

# 2022 Annual Operations Review

Turlock Irrigation District  
Turlock, California



April 2023



# 2022 Annual Operations Review

## Turlock Irrigation District



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# 2022 ANNUAL OPERATIONS REVIEW

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## Introduction

### Purpose

In May 1986, the Turlock Irrigation District (the District or TID) issued \$53,320,000 in Revenue Refunding Bonds, 1986 Series A. These bonds were issued pursuant to Resolution No. 86-164 adopted by the District's Board of Directors on May 20, 1986. Under Section 714.4 of Resolution No. 86-164, the District agrees to file with the Fiscal Agent annually "...a report prepared by the Consulting Engineer discussing and commenting on the operations of the System by the District for the preceding Fiscal Year and containing such recommendations for the future operations of the System by the District as may be deemed necessary or appropriate." Section 101.1 of Resolution No. 86-164 defines the System as all facilities, works, properties, and structures of the District for the generation, transmission, and distribution of electric power; for the collection, control, storage, treatment and delivery, and distribution of water; and for any lawful purpose of the District, except for any separate, non-competing utility (improvement districts) that the District elects to finance. We have prepared this report for the District to accomplish the purposes of Section 714.4 of Resolution No. 86-164.

### The District

The District is an irrigation district organized in 1887 under the provisions of the Wright Act (California Water Code §20,500 et seq.). The District supplies water for irrigation use in a 307.5-square-mile irrigation service area lying within portions of Stanislaus and Merced counties, California. Irrigation service began in March 1900 and the District has provided continuous service ever since.

The District provides electric service in a 662-square-mile service area that includes portions of Stanislaus, Merced, and Tuolumne counties, California. The District also has the right to serve an additional twelve-square-mile area of undeveloped land in Tuolumne and Mariposa counties (Don Pedro South Shore Zone). To provide electric service, the District owns and operates an electric system that includes generation, transmission, and distribution facilities. The District also purchases power and transmission service from others and participates in other utility power supply and transmission arrangements. The District employs approximately 447 people to conduct its irrigation and electric business from its general offices located in Turlock, California.

### Management

The District is governed by a Board of Directors; its five members represent separate divisions of the District for staggered four-year terms. The following table shows the names, occupations, and terms of the current Directors.

### TID Board of Directors

Name	Occupation	Term-Ends
Rob Santos	Doctor of Veterinary Medicine	2024
Michael Frantz	Agri-Businessman	2024
Charles Fernandes	Businessman	2022
David Yonan	Businessman	2026
Joe Alamo	Dairy Farmer	2026
Ron Macedo	Owner RAM Farms	2026

The Board appoints a General Manager and CEO who is responsible for the operations and administration of TID.

■ Michelle Reimers, General Manager and CEO

Michelle Reimers was appointed General Manager by the TID Board of Directors in January 2020. Under the policy-setting guidance of the District's elected Board, she directs the day-to-day operations of the District's extensive irrigation water storage and delivery system, as well as the generation, transmission and distribution of electricity within a 662 square-mile service area in central California.

Reporting to Mrs. Reimers are the Chief Operating Officer, Director of Human Resources, Manager of Security and Emergency Preparedness, and the External Affairs Department Manager.

Michelle Reimers joined the District in August 2006. Prior to her current position, Mrs. Reimers served as the District's Assistant General Manager of External Affairs. In those capacities, Mrs. Reimers was responsible for managing the strategic planning and development for the District's communications, outreach, education and government affairs programs and initiatives. Mrs. Reimers regularly advised the General Manager on matters of public policy and provided counsel regarding the District's opportunities and threats. Mrs. Reimers was also responsible for the scoping, planning and implementation of high-profile projects such as: full redesigns of TID's external and internal websites, the District's first ever power online outage notification system for customers and the District's 125th Anniversary Celebration and award-winning commemorative documentary film *The Irrigationist*. Mrs. Reimers holds a Bachelor of Arts degree in Organizational Communications from California State University Stanislaus and graduated Magna Cum Laude. Mrs. Reimers was appointed General Manager and CEO in January 2020.

■ Brad Koehn, Chief Operating Officer

Brad Koehn was appointed Chief Operating Officer in January 2020. He is responsible for overseeing the District's day to day operations. Reporting to Mr. Koehn are four Assistant General Managers. Each Assistant General Manager has business unit responsibility in civil engineering and water resources, power supply, financial services, as well as electrical engineering and operations.

Mr. Koehn is responsible for the long-term development and management of strategic solutions to the District's day to day operations. Under general direction from the General Manager, Mr. Koehn is responsible for establishing the vision and strategy to



lead the District in the execution of critical and transformative operational strategic initiatives, while maintaining engineering and operational excellence, and managing the overall operation to ensure financial strength, operating safety and efficiency.

Mr. Koehn has over 20 years of experience in the engineering field. Prior to working at the District, Brad spent 16 years in private practice engineering, most recently co-owning a local civil engineering firm. In 2011, Mr. Koehn joined TID as the Civil Engineering Department Manager where he was responsible for the planning, design, and project management of many capital improvement, water-use efficiency, and irrigation automation projects.

Mr. Koehn is a licensed professional engineer and land surveyor in the State of California. He has a long heritage in the local area and has deep ties to Turlock and the surrounding agricultural community. He is active in the community and volunteers his time as a director on two local boards. Mr. Koehn was appointed Chief Operating Officer in January 2020.

- **Manjot Gill, Assistant General Manager, Electrical Engineering and Operations**

Manjot Gill joined the District in September of 2006 and was appointed to his present position of Assistant General Manager, Electrical Engineering and Operations in June 2017.

Mr. Gill directs the planning, design and operation of the District's transmission lines, distribution lines, substations, and communications systems. He also manages various technical studies and oversees coordination with the District's large industrial and commercial customers in the design of new electric service facilities.

Prior to his current position, Mr. Gill held the position of Electrical Engineering Department Manager of Smart Grid and Standards and was responsible for District Metering, Electrical Standards, Solar Applications, Joint Pole, Electrical GIS, and large capital projects. During his career with TID he has also worked on several transmission line projects and designed distribution facilities for large industrial and commercial customers.

Mr. Gill is a graduate of California State University, Sacramento with a Bachelor of Science degree in Electrical and Electronic Engineering. He is also a Licensed Professional Electrical Engineer in the State of California.

- **Dan Severson, Assistant General Manager, Power Supply**

Dan Severson was appointed Assistant General Manager, Power Supply in 2020. He is responsible for managing the District's internal and external power generation and supply resources, day-ahead/hour-ahead energy trading and scheduling, energy settlements and various interactions with the California Independent System Operator (CAISO), the California Energy Commission (CEC) and the Federal Energy Regulatory Commission (FERC). Mr. Severson also oversees the permitting, licensing, design, construction, operation, and maintenance of power generation and related facilities.

Mr. Severson is responsible for the long-term development and management of strategic solutions to the District's power supply. This includes renewable energy and greenhouse

gas emission mandates, wholesale electric and gas transactions, wholesale transmission agreements, risk management in economic modeling, load forecasting.

Mr. Severson holds a Bachelor's degree in Energy Management from Bismarck State College, and has served in a variety of capacities for the District including Government and Regulatory Affairs, Resource Planning, Portfolio Optimization, Contracts, and Environmental Compliance.

- Brian Stubbert, Assistant General Manager, Financial Services and CFO

Mr. Stubbert joined TID in December 2017. Mr. Stubbert is responsible for planning and directing all of TID's financial, information technology, risk and insurance, risks and rates, customer service, and materials management activities. He performs critical analysis on both internal and external events, providing recommendations to the General Manager and Board of Directors. His tasks include developing and improving cost controls and maintaining good credit standing for the District.

Mr. Stubbert has more than 25 years of financial experience in accounting, budgeting, working with auditors and with Boards of Directors. Most of his financial expertise was developed during his tenure within the San Joaquin Valley and its diverse agriculture industry.

Mr. Stubbert is a graduate of California State University, Stanislaus, a member of the American Institute of Certified Public Accountants, and most recently served at Merced Irrigation District where he was the Chief Financial Officer.

- Tou B. Her, Assistant General Manager, Water Resources

Tou Her joined TID in May 1997 and was appointed to his present position of Assistant General Manager, Water Resources in January 2013. He is responsible for the Civil Engineering, Water Distribution, Construction and Maintenance, and Hydrology departments, in addition to overseeing the Don Pedro Recreation Agency.

Prior to his current position, Mr. Her served as the Civil Engineering Department Manager, and was responsible for irrigation capital planning, engineering, and project management, irrigation geographic information system and Supervisory Control and Data Acquisition (SCADA), inspection of dams and other irrigation infrastructure, and survey/right-of-way. He has also managed many complex projects during his tenure at TID, including the Canal Office parking structure expansion and solar energy generation system, Walnut Energy Center's (WEC) water treatment plan microfiltration, and the civil design of many electrical substations.

Mr. Her holds a Bachelor of Science degree in Civil Engineering from California Polytechnic State University, San Luis Obispo. He is a licensed professional civil engineer in the state of California, and an alumnus of the California Agricultural Leadership Program (Class 45).

## **Irrigation System**

The District's irrigation system begins at La Grange Dam on the Tuolumne River. The District and the Modesto Irrigation District (Modesto) jointly own La Grange Dam. At the time of its completion in 1893, La Grange Dam was the highest rock-filled masonry dam in the United States. La Grange Dam diverts Tuolumne River water into the District's Upper Main Canal for conveyance to Turlock Lake, which acts as a regulating reservoir, and hence to the canal distribution system near Hickman on the eastern edge of the District's irrigation service area. Located 3.5 miles upstream of La Grange Dam is the Don Pedro Dam.

The Don Pedro Project was built and is jointly owned and licensed by the District (68.46 percent) and Modesto (31.54 percent). The District is the managing partner and operator. Don Pedro Reservoir contains 2,030,000 acre-feet (ac-ft) of storage at its normal maximum elevation of 830 feet, approximately 1,720,000 ac-ft of which is usable storage. Construction of Don Pedro Dam began in 1967 and commercial operation of the powerhouse began in 1971, when the first of the three units was complete; a fourth unit was completed in 1989.

### **Federal Energy Regulatory Commission Licensing for Don Pedro and La Grange**

The Don Pedro Project operates under a 50-year license granted in 1966 by the Federal Energy Regulatory Commission (FERC) to the Turlock and Modesto Irrigation Districts (Districts). The original license extended through April 30, 2016, but FERC has been issuing an annual license to the Districts to continue operating until the new license is finalized. The Districts initiated the process to relicense the Project using FERC's Integrated Licensing Process in 2010 and are using a consultant to manage the process. Relicensing is an intricate, lengthy undertaking, which will stretch over several years and is open to public participation.

A Final License Application (FLA) for the Don Pedro Project was filed with FERC in April of 2014; however, in 2015, it was ruled that the La Grange Dam was also under FERC jurisdiction. On October 11, 2017, an Amended FLA (AFLA) was filed for Don Pedro and a FLA was filed for La Grange.

FERC issued their Ready for Environmental Analysis (REA) on November 30, 2017, after they reviewed approximately 6,000 pages of filings. Interventions, comments, recommendations, and terms and conditions were due by January 29, 2018, with reply comments to those filings due by March 15, 2018. FERC issued the Draft Environmental Impact Statement (DEIS) to jointly address the Don Pedro and La Grange projects on February 11, 2019.

On July 7, 2020, FERC issued the Final Environmental Impact Statement (FEIS). Two issues are still pending before a new License can be issued.

