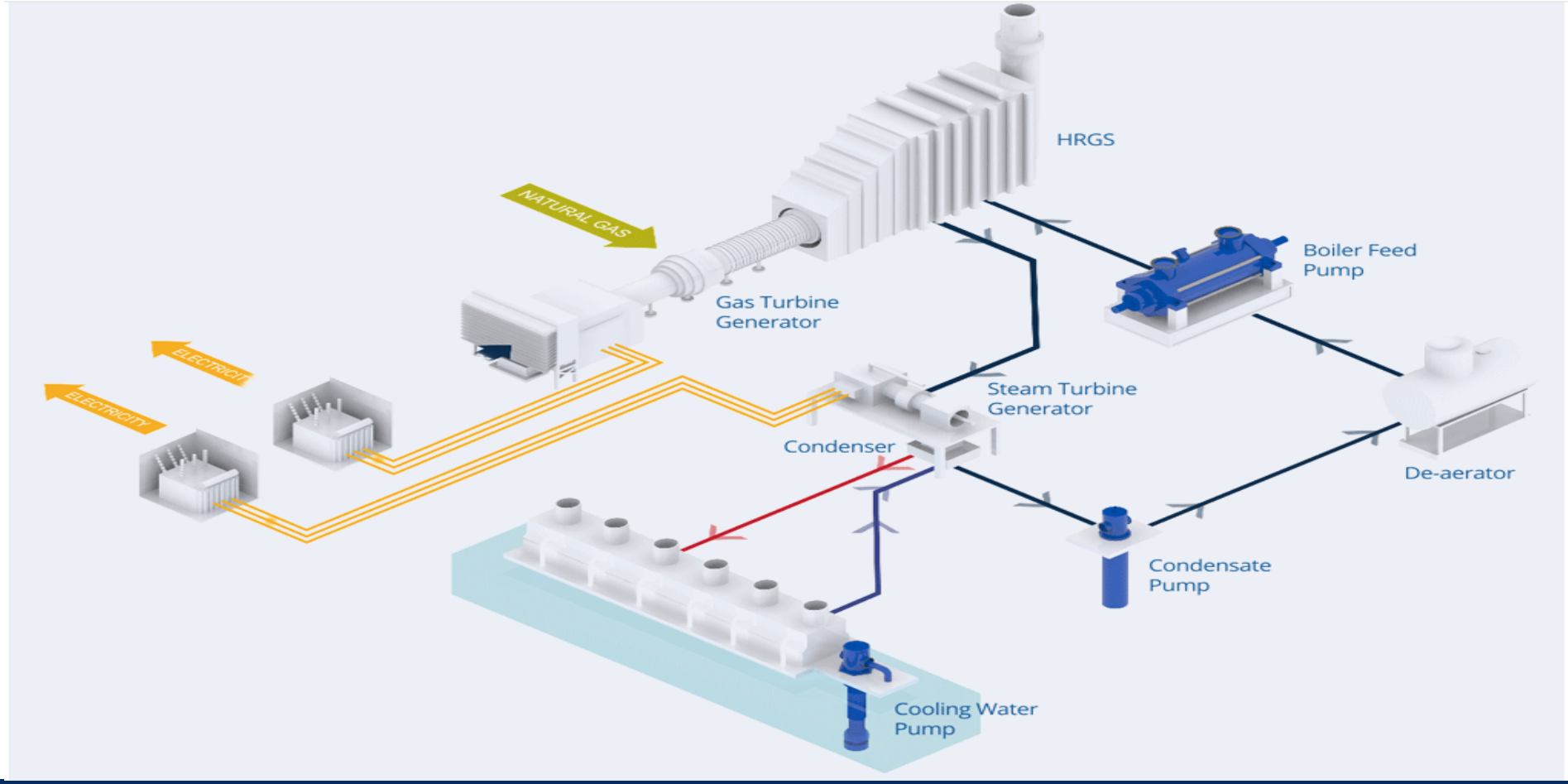
Pros
- Efficiency

Cons
- More complex
- Larger
- Less operating flexibility
- Requires fuel
- Emissions