First, the California State Water Resources Control Board (SWRCB) has to issue a 401 Water Quality Certification (WQC). The WQC application had to be submitted within 60 days after FERC issued the REA; the Districts submitted applications to the SWRCB in January of 2018 and April of 2019. On both occasions, the SWRCB noted the applications were complete but did not issue the WQC. Instead, the SWRCB issued a

denial without prejudice and encouraged the Districts to submit a new request for certification. However, in December 2021, even though it had no application from the Districts on file, the SWRCB summarily issued a 401 WQC for the Don Pedro Project. The Districts litigated the issuance of the 401 WQC in the Tuolumne County Superior Court on a number of grounds, both procedural and substantive. Similarly, the Districts petitioned FERC for a waiver of a 401 WQC on the grounds that the SWRCB had not taken appropriate action in a timely manner on the Districts' two previous requests for a 401 WQC. FERC denied the Districts' Petition on this matter as did the DC Circuit Court of Appeals. A number of other Public Water Agencies in California, including Merced Irrigation District, Nevada Irrigation District, and Yuba County Water Agency, are similarly embroiled in Section 401 litigation for their FERC licenses. Therefore, in early 2023, the Districts filed an appeal to the Supreme Court of the United States and also filed an amicus brief for the Merced, Nevada and Yuba cases.

The SWRCB is also the agency that issued a Substitute Environmental Document (SED) in 2018, as part of the Bay Delta Plan Update (BDP); this SED is discussed in greater detail below under Water Resource Management. In summary, the BDP requires additional unimpaired flows be released to the Tuolumne River, primarily in the spring runoff period. In November 2022, however, the Districts and City and County of San Francisco Public Utility Commission (SFPUC) signed a Memorandum of Understanding (MOU) with the State of California that advances a term sheet for a Voluntary Agreement (VA) that would include a number of flow and non-flow measures that act as an alternative to the flow-centric provisions of the BDP. If the VAs are successful, the SWRCB will issue a new Section 401 WQC to the Districts that will be more consistent with flow and non-flow measures outlined by FERC in the FEIS. This will be an important step forward in the relicensing process and the State process could be complete by mid-2024.

Second, the National Marine Fisheries Service (NMFS) still has to finish its consultation on the AFLA under the Endangered Species Act. NMFS has stated that they cannot do this until the SWRCB issues its WQC. Throughout 2022, District staff continued to communicate with these Agencies to resolve these outstanding issues.

Throughout 2022, the District continued to function under the several Resolutions that were passed in 2021 pertaining to the relicensing of the Don Pedro Operating Project. These included the operation of the Don Pedro facility as well as efforts, management, and costs to address fishery matters on the lower Tuolumne River.

## Dams and Associated Facilities

The scope of TID's dam safety program is summarized in the Owners Dam Safety Program (ODSP), which was originally created in 2012. The purpose of the ODSP is to highlight the importance of dam safety within the organization, establish communication protocols, and clearly define the roles and responsibilities of those parties who are accountable for dam safety. FERC developed an Owners Self-Assessment Evaluation in 2007. It states that the scope of the ODSP "should be commensurate with the size, type and complexity of the owner's dam(s). There is no 'one size fits all' dam safety program." The primary responsibility for dam safety lies

with the Chief Dam Safety Engineer (CDSE). The original ODSP was filed with the FERC on October 20, 2014.

In December 2021, as required by FERC, a 5-year external ODSP review was completed by Gannett Fleming. This review generated a total of 15 comments, 14 of which the District agreed to a plan and schedule for addressing in a February 3, 2022 letter to FERC. Many of the comments will lead to a significant update to the ODSP in 2023. The only comment not instituted pertained to the request that every employee of the District be trained regarding safety at the dams; as many employees are not involved with the dams, this request seemed unnecessary.

On November 29, 2022, the CDSE and Director of Power Generation made a presentation to the Board of Directors reviewing the ODSP, which covers 28 dams and dikes, and stated that “All TID dams remain in acceptable condition for continued operation.” The Board of Directors unanimously adopted Resolution 2022-69 stating “...it is the expectation of the District that issues related to dam safety should be held in the highest regard because of potential adverse consequences associated with failure or incorrect operation of dams and appurtenant structures...”. The Board of Directors also unanimously adopted Resolution 2022-70 amending the 2020-2025 Strategic Plan to add a Goal “to Maintain a robust Dam Safety Program” and specified five actions to be included in this Policy.

In 2022, the budget for Don Pedro and La Grange dam safety Operations and Maintenance (O&M) was \$1,150,834 and for 2023, it is \$1,026,368; these costs are split between the District and the Modesto Irrigation District. The 2022 budget for O&M at Dawson, Turlock Lake and Hickman was \$306,157 and for 2023, it is \$297,790. Dam safety O&M projects include routine maintenance such as vegetation and rodent control and other minor repairs, dam safety engineering staff labor, instrumentation readings, DSOD fees, and consultant/outside services (mainly studies, inspections and assessments).

In 2022, the budget for dam safety Capital Projects totaled \$478,000. The completed projects included: \$103,000 for Upper Dawson Dam Spillway Gate Improvements, \$25,000 for Lower Dawson Dam 2 Access Improvements, and \$350,000 for design of the Turlock Lake dam rehabilitation project (some of which is carryover from 2020 and 2021).

The 2023 Capital budget totals \$700,733 and includes \$350,000 for design of the Turlock Lake dam rehabilitation project (some of which is carryover from 2020, 2021 and 2022). The La Grange Tailrace and Sluice Project is budgeted at \$350,733; this project has been budgeted in previous years (\$230,000 in 2021 and \$271,500 in 2022) but work was unable to be performed due to environmental permitting issues by the Army Corps of Engineers. Due to the high-water year in 2023, this may again be delayed.

For the period 2024-2028, the anticipated budget for dam safety O&M will be between \$1,000,000 and \$1,500,000 annually. The anticipated budget for Capital Projects will be between \$20,000 and \$10,000,000 annually, with the Turlock Lake Dam Rehabilitation Project being the large expenditure during the 2024 and 2025 years.

SB 92 was enacted in 2017 and required inundation maps and Emergency Action Plans (EAPs) for all dams designated by the Department of Water Resources' (DWR) as anything but a low hazard; this information then needed to be submitted to the Office of Emergency Services (Cal-OES). The inundation maps for the Don Pedro dam, dikes and spillway structure were approved by the DWR Division of Safety of Dams (DSOD) on December 14, 2018; the maps and EAPs were submitted to the Cal-OES on December 20, 2018. There were several rounds of comments with the Don Pedro EAP being formally approved by Cal-OES on March 11, 2022. The inundation maps for all of Turlock Lake's dams were submitted to the DSOD on September 28, 2018, and were approved on September 29, 2020. Following several rounds of comments, the Turlock Lake EAP was approved by Cal-OES on August 11, 2022. Dawson is designated as "low hazard" by both FERC and DSOD and, therefore, no EAP is required. For the La Grange Diversion Dam, DSOD changed their designation to "low hazard" on June 10, 2019, whereas FERC confirmed a significant hazard designation on February 3, 2021. On November 19, 2021 the La Grange EAP was submitted to FERC as required per the significant hazard designation. There are currently no outstanding comments on the Don Pedro, La Grange and Turlock Lake EAP FERC submittals.

DSOD and FERC have joint jurisdiction over and inspect four of the District's dams (Don Pedro, La Grange, Turlock Lake, and Dawson) as well as auxiliary features on a periodic basis. FERC also has jurisdiction over and inspects the Hickman project. The District's CDSE performs dam safety inspections for the dam facilities on a quarterly basis.

The CDSE also performs an internal ODSP audit on an annual basis. External consultants perform FERC Part-12 inspections of Don Pedro and La Grange dams on a 5-year basis, and as needed. The audit of the ODSP was last performed in 2021 by Gannett Fleming, Inc. and filed with FERC in February 2022 as previously discussed.

The CDSE inspects the dams and appurtenant facilities on a quarterly basis and utilizes Inspection Checklists, wherein recommendations are defined and then tracked at the next quarterly review. The CDSE issues internal assignments to District staff defining the specific tasks to be performed and deadlines for completion (prioritized based on risk). Many of the recommendations pertain to vegetation removal, repairs, monitoring, and maintenance tasks as well considerations of improvements. The tables below summarize the dates, agencies, comments, recommendations and conclusions taken from the various agencies' inspection reports.

### **Don Pedro**

The FERC performed an inspection on October 26, 2022. Their final report has not yet been received by the District, but on December 7, 2022, FERC sent a letter that stated they "observed an abundance of rodent activity on Don Pedro Dike B and the Gasburg Creek Dike. Evaluate if a rodent abatement program can be established, evaluate the condition of the rodent burrows and impact to the dikes, and assess whether repairs are necessary." The District contracted with FishBio to complete an investigation to identify the specific mammals occurring at each location and their associated burrowing habits and this remains on-going at this time.

In addition to the quarterly District CDSE dam safety inspections noted above, the Don Pedro dam and appurtenant structures were inspected by both DSOD and FERC staff in 2022.

**Summary of Don Pedro Inspections**

Date	Staff(s)	Focus	Comments	Statements
2/18/22 5/23/22 9/30/22 10/26/22	TID CDSE	Main Dam, All Dikes, Spillway, Emergency Siren & Security Cameras, Powerhouse, Diversion Tunnel Inclined Gate House, Power Tunnel Fixed Wheel Gate House & Diversion Tunnel Outlet Works, All Embankment Dams, Drain Outlets	As taken from the 10/26/22 report:  Two Action Items and four Monitor Items related to Potential Failure Modes  Five Action Items (one from 2019 and four from 2022) and eight Monitor Items related to Maintenance  Six Items to Consider	“Based on the visual inspections performed, the dam and appurtenant structures remain in acceptable condition for continued operation.”
5/23/22	DSOD	Observations and Comments on the Dams, Spillway, Outlet, Seepage, and Instrumentation	Continue to remove woody vegetation from the dam and within 10 feet from the abutment contacts.  Backfill and compact rodent holes at Dike A and Gasburg Dike.	“From the known information and visual inspection, the dam, reservoir, and all appurtenances are judged safe for continued use.”
8/8/22	Dam Personnel	4.4 magnitude earthquake in Walker, CA (~80 miles from DP dam). This quake was felt in Turlock but not by staff at the powerhouse; DP Plant staff were requested to perform a visual inspection of the downstream slope, check the seepage weir turbidity, and report anything unusual. Normal conditions were reported back to the CDSE.		
10/25/22	Dam Personnel	5.0 magnitude earthquake near Morgan Hill, CA (~64 miles from DP dam). This quake was felt in Turlock but not by staff at the powerhouse; DP Plant staff were requested to perform a visual inspection of the downstream slope, check the seepage weir turbidity and report anything unusual. Normal conditions were reported back to the CDSE.		
10/26/22	FERC	Spillway, Main Dam, Dikes, Powerhouse	Dam Safety Follow-up Letter from FERC on 12/7/22 requested:	Safety Inspection not yet received by TID

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			<p>“We observed an abundance of rodent activity on Don Pedro Dike B and the Gasburg Creek Dike. Evaluate if a rodent abatement program can be established, evaluate the condition of the rodent burrows and impact to the dikes, and assess whether repairs are necessary.”</p>	
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### La Grange

As the District is proceeding with the licensing of the La Grange dam, specific analyses and inspections have been required. FERC submitted a letter to the District on February 26, 2021 that made the determination of Significant hazard potential based on potential economic and environmental consequences even though no life loss would be expected.

The second Part 12 Independent Consultant 5-year safety inspection of the project was initiated in 2019 and completed in 2020; the final report was submitted to FERC on July 7, 2020. The report included 21 recommendations, most of which were related to documentation updates, inspection procedures, and minor maintenance. A dam stability analysis was recommended to be performed. Consultant request for proposals were received and reviewed in 2022, and analysis commenced in early 2023.

The diversion tunnel was last dewatered and inspected on April 15, 2021; the Inspection Report states “Based on the visual inspection, the Forebay and Tunnel structures remain in acceptable condition for continued operation.” It was noted that it was not possible to fully dewater the structure as there was leakage around the gates, and no inspection was performed in 2022.

In addition to the quarterly District CDSE dam safety inspections noted above, the La Grange dam and appurtenant structures were inspected by DSOD and FERC staff in 2022.

### Summary of La Grange Inspections

Date	Staff(s)	Focus	Comments	Statements
3/2/22 3/25/22 4/22/22 9/26/22	TID CDSE	Dam, MID Intake, Powerhouse, Forebay, Penstocks, Access Road and Trails, TID Intake	As taken from 10/27/22 report:  One Action Item and seven	“Based on the visual inspection, the dam and appurtenant



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10/27/22		Structure, EAP Exemption Conditions	<p>Monitor Items related to Potential Failure Modes</p> <p>Four Action Items and five Monitor Items related to Maintenance</p> <p>Two Items to Consider</p>	structures remain in acceptable condition for continued operation.”
4/22/22	DSOD	Observations and Comments on the Dam, Spillway, Outlet, Seepage, and Instrumentation	<p>Repair the lifted corner of the concrete slab on the downstream face near the crest.</p> <p>Repair the large spall on the downstream face near the bottom of the concrete cap.</p> <p>Remove vegetation that’s growing in the concrete and masonry joints on the downstream face of the dam.</p> <p>Remove vegetation from the downstream groins of the dam.</p>	“From the known information and visual inspection, the dam, reservoir, and the appurtenances are judged safe for continued use.”
10/25/22	Dam Personnel	5.0 magnitude earthquake near Morgan Hill, CA (~62 miles from LG dam). This quake was felt in Turlock but not by staff at the powerhouse; LG Technician staff were requested to perform a visual inspection of the dam, forebay and report anything unusual. Normal conditions were reported back to the CDSE.		
10/27/22	FERC	Powerhouse, Forebay, Main Dam, MID Intake, TID Intake	<p>Minor seepage was noted on the intake headwall structure to the La Grange penstocks.</p> <p>Please continue to monitor this location and make repairs as necessary.</p>	Final Dam Safety Inspection not yet received by TID

**Dawson**

FERC regulates this project’s powerhouse and appurtenant structures, whereas the DSOD regulates the two embankments. This project has a low hazard potential classification based on visual inspection. FERC’s last inspection was in April of 2014, at which time their report concluded, “Based on observations made and discussion held during the inspection, the project was being operated according to the Order Issuing Exemption dated November 10, 1980, and no major safety concerns were noted.” DSOD staff performed an inspection in 2022.

In the Winter of 2021/2022, two new bulkhead gates were added to the Upper Dawson Spillway as a means to release flows in order to minimize the amount of reservoir rise following a power generator trip. The District constructed the project because the reservoir elevation rise needed to release Upper Main Canal flows over the Upper Dawson overpour spillway weir without reduction from Don Pedro could have caused a dam safety issue with the embankment.

**Summary of Dawson Inspections**

<b>Date</b>	<b>Staff(s)</b>	<b>Focus</b>	<b>Comments</b>	<b>Statements</b>
2/25/22 3/2/22 4/22/22 6/9/22 9/16/22 12/2/22	TID CDSE	Lower Dams #1 & #2, Upper Dam, Spillway & Powerhouse, EAP Exemption Condition	As taken from the 12/2/22 report:  Zero Action Items and nine Monitor Items related to Potential Failure Modes  Two Action Items (one from 2020 and one from 2022) and ten Monitor Items related to Maintenance  Zero Items to Consider	“Based on the visual inspections, the embankments and appurtenant structures remain in acceptable condition for continued operation.”
4/22/22	DSOD	Observations and Comments on the Dams, Spillway, Outlet, Seepage, and Instrumentation	Remove the thick vegetation from the downstream face of Dam 2 near the left groin.  Remove the woody vegetation from the downstream toe of Dam 2.  Remove the tipped tree that is almost dead and the tree	“From the known information and visual inspection, the dam, reservoir, and appurtenances are judged safe for continued use.”

			stump from the downstream face of Dam 1.  Add rodent control measures to Dam 1.	
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**Turlock Lake**

FERC regulates the powerhouse and the DSOD regulates the control structure and 18 small earth fill dams filling topographic lows around the lake’s perimeter. DSOD staff performed an annual inspection in 2022. FERC regulates the powerhouse but does not inspect this project.

**Summary of Turlock Lake Inspections**

<b>Date</b>	<b>Staff(s)</b>	<b>Focus</b>	<b>Comments</b>	<b>Statements</b>
3/8/22 3/25/22 4/22/22 9/28/22 11/4/22	TID CDSE	All Dams, Outlet Works, Powerhouse	As taken from the 11/4/22 report:  Two Action Items and twelve Monitor Items related to Potential Failure Modes (one from 2020 and one from 2022)  Nine Action Items (three from 2021 and six from 2022) and twelve Monitor Items related to Maintenance  One Item to Consider	“Based on the visual inspection, the dams and appurtenant structures remain in acceptable condition for continued operation.”
4/22/22	DSOD	Observations and Comments on the Dams, Spillway, Outlet, Seepage, and Instrumentation	Increase rodent control measures at embankments B, C, H & L. Backfill and compact rodent at these dams and at embankment E.  Remove the large woody debris from the upstream face of embankment E.  Continue to monitor the desiccation cracks at embankments J & K.	“From the known information and visual inspection, the dam, reservoir, and the appurtenances are judged safe for continued use.”

**Hickman**

FERC staff did not inspect this project in 2022. DSOD does not regulate or inspect this project.

**Summary of Hickman Inspections**

<b>Date</b>	<b>Staff(s)</b>	<b>Focus</b>	<b>Comments</b>	<b>Statements</b>
3/25/22 6/9/22 9/26/22 12/2/22	CDSE	Embankment, Powerhouse, Spillway, EAP Exemption Conditions	As taken from the 12/2/22 report:  Two Action Items and no Monitor Items related to Potential Failure Modes  Two Action Items and eight Monitor Items related to Maintenance  No Items to Consider	“Based on the visual inspection, the embankments and appurtenant structures remain in acceptable condition for continued operation.”

**Irrigation Facilities**

The District owns and maintains over 250 miles of canals, laterals and drains, approximately 90 percent of which are concrete-lined.

In 2022, the budget for Irrigation Capital improvements was \$2.5 million for projects below La Grange. The categories of projects include walkway and handrail rehabilitation, drain pump rehabilitation, earth resources, Upper Main Canal (UMC) patching, drop rehabilitation, gunite resurfacing, canal rehabilitation, flow measurement/SCADA and property/easement acquisition. Priorities were in gunite resurfacing (\$735,000), drop rehabilitation (\$735,000) and flow measurement/SCADA (\$660,000). Actual Irrigation Capital expenditures for 2022 totaled \$2.7 million given the desire to make improvements to the Turlock Lake Bypass Gates and to add a second flow meter in the UMC at Peasley Fill.

Also in 2022, the United States Bureau of Reclamation (USBR) awarded a \$2 million grant to the District to partially fund the Ceres Main Regulating Reservoir Project, a project that is scheduled to be completed over the 2022 and 2023 budget years. While the District had budgeted \$6 million to be expended on the reservoir project in 2022, USBR delayed the District’s ability to start work in a timely manner; thus, only \$2.3 million of the \$6 million budget for this project was spent, which made funds available for other projects.

For 2023, the Capital budget for the Water Resources Administration projects downstream of La Grange is \$12.5 million. Large cost items include \$4.8 million for the Ceres Main Regulating Reservoir project, \$2.5 million for Irrigation Capital improvements, and \$3.0 million for vehicle replacements. For the period 2024-2028, the anticipated Irrigation Capital improvements budget will be \$2.5 million annually.

Project Nexus is another large cost item at \$13 million in 2023. The State of California fully funded the project at \$20 million; the District will utilize this funding over a span of multiple years until the project is complete. Project Nexus will study the solar over canal design and deployment on behalf of the State of California using the District's canals and electric grid access. This Project is discussed further below.

### **Upper Main Canal to Turlock Lake**

The Upper Main Canal (UMC) is the main artery of the entire irrigation system as it conveys all irrigation flows approximately 8.7 miles from La Grange Dam to Turlock Lake, and thence to the irrigation distribution system. The UMC was initially constructed at the same time as the La Grange Dam and although it is an aging facility, District staff believes that the modified operation, yearly maintenance and continuous monitoring of its condition keeps it functional and reliable for the District's purposes. District staff weighs the potential risks versus the estimated costs when assessing changes associated with the system.

In 2020, the District initiated a comprehensive review of the UMC to guide the District's short- and long- term plans for the UMC. The short-term timeframe (0-5 years) is related to maintaining the UMC for near term safe and reliable operations. The long-term timeframe (5-20 years) is looking at the potential rebuild of parts of the system for long-term safe and reliable operations. This comprehensive review included two parts: a physical UMC facilities assessment and a hydraulic study of the canal that included operational flow tests and hydraulic modeling.

In 2021, the District conducted a special aerial survey using light detection and ranging (LiDAR) technology of the canal during the spring canal outage. The District then hired Provost and Pritchard (an engineering consultant firm) to utilize the new survey data to create a two-dimensional hydraulic model of the UMC, including Dawson and Floto lakes, using the U.S. Army Corps of Engineer Hydrologic Engineering Center River Analysis System (HEC-RAS). This model was completed in 2021. The UMC model allows the District to simulate various flow and/or operating scenarios to explore the full capabilities of the UMC and the lakes for the purposes of maximizing water supply and power generation opportunities. To calibrate the UMC model, the District conducted several flow tests on the UMC between 2020 and 2022 at which time actual hydraulic data was collected in the field. This data was used to verify preliminary model results and to identify areas of the model needing refinement to better reflect the field data.

In 2022, a technical memorandum of the results was submitted to the District. The District then tasked Provost and Pritchard to determine what hydraulic improvements would be required to increase the capacity of the UMC to convey 3,200 cfs, 4,000 cfs or 5,000 cfs flow rates. Their report on the results will be submitted to the District in March of 2023. Gannett Fleming, a separate engineering consulting firm with cost-estimating expertise and a unique understanding of the UMC, will use the data in that report to develop an improvement cost analysis, also to be completed in 2023.

Survey markers that were installed at various sensitive locations on the UMC such as Snake Ravine and the Warehouse Slide have shown no movement in 2022.

In July of 2022, a new and potentially serious leak was observed on the UMC at the toe of the river side embankment upstream of the flow measurement gauge near the La Grange forebay. After inspection by engineering and maintenance staff, management made the decision to shut off and drain the canal for emergency repairs. Once drained, a large buckle was found in the layers of gunite on the interior floor of the canal adjacent to the leak. District construction crews were able to clean and repair the damaged area and return the canal to service within 30 hours. The UMC ran without issue for the remainder of the irrigation season and the repair area was cleaned and inspected during the regular yearly canal inspection in October and found to be in stable condition.

District staff inspects the UMC at the end of each irrigation season starting just downstream of the canal forebay gates at the La Grange powerhouse intake and ending at the intake to Turlock Lake. The UMC inspection was done on October 20, 2022. Staff indicated that this effort is for internal information and is not a requirement of any Agency. The majority of the inspection report showed “no apparent deficiencies”. District staff did note that there were “Large number of buckles and delamination of the floor lining.” Areas that need repairs were marked with paint, locations where rocks and dirt need to be removed were described, and completion dates were defined. A hillside drainage culvert at 20 Minute Falls, which has had periodic problems with corrosion, was lined with concrete to prevent further corrosion.

Operations staff drive the road adjacent to the UMC two times per day and in any abnormal condition or event to make observations of its integrity. An example of an abnormal condition would be if there was an earthquake greater than 6.0 within 50 miles.

An Incident Action Plan (IAP) was developed in 2021 for all of the District’s Canal Systems. The purpose was to update procedures for District staff to follow during unusual events such as earthquakes, landslides, levee failures, etc. Responsible staff and their expected actions are outlined in this document.

In August 2008, a consultant performed a Condition Assessment Study of the Entire Upper Main Canal (UMC). This study stated that the following goals were provided by the District related to the UMC system: no unscheduled repair outages lasting longer than 17 days during the irrigation season under extreme loading such that the canal will remain in service after a major earthquake, and no maintenance outages during the irrigation season. These continue to be the goals of the District. The 17-day period was developed because that is the amount of water that can be contained in Turlock Lake. The consultant of this 2008 study also recommended additional engineering studies be performed to analyze the stability and reliability of the Peasley and Delaney Fills and the upper 7,500 feet of the UMC system as well as some inspection and repair work be performed on the tunnels. Staff considers that this document must be read within the context of how the UMC had operated until 2003, when the flows would typically be pulsed for electricity needs and sometimes reach a maximum of 3,200 cubic feet per second (cfs) without any ramping rate criteria. During that time, cracking, buckling and leaking periodically occurred that then required repairs beyond normal maintenance work. In 2003, the District looked at options to completely reconstruct the UMC; however, due to high costs, the District decided to implement operational criteria

to limit the maximum flow in the UMC to 2,500 cfs with ramping rates of 500 cfs/hour. These ramping rates are still in place.