Combined Cycle Combustion Turbine-Similar to SR Unit 9 & 6



Combined Cycle Combustion & Steam Turbine-Similar to SR Unit 9 & 6

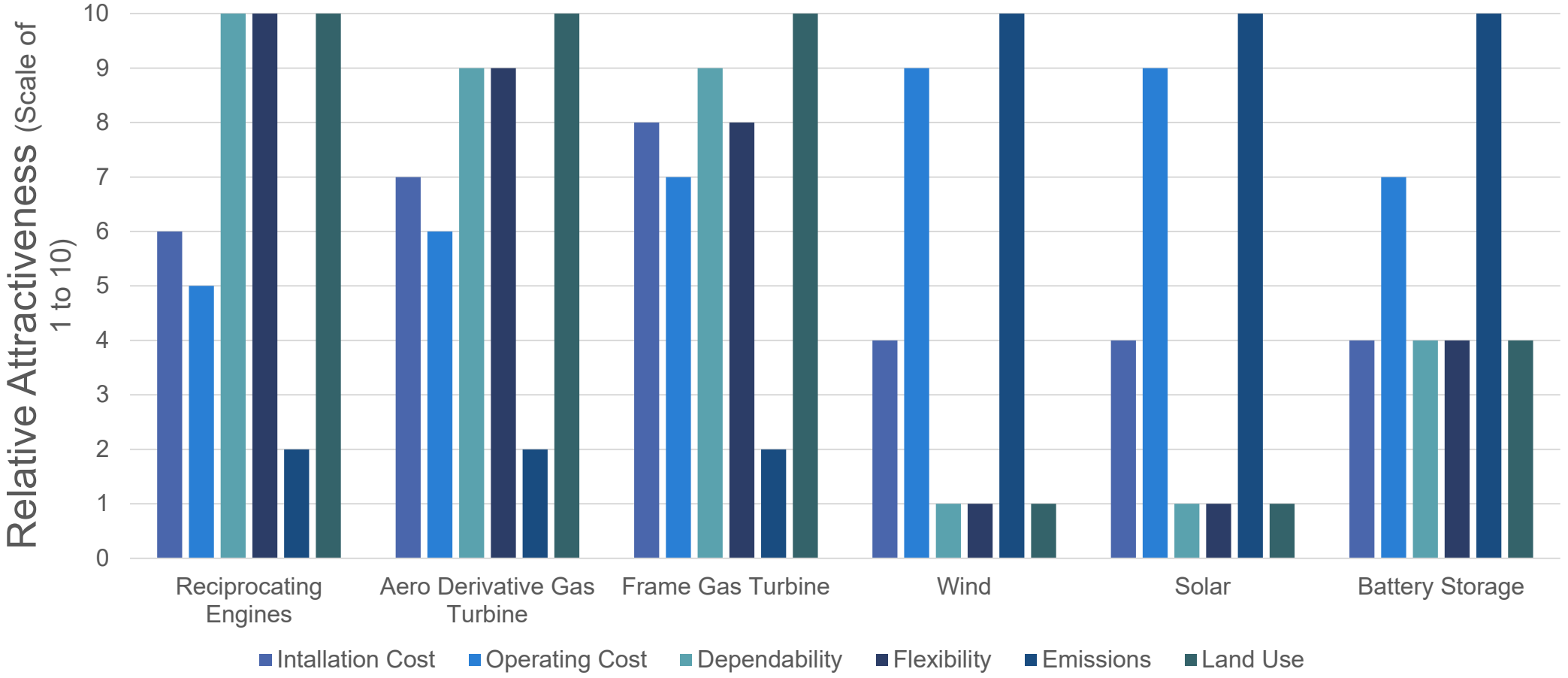


Internal Combustion Engine

Pros
- Can be added in small sizes
- Dependability
- Operating flexibility

Cons
- More expensive per MW than gas turbines to install
- Requires fuel
- Emissions