There are three major fills on the Upper Main Canal: the Morgan Fill, the Delaney Fill, and the Peasley Fill. Operations staff is directed, for all three fills, to inspect the upstream and downstream entrances and channels after each major storm event or monthly if there are no storms, and to report any adverse information to the Civil Engineering Department. The Morgan Fill was reconstructed in 2000, the Delaney Fill had some crack repairs performed in 2009 and in 2019, and the Peasley Fill had rehabilitation work performed on the flume floor in 2007-08. New crack gauges were installed at the Delaney and Peasley Fills in 2019, replacing older gauges from 2008; staff reports indicate that there continues to be no movement at the gauges. Two existing cracks at Delaney Fill were repatched in 2021 due to the original aging patch material no longer preventing leakage. Cracking of the new patch material was noted in 2022 and led the District to reapply the patch and begin survey monitoring of the canal for any movement in that location.

Sensors that can measure flow and/or water levels are in place at the Peasley and Delaney Fills. The measuring site upstream of Morgan Fill also provides this data. An additional water level sensor was installed in 2020 at Lower Dawson Dam #1 near the outlet into the UMC. All of these sensors are set to alarm if there is a sudden or unexpected change in water elevation or flow rate; various staff are on the call list and it is monitored 24 hours per day. Were these sensors to alarm, staff would access the site within fifteen minutes and then inform civil engineering, maintenance and management teams, who would then determine both immediate actions to take as well as any remedial actions that may be required to resolve the issue.

Remote cameras have also been installed at all telemetry sites as well as the first Lake Road bridge crossing and are accessible to the canal tender.

### **System below Turlock Lake**

The entire irrigation system below Turlock Lake is normally inspected on an annual basis by at least three individuals with at least one inspector from Water Distribution, one from Construction & Maintenance, and one from Civil Engineering. The entire system is reviewed with particular attention being paid to those areas that have had ongoing issues. This effort takes approximately fifteen days during the non-irrigation season, with one section of canal inspected per day. During these staff inspections, all facets of the irrigation system are rated on their conditions. These inspection ratings are one element that staff uses to prioritize the projects that get placed in the five-year irrigation capital budget.

The 2022-2023 winter inspection was postponed due to the high volumes of storm water in the canal system and the large amount of construction taking place on the Ceres Main canal related to the new Ceres Main Regulating Reservoir. District staff said there have been no significant, unexpected adverse findings. Canals were still inspected by operators at the end of the 2022 irrigation season and this postponement is not anticipated to significantly affect the canal system or irrigation capital planning.

Construction of the Ceres Main Regulating Reservoir Project began in October 2022 and is estimated to be completed by June 2023. This concrete lined reservoir will capture spills and return the water to Lower Lateral 3 and the Ceres Main Canal, with the work being performed by District staff. The District received a \$2 million grant from the United States Bureau of Reclamation (USBR) in March of 2022. The Reservoir will have a similar function to the one built in 2016 at Lateral 8. The Reservoir will have the capacity of 220 acre-feet and is expected to save approximately 10,000 acre-feet of water per year by capturing operational spills from the system and using them to supplement irrigations and reduce groundwater pumping downstream. Estimated construction costs are approximately \$8.7 million.

In June 2021, the Board of Directors approved the purchase of a 40.13-acre parcel on Blaker Road for the purpose of implementing the Lateral 5.5 Regulating Reservoir. In 2022, design was completed and CEQA clearance was obtained. The District is seeking grant funding for this shovel-ready project that will have the capacity of 140 acre-feet and is expected to save approximately 4,000 acre-feet per year by capturing operational spills from the irrigation system and using them to supplement surface water irrigations. In addition, tertiary treated wastewater from the City of Turlock's wastewater treatment plant could also be captured and stored in this location. The project will also reduce the need to supplement irrigation flows with groundwater pumping along the Lateral 5.5 canal. The project has an estimated construction cost of approximately \$8.5 million.

In July of 2022, the District completed plans to automate five canal water level control structures on the Main Canal below Turlock Lake and submitted an application for a USBR grant to fund the project, which will replace old radial gates and wooden boards with remotely controlled Rubicon flume gates and actuated aluminum slide gates. USBR is expected to announce grant awards by April 2023, and if the District is a grant recipient, staff will request Board approval to begin construction on a portion of the work starting in November 2023.

The Nielson and Harding Fish Barrier Projects were completed in 2021 and 2022 respectively. The purpose of these projects was to prevent fall run Chinook Salmon from entering the District's canal system from the San Joaquin River. The District is in the process of completing initial monitoring requirements, closing out permits and submitting the final report to DWR for grant reimbursement.

### **Improvement Districts**

Growers, in cooperation with the District, have formed more than 1,500 improvement districts to install facilities for the distribution of irrigation water, for pumping, and for drainage purposes. In 2022, 147,917 acres were irrigated within the District, of which approximately 124,000 acres were within improvement districts. At this time, approximately 1,043 of the improvement districts are active. The average improvement district contains 224 acres and includes 12 parcels of land. Any parcel may lie in more than one improvement district. The District loans funds, repayable over a 10-year period, to the improvement districts for construction of their facilities and provides annual maintenance on a cost-reimbursable basis. There has been an increase in the



number of canal side gates being added; District staff thinks this is attributable to a desired flexibility in where the water is delivered rather than an increase in the number of growers.

Farmers are allowed to transfer, on paper, some of their water between parcels, which they own or rent, within the irrigation season. This allows one field to be fallow and the water that would have been available to that parcel to be diverted to another parcel; for example, from one area that might historically have been planted in row crops to another area that has permanent crops such as orchards. This is particularly important during drought years.

Approximately half of the irrigated acres are for tree crops and the other half are for growing forage crops (alfalfa and corn) for dairies. For tree crops, some farmers have switched their method of irrigation from flood to micro/drip, which has affected how water is taken from the District's facilities but not in the overall amount of water that is used according to District staff.

## **Drainage Facilities**

The District also operates drainage wells in an effort to influence groundwater levels, particularly on the west side of the District. Where possible, drainage is discharged into the canal system so that it can be utilized for irrigation at other locations. Drainage pumping decreased in 2022 by 27% as compared to 2021, and 34% compared to 2020.

The canals and laterals also act to collect storm drainage from the cities of Turlock, Ceres and Hilmar. No adverse conditions to the system were noted due to rainfall events in 2022.

## **Water Conditions**

During the 2021-22 Water Year, California and the District experienced a below average water year, with the Tuolumne River computed natural flow at 1,132,905 ac-ft, or approximately 58.2% of the historic average.

Since Water Years are defined for the period from October of one year through September of the following year, forecasts include estimates of future precipitation based on historic averages. The CDWR Water Year forecast on March 1, 2023 was 3,605,000 ac-ft (185% of the historic average); it included an April through July forecast of 2,350,000 ac-ft.

The CDWR changed from a 50-year average to a 30- year average to calculate the average historic Water Year. The latest prediction period uses data from 1991-2020. The resulting defined average historic Water Year for the Tuolumne River watershed was 1,946,000 ac-ft for the Water Year.

For historical comparisons, the wettest year on record occurred in 2016-17, when it was 256 percent of the historic average. Prior to that, the 1982-83 water year was 243 percent of the historic average. The driest water year on record occurred in 1976-77, when it was 18 percent of the historic average.

It should be noted that in the past, this report has referenced “normal” water years; the corrected terminology is now “historic average” water years.

### Water Rates and Operations

A new irrigation rate schedule was adopted in 2015 to address the various projects outlined below in the section titled Water Resource Management. The District’s goals were outlined in their presentation when presenting the proposed rate increase: “protect water rights, maximize water use efficiency (conservation), assure sustainability & reliability of our water resources, and keep future rates reasonable.”

On March 22, 2022, the Board of Directors established that the Dry Year Rate Schedule would be used and set an availability of 27 inches per acre. The Board of Directors also allowed for those parcels that needed more than 27 inches of water to produce a crop to complete their last irrigation; it was billed at the appropriate tier.

The 2022 irrigation season began on March 28 and concluded on October 12. During the 2022 season, the District delivered 334,883 ac-ft of irrigation water (based on receipts) to 147,917 acres of land, of which 82 percent came from the Tuolumne River and the remainder from groundwater pumping. Deliveries in 2022 were approximately 10.9 percent lower than in 2021 and approximately 17 percent lower than 2020. The amount of water stored in Don Pedro and Turlock Lake increased from 572,575 ac-ft to 671,214 ac-ft between 2021 and 2022; this number includes the City and County of San Francisco’s water bank. The District’s portion of that water increased from 346,303 ac-ft to 425,705 ac-ft between 2021 and 2022. None of these values include the dead storage capacity of 309,000 ac-ft of water stored in Don Pedro.

Groundwater pumping, both by District pumps and privately-owned pumps contracted by the District pump, provides irrigation water during below average precipitation years. In the 2017 and 2019 season, which both had significantly above average precipitation years, groundwater pumping was one of the lowest on record with 25,477 ac-ft and 34,035 ac-ft, respectively pumped. In 2022, the groundwater pumping, including both drainage and water supply pumps, totaled 75,873 ac-ft. The District pays the well owner a cost per acre foot pumped plus all electricity and maintenance costs. Approximately 118 improvement district and private wells were rented by the District in 2022.

The online Water Ordering System was enhanced to provide grower access to real-time data and provide benefits from various system improvements.

A part of the groundwater basin lying east of and adjacent to the District boundaries is over-drafted as more orchards are being cultivated in this area, and which relies entirely on groundwater for their supply. The overdraft has begun to encroach into the District’s part of the basin causing the groundwater on the eastern side of the District to flow eastward toward the cone of depression. To reduce the overdraft east of the District, the District has made surplus water available in normal and above normal water years to irrigators immediately adjacent to the District facilities but outside the District boundaries. Due to dry conditions in 2022, replenishment water was not available for

purchase for lands outside the District’s irrigation service area that are also within the Turlock groundwater subbasin.

The District tracks its water delivery efficiency by dividing the amount of water delivered by the calculated value of total water supply. The total water supply is the sum of the Turlock Lake releases plus the amount of water delivered by District pumps to the canal, either from drainage pumping or from water supply pumping, minus the bypass water. The water delivered is obtained from the accounting receipts for the water purchased by farmers, but it does not account for operational spills out of the canal system that are inherent in any gravity-type irrigation system. System efficiency can thus be calculated in two ways: the first includes the spill as part of the water supply and the second excludes the spill from the water supply. Both efficiencies are included in the following table.

**Selected Irrigation Operating Statistics**

	Water – Acre-Feet			Percent Change	
	2022	2021	2020	2022-2021	2021-2020
1 Turlock Lake Releases	336,377	363,485	435,798	-7.5%	-16.6%
2 Drainage Pumping (District)	21,391	29,157	32,541	-26.6%	-10.4%
3 Water Supply Pumping	54,482	64,107	36,150	-15.0%	77.3%
4 Bypass <sup>(1)</sup>	0	0	0	0.0%	0.0%
5 Total Water Supply	<u>412,250</u>	<u>456,749</u>	<u>504,490</u>	-9.7%	-9.5%
6 Water Delivered	334,883	376,024	403,466	-10.9%	-6.8%
7 Efficiency if Include Spill <sup>(2)</sup>	81.2%	82.3%	80.0%	-1.4%	2.9%
8 Spill	13,387	18,240	45,724	-26.6%	-60.1%
9 Spills – % of Total Supply	3.3%	4.0%	9.1%	-18.5%	-56.0%
10 Water Supply minus Spill	<u>398,863</u>	<u>438,509</u>	<u>458,766</u>	-9.0%	-4.4%
11 Efficiency if Exclude Spill <sup>(2)</sup>	84.0%	85.8%	88.0%	-2.1%	-2.5%
12 Irrigated Land – Acres	147,917	149,159	149,269	-0.8%	-0.1%
13 Total Water Stored – ac-ft <sup>(3)</sup>	671,214	572,575	1,064,420	17.2%	-46.2%
14 TID Water Stored – ac-ft <sup>(4)</sup>	425,705	346,303	734,229	22.9%	-52.8%
15 Revenues – \$1,000	\$11,171	\$11,423	\$9,784	-2.2%	16.8%

(1) Bypass diversions into Tuolumne River near Hickman. The purpose of these flows is to reduce the flow fluctuations in the Tuolumne River between La Grange and Hickman, while allowing more water to be released at Don Pedro for power production. This typically happens in above average water years when Don Pedro does not need to be replenished.

(2) Efficiency can be calculated in two ways. The first method is calculated as the “Water Delivered” divided by the “Total Water Supply” where the “Total Water Supply” includes Spill. The second method is calculated as the “Water Delivered” divided by the “Water Supply minus Spill” where the Spill is subtracted from the “Total Water Supply”. Private groundwater pumping is not accounted for in any scenario.

(3) Total Water Stored includes Turlock Lake and Don Pedro Reservoir (TID active storage which also includes the City and County of San Francisco’s water bank share) as of December 31.

(4) TID Water Stored includes Turlock Lake and TID’s portion of the Don Pedro Reservoir (i.e. it excludes the City and County of San Francisco’s water bank share that is stored in Don Pedro) as of December 31.

### Water Resource Management

The Tuolumne River hydrology continues to show an increase in volatility, which could have a significant effect on the firm yield potential of the water supply for environmental requirements, water supply, and electrical production. When adding this topic to the hurdles of climate change, regulatory requirements and additional demand on the water supply, the District recognizes the need to optimize and manage this resource to the highest degree possible. The following resources and tools have been implemented to assist the District with accomplishing this goal and are intended to address how the water is being efficiently distributed.

- **ASO (Airborne Snow Observatory):** ASO technology was developed at the NASA Jet Propulsion Laboratory to map the snow water equivalent (i.e., the volume of water stored as snow) and snow albedo (i.e., the reflection of incoming radiation) completely and accurately across mountain basins by measuring snow depth and snow reflectivity using airplane-mounted light detection and ranging (LiDAR) technology. This work allows the District to get direct measurements of the snowpack at millions of points, and thus provide projections of available water. The District contracted with NASA to fly the watershed in both February and March of 2022.
- **Center for Western Weather and Water Extremes (CW3E):** The goal of the Center for Western Weather and Water Extremes (CW3E) led by the Scripps Institute of Technology is to improve atmospheric river forecast and provide tools to assist water managers with flood control and water supply decisions. The District has been integrating CW3E's innovative products into its decision-making process.
- The **Hydrologic Forecast Analysis Model (HFAM)** is a physically based hydrologic model developed by Hydrocomp that runs on an hourly time step. The model gives an understanding of what is happening on every land segment in the entire watershed and allows water managers to make informed decisions. For over 20 years, the District has been working with Hydrocomp to develop and optimize the HFAM model of the Tuolumne System
- The **Lower System Analysis Model (LSAM)** is a model that was developed to support water supply planning and management, and is an important tool in establishing the amount of water available to the District's growers on an annual basis. The LSAM allows for the complete accounting of water and improves confidence in the modeling results compared to previous methodologies.
- **Drought Planning Efforts:** The District has ramped up its efforts on drought planning and developed a drought planning matrix to identify categories, actions, and timing necessary to successfully navigate drought years. The matrix included many categories ranging from Board interactions & approvals (policy level discussions and directions), District operations (water resource assessment/analysis/modeling, water availability, water rate schedules, irrigation operations, conjunctive management, and water use efficiency projects and efforts), online tools (online ordering, mobile friendly account access, dashboards, alerts, and forecasting tools), grower assistance programs (pump rental, pumping for credit,

and water transfer programs), and grower communications. Specific examples include the Agricultural Water Management Plan (AWMP) , Draft Irrigation Facilities Master Plan (IFMP), Drought Transfer Pilot Program, Farmer to Farmer Transfer Program, Pumping for Credit Program, Land Lease Transfer Program, and the Land IQ Program

- **San Joaquin Forecast-Coordinated Operations Grant:** The San Joaquin Forecast-Coordinated Operations Program (SJ F-CO Program) is a collaborative initiative among partner agencies for coordinated operation of reservoirs and to enhance communications, hydrologic data collection and information exchange, reservoir modeling, and operational training. The SJ F-CO Program partner agencies include U.S. Army Corps of Engineers' Sacramento District Office (USACE), California Department of Water Resources (DWR), National Weather Service's California-Nevada River Forecast Center (CNRFC), TID, Merced Irrigation District, U.S. Bureau of Reclamation's Friant Division Project, Kings River Water Association, and Kings River Conservation District. The District applied for and received an SJ F-CO Program grant in the amount of \$2.1 million for Don Pedro Reservoir, Tuolumne River Forecast Data and System Upgrades, to improve the accuracy of flood forecasting for the Tuolumne River watershed and for overall coordination with other reservoir operators in the San Joaquin River watershed. The projects planned for and executed under the grant include additional meteorological gaging stations, improved streamflow gaging and reporting, improvements to the District's HFAM model, web services for data acquisition by partner agencies, data collection through airborne remote sensing of snowpack, and infrastructure improvements for the California Data Exchange Center.

### **Water Rights Application**

On January 26, 2022, the District, on behalf of both the Turlock and Modesto Districts, filed a water rights application with the State Water Resources Control Board for an additional 2.7 million acre-feet of Tuolumne River water. This is the first such application by the Districts since 1951; the intent is to capture unappropriated flood waters between November 1 and June 14 on an annual basis and put them to beneficial use. The application included a variety of water supply projects, some of which are being analyzed within the District's Water Supply Augmentation Study. This Study was initiated in 2022 and includes off-stream storage reservoirs, groundwater recharge and storage, as well as reservoir interconnections, and is anticipated to be completed in 2023.

### **Project Nexus**

In 2022, the District received \$20 million in funds from the Department of Water Resources (DWR) for the Solar Panel Pilot Study Project, known as Project Nexus. This project is a partnership formed between the District, University of California at Merced, DWR, and Solar AquaGrid. As stated on the District's website:

The first-ever solar panel over canal development in the United States, the Project will assess reduction of water evaporation resulting from mid-day shade and wind mitigation; improvements to water quality through reduced vegetative growth;

reduction in canal maintenance through reduced vegetative growth; and generation of renewable energy.

CEQA clearance has been obtained. Design of both the narrow-span and wide-span sections are ongoing and construction on both sections are scheduled to start in late 2023 with completion anticipated by late 2024. The District has contracted with Solar AquaGrid to be the project developer and program manager, although the District will remain as the overall Project Manager. The project will include the installation of 4 MW of solar panels over approximately 8,500 feet of the District's canals. There are two phases associated with this project, the first phase relating to a narrow canal and the second phase relating to a wider canal.

### **Final Substitute Environmental Document (SED)**

The State Water Resources Control Board (SWRCB) began working on a Bay Delta Plan Update (BDP) with a Notice of Preparation in 2009, and in 2012, they issued the Draft Substitute Environmental Document. On July 6, 2018, the State Water Resources Control Board (SWRCB) released the Final Substitute Environmental Document (SED) in support of Phase 1 of the BDP. The BDP dictates that 40 percent (range 30%-50%) of the unimpaired flow be released each year from the Merced, Stanislaus, and Tuolumne rivers between February 1 and June 30. The SWRCB determined that this amount of flow is needed to support fish and wildlife in the San Joaquin River and its tributaries, as well as to meet salinity objectives to protect agriculture in the southern Delta. On December 12, 2018, the SWRCB approved the "Adoption of Amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary and Final Substitute Environmental Document".

In 2019, the San Joaquin Tributaries Authority (SJTA) filed a lawsuit challenging Phase 1 of the BDP. The SJTA is a coalition of water agencies whose members include the District, as well as Modesto Irrigation District, Oakdale Irrigation District, South San Joaquin Irrigation District, and the City and County of San Francisco. The SJTA's "mission is to promote sound, environmentally responsible solutions to water supply management within a framework that recognizes the historic rights of its member agencies and the concerns of ratepayers."

On October 20, 2021, the District and other parties included in Phase 1 of the BDP were notified by the Secretaries of the California EPA and Natural Resources Agency that negotiations over the Voluntary Agreement (VA) had been terminated. The State noted that it would now focus its efforts on Phase 2 of the BDP, which addresses the Sacramento River basin. Furthermore, the letter indicated that Phase 1 of the BDP would now be implemented by the SWRCB, potentially through some type of regulatory action. However, while not stated in the letter, it was understood that the Tuolumne River maintained the opportunity to negotiate a VA as this was explicitly stated in the SWRCB Resolution that adopted Phase 1 of the BDP in 2018.

On November 9, 2022, the District took a step forward in resolving its dispute with the State of California regarding the SED and the BDP. Specifically, at the direction of the District Board, the General Manager signed a Memorandum of Understanding (MOU) advancing a term sheet for a VA to update and implement the Bay Delta Water Quality

Control Plan. The MOU establishes agreement on a number of flow and non-flow measures that create deal points and a general pathway for SWRCB review and approval of a VA for the Tuolumne River. The District and its partners on the Tuolumne River (Modesto Irrigation District and SFPUC) are participants in a number of sub-committees that are developing the final VA that will be presented to the SWRCB towards the end of 2023 with final approval in late spring 2024.

### **Sustainable Groundwater Management Act (SGMA)**

The Sustainable Groundwater Management Act (SGMA) was passed in 2014; it enabled local agencies within a subbasin to form a Groundwater Sustainability Agency (GSA). Two GSAs were formed within the Turlock Subbasin and approved by the DWR in 2017: the West Turlock Subbasin Groundwater Sustainability Agency (WTSGSA) and the East Turlock Subbasin Groundwater Sustainability Agency (ETSGSA). The process was coordinated with all local public agencies eligible to form GSAs to ensure that the entire Subbasin was covered, without overlap, as required by SGMA. The District is a member of the WTSGSA and is coordinating efforts relating to the development and implementation of the Groundwater Sustainability Plan (GSP).

On January 6, 2022, the first GSP was formally adopted by the WTSGSA and the ETSGSA, and was then submitted to the DWR on January 28, 2022. DWR is in the process of reviewing the GSP and is expected to make a determination by January of 2024 as to whether or not the GSP meets the regulatory requirements or if revisions are needed.

The GSP describes groundwater resources and conditions, and identifies how the subbasin will be managed to achieve sustainability within a 20-year timeframe. It will be updated every five years.

The first Annual Report was submitted to the DWR in March 2022 and was focused on updating data and other information from water years 2015 to 2021. The second Annual Report was completed, and includes an update of data from water year 2021 to 2022. The report was submitted to DWR on March 29, 2023.

Within the GSP several items of interest were noted:

- The sustainable yield for the Turlock Subbasin is estimated at 311,000 ac-ft per year, with historical data indicating that an average of 65,000 ac-ft is being overdrafted annually.
- The west subbasin is a net recharger due to its conjunctive use of groundwater and surface water, but the east subbasin is a net extractor of groundwater, as it relies nearly entirely on groundwater for its supply.
- The urban water demand and supply is projected to change with increased water demand due to growth, and all of the urban agencies except one are 100 percent reliant on groundwater. This will change as the Stanislaus Regional Water Authority (SRWA) Project is implemented, thereby bringing surface water from the Tuolumne River to the cities of Turlock and Ceres.

The GSP includes a series of physical projects as well as management actions, and an implementation schedule to achieve sustainability. Activities include development of

several projects within the District. Construction of the Ceres Main Regulating Reservoir began in October 2022 and is anticipated to be completed in June 2023. The SRWA project is anticipated to be completed in Fall 2023. A pilot FloodMAR (flood managed aquifer recharge) project was initiated in 2022 and is in partnership with Sustainable Conservation and DWR.