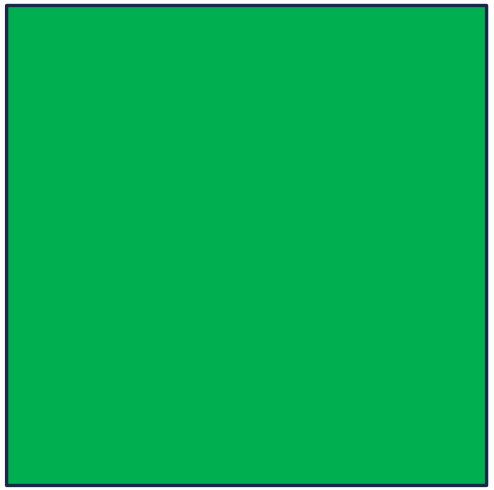
Resource Characteristics Tradeoff



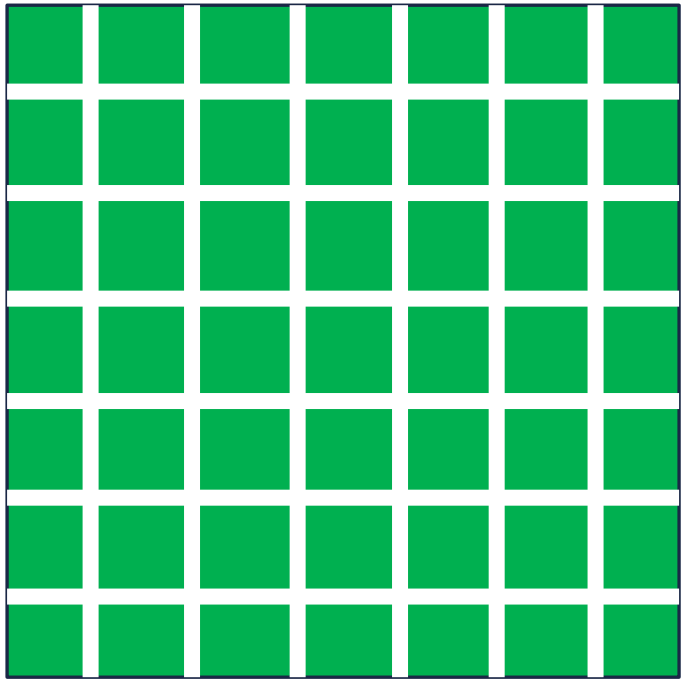
Land Requirements

In addition to direct cost trade-offs, land use (space) requirements for each resource type must be considered.

200 MW gas turbine
5 acres, added to existing site



200 MW utility-scale solar
2000 acres, new site



200 MW community solar
3000 acres, multiple new sites

Discussion

- Questions and answers

IRP Update

Task Number	Task	Task Start	Task Complete
0	Contract Execution/PO Issued/Project Commencement	7/29/2024	
1	Kickoff Meeting (August 7, 2024)	7/29/2024	8/7/2024
2	Develop Long-Term BPUB Load Forecast (Forecast by 10/9/2024 & Report by 1/8/2025)	7/29/2024	10/9/2024
3	Develop Long-Term Market Price Forecast	7/29/2024	8/21/2024
4	Develop Nodal Price Forecasts	7/29/2024	10/9/2024
5	Assess existing Generation Resources	7/29/2024	10/9/2024
6	Identify and Characterize New Potential Resources	7/29/2024	10/9/2024
7	Base Case Expansion Plan and Production Cost Analysis	7/29/2024	11/27/2024
8	Supplemental Analysis	11/7/2024	2/5/2025
9	Assessment of Demand-Side Management Opportunities	7/29/2024	2/5/2025
10	Assessment of Distributed Generation Opportunities	7/29/2024	2/5/2025
11.1	Facilitated Workshops #1	7/29/2024	10/23/2024
11.2	Facilitated Workshops #2	7/29/2024	11/20/2024
11.3	Facilitated Workshops #3	7/29/2024	12/18/2024
11.4	Facilitated Workshops #4	7/29/2024	2/12/2025
12	Submit Final IRP Report	7/29/2024	3/10/2025

BROWNSVILLE
PUBLIC UTILITIES BOARD

Public Comments

BROWNSVILLE
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Next Meeting Date

SEPTEMBER 18, 2024

BROWNSVILLE
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Adjournment