Additional work, funded under a Proposition 68 grant from DWR includes: (1) installation of dedicated monitoring wells in early 2022; (2) development of a Groundwater Recharge Assessment Tool (GRAT) to evaluate recharge opportunities in the subbasin; (3) development of a Programmatic Environmental Impact Report (PEIR) to facilitate California Environmental Quality Act (CEQA) review of projects and management actions included within the GSP; and (4) siting and preliminary design of additional monitoring wells for the subbasin. The PEIR was certified by the WTSGSA on March 16, 2023. The ETSGSA (located to the east of TID's boundaries) has begun efforts to improve recharge, set pumping limits, improve measurement of water pumped, and explore land repurposing opportunities; all of which were anticipated to better match water use with available supplies, and enable the subbasin to achieve sustainability by 2042. Other activities include water level monitoring, and developing a water accounting framework. Updates to these and other activities were included in the second Annual Report.

The GSAs have also applied for \$20 million dollars in grant funding to support ongoing GSP implementation activities. If fully funded, the grant would pay for: (1) a Recharge Master Plan for the Subbasin, along with pilot projects and programs to provide a roadmap to maximizing recharge opportunities; (2) monitoring and instrumentation improvements including monitoring wells and transducers, meters for wells in ETSGSA, and other data to measure/document water use spatially within the subbasin; (3) completing various GSP implementation commitments, addressing known data gaps, preparing for updates to the GSP due in 2027; and (4) funding a portion of the construction of the Ceres Main Regulating Reservoir. It is unclear at this time if part or all of the funding request will be granted. Determinations are currently anticipated in August 2023.

### **Water Curtailments**

As climate change and drought are affecting the precipitation patterns in California, the SWRCB has been attempting to protect California's water resources for municipal as well as fish and wildlife uses.

In 2015, the SWRCB Division of Water Rights "sent notices to all entities claiming water rights with a priority date of 1903 or later that the right to divert water may be curtailed" in dry years. The SJTA filed a lawsuit challenging the Notices and the Santa Clara County Superior Court (where the cases were consolidated) ruled in favor of the SJTA on both procedural and substantive grounds. On October 21, 2021, the California State Attorney General appealed this decision to the 6<sup>th</sup> District Court of Appeals. On September 12, 2022, the Attorney General's appeal was denied by the Sixth District County of Appeal and the trial court's ruling was upheld. Subsequently the Appeal Court also affirmed the trial court's order that the Districts are entitled to reimbursement for their attorney fees.



In 2021, the SWRCB adopted an Emergency Drought Curtailment Regulation. The SJTA “filed a writ of mandate challenging” this Regulation. In addition, the Districts and other affected districts have filed a Petition for Reconsideration of the Curtailment Order, which is a first procedural step that must be taken prior to challenging the Curtailment Order. The District filed a lawsuit in December 2021 challenging the Curtailment Order. The curtailment order was extended in 2022 and implemented sporadically through the year. However, the Districts were able to adjust operations so that water supply was not unduly impacted. Monthly reports of prior diversions and projected demand were also filed with SWRCB.

### **Other Plans**

The District participates with various memberships and contracts that work together to achieve favorable legislation, stay informed on pertinent policy and share legal costs.

The District also collects a fund, accrued through the rate structure, to address the additional costs associated with critically dry years. These costs are attributed to increased pumping and lower volumetric revenues.

## **Water Quality Regulations**

District staff monitor the regulatory environment and participate in proceedings as needed to ensure that the District is prepared for and able to comply with new requirements as they are instituted. District staff stated that there were no significant changes to the various regulations affecting the District in 2022.

In the past, the District developed an internal program to collect and measure the quality of water being discharged into its system from growers. Over time, the District’s role diminished in this venue as the Regional Water Quality Control Board (RWQCB) instituted various regulatory programs. These programs include the Irrigated Lands Regulatory Program (ILRP), the Confined Animal Facility Program (CAFP), and the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) Program, as well as a myriad of other oversight issues including but not limited to pesticide management, climate change, and stormwater. The RWQCB is also responsible for developing Waste Discharge Requirements (WDR) on various dischargers and to develop a Basin Plan for the entire region. The District does not have WDRs but it does have a National Pollutant Discharge Elimination System (NPDES) permit for aquatic pesticide use in its canals to minimize algal growth.

The Federal Clean Water Act [Section 303(d)] requires that the RWQCB and the State Water Resources Control Board (SWRCB) maintain a list of impaired waterways. The most recent list for the Central Valley is included in the Final 2020 and 2022 Integrated Report and was approved by the Environmental Protection Agency (EPA) in May 2022. The current list includes a variety of local waterways. Category 5 criteria include “a water segment where standards are not met and a total maximum daily load (TMDL) is required, but not yet completed, for at least one of the pollutants being listed for this segment.” There are 1,239 waterbodies on this list. Hetch Hetchy Reservoir, Don Pedro Reservoir and Turlock Lake are listed for mercury, with the source unknown. The

SWRCB and the RWQCB are working together on statewide TMDLs for mercury. The lower Tuolumne River, from Don Pedro Reservoir to the San Joaquin River, is listed as impaired for group A pesticides, mercury, water temperature, and toxicity. The Highline Canal (From Mustang Creek to Lateral No. 8) is listed for toxicity. Mustang Creek is listed for pesticides, metals, pathogens, nutrients, salinity, and total toxics. The District's Lateral No. 7 and Lower Stevinson Canal are listed for nitrates/nitrites and specific conductivity. The Levee Drain is listed for nitrates/nitrates, specific conductivity and total dissolved solids. The Harding Drain is listed for toxic organics, pesticides, and pathogens. The pesticide listings are for chemicals not used by the District, but are used by others in both the urban and agricultural settings. The 2024 Integrated Report is being developed at this time, with no listing revisions currently proposed for local waterways.

A Basin Plan Amendment for the RWQCB's Basin Plan was adopted in 2017, which could enable changes to some of the beneficial uses and, therefore, water quality objectives associated with the District's canals and irrigation water supplies. The District has maintained that the canal system does not transport or supply municipal water and should not carry the MUN designation, or be required to meet drinking water standards. However, under SWRCB policies, the Basin Plan broadly assigns municipal beneficial uses to all waterways throughout the state unless specifically designated to not be a MUN supply. This broad interpretation of MUN beneficial uses has resulted in several canals being listed as impaired for pesticides to protect these MUN uses. The current Basin Plan Amendment provides a streamlined process to de-designate MUN uses or specify a "limited MUN" use in the future. The District will continue to participate in this process and, if approved, work with the RWQCB to modify canal designations as appropriate to meet current and future needs. De-designating MUN would correct an inaccurate characterization of the canal uses, thereby providing regulatory relief by enabling the removal of some 303(d) listings, and other regulatory requirements in the future, without impacting canal water quality or existing uses.

## Domestic Water Supply Development

The Stanislaus Regional Water Authority (SRWA) is a joint powers authority (JPA) currently comprised of the cities of Turlock and Ceres. The SRWA is developing a Regional Surface Water Supply Project (RSWSP) that will provide safe and reliable drinking water to the cities to supplement their existing groundwater drinking water supplies. While the District is not a member of the JPA, the District is involved as a participant due to the future transfer of water to the SRWA for the RSWSP. The District Board passed a Resolution approving a Water Sales Agreement (WSA) to the SRWA in 2015, which has a 50-year term and defines conditions under which the District will transfer water to the SRWA.

In June 2018, the District submitted a water transfer petition to the State Water Resources Control Board (SWRCB) seeking approval to transfer 17,375 acre-feet per year of surface water to the SRWA for the RSWSP using its post-1914 water rights. In April 2020, the District Board approved an amendment to the WSA that gave the District flexibility to provide surface water to the SRWA for the RSWSP using its pre-

1914 rights, post-1914 rights, or some combination of both. The petition process is ongoing with a goal of obtaining SWRCB approval of the water transfer by June 2024.

In June 2020, the SRWA Board approved a contract with Jacobs Engineering to design and construct a raw water pump station, a raw water transmission pipeline, a water treatment plant, and two finished water transmission pipelines. Operation of the entire project is set to commence in October 2023.

In October 2020, the District sold the parcel that the RSWSP will be sited on to the SRWA. The District will retain ownership of the raw water pump station and the pipeline delivering raw water to the RSWSP and is paying twenty percent of its construction cost. The purpose of this retention is so that the District can pump water into the Ceres Main Canal in the future if this necessity arises. The District also contracted with the SRWA for the SRWA to operate and maintain those items.

While the cities of Ceres and Turlock have already enacted water rates to fund the project, the SRWA continues to work on obtaining grant funding and low-interest loans to lower the project's cost.

The District is also responsible for supplying water to the town of La Grange. In 2020, two new finished water storage tanks were installed since the existing finished water tanks were nearing the end of their service life. In 2021, construction began on a replacement raw water pump station and a new maintenance building; both facilities were completed in April 2022.

## Electric System

### General

The District owns and operates an integrated electric generation, transmission and distribution system that serves over 104,000 customer accounts within a 662-square-mile area. Over the last several years, the District has expanded and diversified its generation assets, developed a comprehensive conservation program, embraced renewable generation, and continues to adjust to changing legislative and regulatory requirements. The following sections describe the key segments of electric utility operations and many of the programs adopted by the District.

### Response to Potential Competition

The District continually responds to changes in the electric industry, is evaluating or re-evaluating initiatives, and continues to position itself for corrective actions that may be needed to address the evolving electricity industry structure. In 2022, much of this activity focused on the development of the Extended Day Ahead Market. As discussed below, distributed solar reached five percent of peak demand in 2014, which by statute allowed the District to re-evaluate how its self-generation rates are structured to accommodate increased prevalence of customer-sited generation in its territory. The District took measures, despite controversy and objections from solar power providers, to reduce the cross-subsidy associated with new customer solar, while continuing net metering and grandfathering without changes to those who installed self-generation under the state-mandated five percent cap. The District's successor tariff has resulted in continued but slowed growth of solar. Since the change, the number of customer solar accounts has increased to 3,633 accounts in 2022.

The Legislature passed AB 117 (Migden) in 2002 to allow cities and counties to provide Community Choice Aggregation within their boundaries. Service territories of Publicly Owned Utilities are exempt from this legislation, so it has not affected the District.

### TID Balancing Authority Area

In order to control transmission costs and to maintain control of its generation and transmission assets, the District, effective December 1, 2005, established a Balancing Authority Area (BAA) separate from the California Independent System Operator (CAISO) BAA. The District has full responsibility for generating, scheduling, balancing, and delivering power to its customers. The District reports that coordination with the CAISO and operations of the BAA are working well. The District does not plan to become a part of the CAISO BAA. The establishment of a BAA has reduced the uncertainty caused by the variability in CAISO policies and rates, and is expected to continue to reduce power supply costs over what they would be with full CAISO participation. The District has created a second power control center as a back-up to its primary center located in central Turlock. The back-up center is available in the event the District has to abandon the existing center in any sort of an emergency. The Trading

and Scheduling area also has a back-up plan and location to continue economic dispatch operations should an emergency require relocation.

The District has entered into separate operating agreements with the CAISO and the Balancing Area of Northern California (BANC) defining how they will operate as interconnected BAAs. BANC is made up of the electric service areas of the Sacramento Municipal Utility District (SMUD), Modesto Irrigation District, The City of Redding, and most of the Western Area Power Administration Sierra Nevada Region. The District has also amended its system Interconnection Agreement (IA) with Pacific Gas and Electric Company (PG&E) in order to address the District's status as a BAA.

As a BAA separate from the CAISO, the District only incurs CAISO Grid Management Charges, Wheeling Access Charges, and other CAISO charges when the District chooses to purchase or sell energy from or to the CAISO. By operating as an independent BAA, the District avoids the uncertainty associated with paying the myriad of fees imposed by the CAISO on customers within the CAISO BAA.

Other major benefits are accruing with operation of the 250 MW WEC located in west Turlock. When this natural gas-fired plant was completed, it doubled the District's in-house generating capacity and at times can provide power in excess of its retail customers' needs. Surpluses are sold pursuant to contracts described in this report or on the open market.

With the completion of the Almond Power Plant's Units 2, 3 and 4 in the summer of 2012, TID acquired an additional resource that serves to bolster the District's ability to match generation to load on a continuous basis. The flexibility of the units has provided the opportunity to sell operating reserves, capacity, and energy to neighboring balancing authorities and utilities when not needed for District use.

## **Customers, Sales, and Peak Demand**

In 2022, the District experienced a slight decrease in sales. The 2022 annual peak demand of 594 MW for TID only and 720 MW for the BAA occurred during September. TID 2022 peak demand was up 5.7 percent from the 2021 peak demand. During 2022, the District experienced an increase in the number of accounts and a slight decrease in electricity sales. Total revenues increased by 25.8 percent. At the end of 2022, the District served 103,984 retail customer accounts. Retail energy sales were 2,165 gigawatt hours (GWh), down slightly by 2.7 percent from 2021. Retail revenues increased 18.3 percent from those realized in 2021 to approximately \$343 million. Selected electric operating statistics are shown in the following table:

Customers, Sales and Peak Demand

	Years			Percent Change	
	2022	2021	2020	2022-2021	2021-2020
Accounts – Year End	103,984	93,916	103,984	10.7%	-9.7%
System Peak Demand – MW	594	562	571	5.7%	-1.6%
Retail Energy Sales – MWh	2,165,286	2,224,430	2,163,507	-2.7%	2.8%
Revenues – \$1,000					
Retail *	\$342,773	\$289,834	\$275,323	18.3%	5.3%
Wholesale Electric	120,579	78,830	47,052	53.0%	67.5%
Wholesale Gas	8,888	5,237	2,005	69.7%	161.2%
Other Electric	577	1,913	4,383	-69.8%	-56.4%
<b>Total</b>	<b>\$472,817</b>	<b>\$375,814</b>	<b>\$328,763</b>	<b>25.8%</b>	<b>14.3%</b>

## Rates and Energy Services

TID uses the Power Supply Adjustment (PSA) to accommodate the changing costs for procuring fuel and energy. The PSA, which was implemented in 2005, will continue to be used as a means of accommodating the unpredictable costs of procuring fuel and energy to meet customer demands and will be reviewed semi-annually and adjusted as necessary. The PSA is designed specifically to fund purchased power costs net of wholesale sales and fuel costs in excess of the amount of such costs recovered in base rates subject to the limitations specified in the District’s policy on the PSA. Similarly, a credit will be provided to retail electric customers if the base rates are in excess of what is needed to pay for such costs. Future adjustments are generally calculated and applied at six-month intervals, the reviews occurring each April and October, with adjustments going into effect in June and December.

The PSA will not add more than 1¢ per kWh to the base rate. Market fluctuations that force the net cost of power and fuel higher than the 1¢ per kWh may be absorbed through transfers from the District’s existing rate stabilization fund. In cases where net power and fuel costs fall below costs recovered in base rates, customers will realize a reduction of up to ½¢ per kWh in their bills and surplus savings may go back into the rate stabilization fund. The PSA began the year at a credit of 0.5¢ per kWh, but due to increases in the natural gas and power costs the PSA moved to a charge of 0.5¢ per kWh for the December control month. The District expects to recalculate the PSA in the spring to determine if change to the PSA is warranted. As power supply costs change, the District expects the PSA rate will change accordingly. The calculation at year-end for the PSA showed a balance due to customers of \$140.9 million. In September 2022, the Board of Directors approved a resolution authorizing transfer of funds from the PSA Balancing Account to the Rate Stabilization Fund to utilize monies to fund expenses resulting from increased power costs. During the 2022 budget process, the Board of Directors approved a resolution authorizing the transfer of funds from the PSA

Balancing Account to the Rate Stabilization Account to utilize monies to fund capital projects. In November 2017, the Board of Directors approved a resolution authorizing transfer of funds from the PSA Balancing Account to Rate Stabilization Account to utilize monies to fund capital projects beginning in 2018 through 2020, reduce the amount of the District's next bond refunding, reduce the District's unfunded pension liability, and reduce the District's unfunded OPEB liability.

In December 2011, the Board of Directors approved a new charge to cover the increasing costs of complying with environmental regulations through an Environmental Charge (EC). The EC became effective February 1, 2012. The EC costs include the cost of the Tuolumne Wind Project, AB 32 Compliance, and future costs to comply with environmental laws, rules and regulations as may be placed upon the District. Some of these costs were formerly collected under the PSA. The EC is set at \$0.0269/kWh.

### **Electric Rates**

In December 2014, the District's Board of Directors approved proposed changes to the District's current rate structures as it faced a projected revenue shortfall in 2015. The District covered this shortfall through an increase in base rates of two percent, and transfers from the Rate Stabilization Fund.

In 2014, the District proposed that rate structures for self-generation customers be changed. As a result of State mandates, solar installations increased dramatically in TID's service area, reaching the five percent California net metering cap in November 2014, enabling the District to restructure its self-generation rates. The new self-generation rates are composed of a customer, demand, and two-block time-of-use energy charges, where generation and consumption are netted monthly within the two time blocks. The self-generation rate schedules covers a portion of the District's full cost of service for self-generation customers with the intent, they will eventually reflect the total cost of service in increments over the next few years rather than all at once. The District feels this is consistent with its recently approved policy on solar neutrality which reads:

*“[the] District shall be neutral as to whether or not customers choose to install solar generation and shall not erect any artificial barriers to the customer's informed decision to install solar generation. TID's policy goal shall be fairness and rate equity between solar and non-solar customers as well as provide quality resources to assist customers interested in solar as an energy option.”*

### **Competitiveness of TID**

The largest utility in the region surrounding the District is PG&E. The District compares favorably with PG&E's electric rates schedules and other utilities in the area, as shown in the following table:

**Electric Rate Comparison (cents/kWh)**

	Residential	Commercial*	Industrial**	Heavy Industrial***
TID	15.59 ¢	14.20 ¢	12.04 ¢	10.08 ¢
PG&E	31.52 ¢	28.90 ¢	19.73 ¢	18.33 ¢
Modesto	18.07 ¢	16.04 ¢	12.24 ¢	10.67 ¢
Merced	17.41 ¢	16.62 ¢	13.60 ¢	10.92 ¢
SMUD	16.88 ¢	16.54 ¢	13.57 ¢	12.57 ¢

\* Represents the average cents/kWh and usage for the CE rate schedule which comprises 99 percent of all Commercial customer revenues.

\*\* Represents the average cents/kWh and usage for the HT/HG rate schedule, which comprises 34 percent of all Industrial customer revenues (the highest among industrial rates).

\*\*\* Represents the average cents/kWh and usage for the BP rate schedule, which comprises 23 percent of all Industrial customer consumption (the largest customers).

The table above compares the average annual usage for a customer in the rate schedule, with an average load profile.

**Public Benefits Programs**

The District’s state mandated Public Benefits Programs are funded by a 2.85 percent public benefits surcharge on the retail energy sales. The Energy Services Division has been established to provide assistance on outreach and to implement and achieve the District’s energy efficiency goals. Current programs include:

- As of December 2022, the District was providing a low-income discount to 4,214 qualifying customers. The CARES program reduces the monthly customer charge of \$17 to \$6, a savings of \$11, and provides a 15 percent discount on the first 800 kWh energy charges.
- The District provides a 50 percent discount on the first 500-kWh energy charges for customers who use additional energy due to life-support equipment or a medical condition.
- The District contracts with a contractor to provide dwelling weatherization for low-income customers. This facilitates more efficient energy use while improving comfort and reducing energy bills.
- Two Energy Efficiency Analysts works with retail customers to provide energy audits.
- One fully functional customer service center is maintained, in addition to the one in the headquarters office, to increase customer service and to further public benefits outreach, particularly the low-income programs.
- Meter Manager has been implemented providing industrial customers with detailed energy usage information. Customers can go on-line to monitor their energy consumption and monitor the impact in energy charges caused by changes in operations.



- **Premier Shade Tree Program:** TID held its annual premier shade tree program that encourages energy efficiency by planting shade trees. TID sold shade trees with planting kits to customers at a discounted rate. Shade trees help to clean the air, provide oxygen and reduce pollution, along with saving energy and money.
- **Energy Education Program:** TID provides a free energy education program for local teachers and students. The program educates the youth by providing lessons that incorporates technology that encourages energy efficiency, conservation and renewable energy. Students receive a free Energy Efficiency Kit, which will help families save energy at home at no cost to the school or families.

### **2022 Public Benefits Summary**

Public Benefits revenue and expenses for 2022 was \$8.7 million. No funds were carried into or out of the fiscal year.

### **AB 2021 Compliance**

California passed AB 2021 in 2007, which requires each local Publicly Owned Utility (POU), on or before June 1, 2007, and by June 1 of every third year thereafter, to identify all potentially achievable cost-effective electricity efficiency savings and to establish annual targets for energy efficiency savings and demand reduction for the next 10-year period. Within 60 days of adopting annual targets, each local Publicly Owned Utility shall report those targets and the basis for establishing those targets to the CEC. In March 2013, the Board of Directors adopted a 10-year plan to promote energy conservation through gains in customer efficiency projects. Subsequently, California passed AB 2227 which changed the timelines established by AB 2021 by making the identification of targets due March 15, 2013 and by March 15 of every fourth year thereafter.

The 2022 target was to conserve 11.2 million kWh's. TID was unable to achieve its program and saved 4.6 million kWh's, through various programs. 73 percent of the non-residential savings is attributed to LED lighting.

In 2022 TID's non-residential lighting projects achieved the majority of these saving at 3.52 million kWh's.

### **Transportation Electrification**

As part of the State of California's goals for transportation electrification, Executive Order B-16-12, B-48-18 and the Clean Energy and Pollution Reduction Act, provides utilities funds to promote transportation electrification.

In October 2018, TID's Board adopted an Electric Vehicle Program. This plan includes strategies for electrifying TID's fleet. A program for employee workplace electric vehicle charging, which shall include a fee for this service. Lastly, a rebate program for customers, which include; Residential electric vehicle rebate, residential and non-residential charger rebate and funds for partnership programs.

In 2022, TID fleet consisted of 1 battery electric vehicle, 5 plug-in hybrid, 3 line trucks with 40' electric buckets and 3 line trucks with 60' electric buckets. TID offered 29

electric vehicle parking spots available to employees throughout the District properties. Currently, 17 employees are actively utilizing those parking spots. TID also issued 301 electric vehicle rebates and 169 electric vehicle chargers.

### **Transmission and Distribution Facilities**

The District owns 379 miles of transmission line, approximately 2,300 miles of distribution line, and 29 substations. The District's electric system is directly interconnected with Hetch Hetchy Water and Power at Oakdale, PG&E at Westley, Modesto Irrigation District at Parker, Western Area Power Administration at Tracy, and Merced Irrigation District at Pioneer. During 2022, the District invested approximately \$13 million in new distribution facilities to serve new customers, replace worn components, and upgrade lines.

In 2016, the District completed installation and setup of specialized software that provides continuous real-time contingency analysis capabilities. Based upon recommendations developed as a result of the 2011 Southwest Blackout and the resultant NERC Reliability Standards, this software models the District's system and predicts the system's response to various internal and external contingencies should those contingencies occur in real-time. Predictive response is based upon real-time telemetry and state estimation capabilities that are part of the software. Additionally, the District has contracted with RC West to receive backup Real Time Contingency Analysis support in order to ensure the District retains robust and ongoing real time analysis capabilities. The result is ongoing increased situational awareness and reliability of the District's transmission system, along with the ability to preempt the effects of various contingencies before they might occur.

In 2018, TID began a multi-year project to repaint 174 230 kV steel poles. TID owns 57 poles and TID and MID jointly own 117 poles. The poles have extensive rust and contamination that requires abrasive blasting and containment prior to painting. \$1,773,000 was spent on painting 38 jointly owned poles in the Spring of 2022. MID will share the cost for that season. In Fall of 2022, \$900,000 was spent on painting 8 TID owned poles. This multi-year project is expected to be complete by the end of 2023.

TID owns approximately 70,000 wood poles. Each year, TID plans to perform intrusive testing of 10% of its wood poles, and to replace or reinforce decayed and damaged poles. In 2022, TID inspected 5,703 poles and 437 poles were in need of replacing or repair, with a rejection rate of about 5%. The total 2022 project expenses were \$1,435,000. During 2022, 147 of the 437 poles that failed and needed to be replaced were replaced.

In the first quarter of 2022, TID completed the reconductor of the Fairground-College-Geer 69 kV Line to increase ampacity of transmission line from ~730 A to ~1100 A. In order to fully utilize the ampacity of the proposed new conductor, substation work at Fairground and Geer was also necessary. This project benefits normal day-to-day operations as the Fairground-College-Geer 69 kV Line is the limiting element for a large number of TID's Operating Nomograms. Addressing this limiting element reduces Must-Run Generation requirements across the full range of system loads. Furthermore, during periods of high system loads along with the assumed unavailability of Don Pedro generation, the Fairground-College-Geer 69 kV Line can exceed its emergency facility

rating following a credible contingency event. This project also resolved these exceedances beyond the 10-year planning horizon.

## **Distribution System Reliability**

The District has continued several programs to control the number and duration of distribution system outages and is using industry measures of reliability to monitor quality of service. Programs include contracting out tree-trimming, replacement of underground cable based on failure trends, prioritizing preventative equipment inspections according to reliability impact, and refinement of data categorization. Throughout 2022, the average customer was without power for approximately 68 minutes. The 2022 frequency of outages averaged less than one outage per customer (0.88). The District continues to use these statistics to help identify distribution system challenges and to refine its emphasis on addressing those challenges.

### **Cable Replacement Project**

The District's ongoing underground cable replacement program continues to systematically replace underground cable with new cable in conduit in order reduce impacts to service and reliability. This is done for cable experiencing multiple failures, or for cable reaching its end of life expectancy. Replacement work is prioritized by emergency needs, support for load growth, and cable life expectancy. This frequently includes placement or replacement of conduit as an added measure of serviceability. In 2022, the District replaced 0.6 miles of underground cable and installed 0.8 miles of conduit.

### **Wildfire Mitigation Plan**

In 2019 in accordance with a new state law, TID prepared a Wildfire Mitigation Plan (WMP). The WMP is an action plan for reducing wildfire risk from TID electric facilities. The plan addresses new state required vegetation clearance and line inspections. TID complies with all legal requirements, and is taking additional steps to harden its electrical system in areas of high fire risk. The WMP addresses installation of equipment and new operational protocols that will reduce the risk of fire ignition from TID facilities and personnel. TID's Board approved the Wildfire Mitigation Plan in November of 2019 and the last update was approved in August 2021. California Senate Bill 901 (SB 901) mandates that local publicly owned electric utilities or electrical cooperatives shall, before January 1, 2020, prepare a WMP. Additionally, publicly owned electric utilities and electrical cooperatives are required to contract with a qualified independent evaluator with experience to assess the comprehensiveness of its WMP every three years. TID had requested Grid Subject Matter Experts ("GridSME") to conduct a review and assessment of their WMP to ensure it meets the requirements outlined in SB 901. GridSME concluded TID's Plan is comprehensive and meets the requirements of PUC §8387. TID will be utilizing an independent evaluator for its 2023 WMP update.

### Microwave System Upgrades

In 2018 the District commissioned an engineering assessment of its microwave communications network, to determine the requirements for continued operations and how to meet the growing demand for additional bandwidth.

The study determined that many of the radio links and associated equipment were approaching obsolescence and suffered from reduced functionality, lack of vendor support and non-availability of spare parts. The system also had limited capability to integrate with modern communication technologies.

The assessment recommended a three-year microwave system upgrade which would focus on replacement of the most critical communication links in Phase I, replacement of less critical and unlicensed links in Phase II, and creating redundancy and resilience and integration of newer technologies in Phase III.

Phase I of the microwave system upgrade was completed in August of 2020, Phase II was completed in December of 2020 and Phase III was completed in December of 2022.

### Existing Generating Facilities

#### Don Pedro Power Plant

The Don Pedro Project consists of a dam, a reservoir, and a powerhouse on the Tuolumne River 3.5 miles upstream of La Grange Dam. The powerhouse generating capacity is 203 MW under normal water conditions. The District's ownership share is 68.46 percent, which equates to approximately 139 MW. Don Pedro is operated and maintained by TID. In 2022 the District's share of energy produced from Don Pedro generation was 153 GWh. Average annual energy production for the District has been 244 GWh over the last 10 years. Turbine/generator inspections are performed yearly and minor cavitation repairs are typically made annually for each unit turbine. Automated generator controls have been added to all units to facilitate BAA operations. The District added an air gap monitoring system upgrade to Unit 3 in 2011 and the other units have also been upgraded. A continuous Partial Discharge (PD) system was fully commissioned in 2012 and staff continues to evaluate the information obtained thereby regarding operation and longevity of the generators. As part of the Don Pedro Upgrade Project, all generating units were thoroughly inspected in 2017 and electrically tested in 2013. An inspection of Generation Units 1-3 was performed while the power tunnel was out of service for the tunnel rehabilitation project. The inspection found that all three Units 1-3 have either cracks or indications in the rotor spider to rim connections. Generation experts from two consultants were brought on board to assist TID in addressing the issues. Unit 2 was concluded to be safe to operate, and was brought back to service. Units 1 and 3 had repairs implemented in 2018.

The District overhauled Unit 4 in 2000/2001, Unit 2 in 2004/2005, and Unit 3 in 2006/2007. The overhaul of Unit 1 completed this overhaul cycle in 2008. In 2011, Unit 4 had modifications performed to its collector ring system to prevent carbon dust build up on the rotor. Unit availability in 2022 was as follows: Unit 1: 76.37 percent, Unit 2: 62.58 percent, Unit 3: 78.30 percent, and Unit 4: 72.73 percent.

In July 2016, the Turbine Shutoff Valve (TSV) that serves the 4<sup>th</sup> branch of the power tunnel manifold which in turn serves the Hollow Jet Flood Control Valve and Unit 4 generator, failed to close under routine maintenance operation and was removed from service while a new valve was procured. The new valve was installed in 2017 and was tested under dynamic flow conditions. The valve successfully closed although damage to the valve was detected. Unit 4 was placed back in service in December of 2019 after the successful installation of a new Butterfly Style TSV. The new TSV was successfully tested with full flow through Unit 4.

In preparation for the Power Tunnel rehabilitation, an inspection was performed on the newly refurbished (2016) Diversion Tunnel equipment. The inspection revealed the bronze thrust nuts on the slide gates had failed. The nuts were replaced with 17-4 stainless steel nuts. The Diversion Tunnel was placed back in service and used exclusively during the Power Tunnel outage. A follow up inspection was performed after the completion of the Power Tunnel outage that revealed no damage.

The Power Tunnel rehabilitation project was completed in 2017. Major components of the work included fabrication and installation of new bulkhead and fixedwheel gates, and a new Unit 4 TSV. The bulkhead and fixedwheel gates were commissioned successfully.

The Don Pedro power house, commissioned in 1971 was built for a 30-40 year life span, and has reached the point where many of the components are obsolete are beyond their service life. In 2013 the District started in earnest on the life extension measures for the systems and components around the Turbine/Generator. This work included the refurbishment of the ancillary components of the powerhouse such as the Power Tunnel, Diversion Tunnel and associated Bulkhead and Fixedwheel Gates and controls. The Districts' also intend on upgrading the Don Pedro Turbines and Generators, and in 2020 completed a robust analysis of various Turbine/Generator combinations. TID and MID Staff worked with Stantec and Ascend Analytics to produce a cost/benefits study with the objective of choosing the optimal capacity combinations. On August 18, 2020, TIOD Staff held a Board Workshop presenting the results of the analysis, which is an uprate of plant capacity from 204.7 MW to 264.3 MW. TID will be getting bid packages in from prospective vendors in May of 2021, with the goal of having the entire Life Extension done by 2026.

Water Year 2022 was below average, approximately 59.3% of average. TID's Don Pedro generation was 153 GWh in 2022 compared with an average (1984-2020) of 354 GWh. The decreased generation was due to the below average hydro conditions. As a result of the below normal conditions and generator unit availability, Don Pedro generation for 2022 was 6.8 percent of retail load compared to roughly 14.0 percent in an average year.

## **Thermal**

### **Walnut Combustion Turbines**

The District owns two gas-fired combustion turbine generating units, each having a capacity of 24.8 MW, as limited by the Air Pollution Control District's (APCD) Permit

to Operate. Located at the District's Walnut Substation, these units were placed in service in 1986 and are used to generate power during peak periods and provide operating reserve, offsetting purchases of more expensive power. These units are available 100 percent of the time (two-unit average) and reduce the need to purchase reserves. The District has upgraded the combustion technology to lower emissions and modified emission controls to comply with September 2007 APCD standards. The units are capable of dual fuel operation and in 2011 are tested bi-annually on natural gas and diesel fuel. The units have been permitted for 877 hours per year. The APCD has implemented new NOx rules which place additional restrictions on these turbines. The new restrictions limit operations, other than those related to "Energy Emergencies," to a maximum of 200 hours per year. Additionally, each hour of operations related to "Energy Emergencies" shall incur a penalty from the APCD.

### **Almond Power Plant**

The Almond Power Plant, a steam-injected combustion turbine power plant, was brought online in 1996 and is owned and operated by the District within its service area west of Ceres.

The District repowered the Almond Power Plant in 2003 with a new LM 6000 turbine-generator, which resulted in a slight increase in capacity to 48.3 MW (net) and an improvement in fuel efficiency. During 2022, this unit generated approximately 81 GWh. The engine received a 25,000 hour major overhaul and hot section replacement in 2012 and was returned to service after several weeks at the GE depot.

### **Almond II Power Plant**

In October 2008, the District Board of Directors approved the addition of three new LM 6000PG units (174 MW) at the Almond site to provide for increased system reliability and generation reserves, to potentially defer the addition of transmission at Ceres, and to defer external transmission investment. The District submitted APCD and CEC preliminary filings in March and April 2009, respectively. On December 15, 2010 the CEC issued its final decision authorizing the license, and construction began on February 28, 2011. Mechanical completion occurred on March 20, 2012 within the estimated budget of \$220 million and the project completed testing and commissioning and entered commercial operation in July 2012. In 2022, Almond II produced 209 GWh.

### **Walnut Energy Center**

The WEC is a 250 MW natural gas-fired, combustion-turbine based, combined-cycle generating plant. Construction was completed in 2006 on an 18-acre site at the western edge of the City of Turlock, within a short distance of the Walnut Substation and the Walnut combustion turbines. The plant includes two 85 MW combustion turbine generators and one steam turbine-generator rated at 100 MW, two heat recovery steam generators, a condenser, cooling towers, a new 3.6-mile-long gas pipeline, and a new 13.8/115 kV switchyard.

The WEC has a tested heat rate at standard atmospheric conditions of 6,735 BTU per kWh LHV (lower heating value). The gross capacity is 257 MW, which, after subtracting parasitic load, results in between 250 and 254 MW delivered to the grid (depending on the delivered natural gas pressure and ambient weather conditions). In 2022, the WEC produced 1,467 GWh.

The WEC was designed to use reclaimed water from the wastewater treatment plant operated by the City of Turlock. The plant was initially operated using groundwater for 17 months while awaiting the availability of reclaimed water. About seven percent of the water used by the plant has been groundwater; it was used when the City's reclaimed supply was not available. Studies indicate that even at maximum possible continuous usage of groundwater over a 50-year period, there would be no significant impact to deep wells and nearly insignificant impact to only one shallow well in the vicinity. A permit for permanent switch to reclaimed water for the plant cooling was received in 2007. TID applied in January 2011 for a license amendment at the CEC to allow increased use of "poor quality" groundwater during times when the City reclaimed water is not available in sufficient quantities. On August 27, 2013, the CEC approved TID's proposed Amendment to increase the maximum annual groundwater usage limit. The reliability of the reclaimed water has improved, since the time this amendment was approved, resulting in a significant reduction in the plant's usage of groundwater.

In 2013, WEC Unit 2, a GE Frame 7EA unit underwent its first major inspection wherein the rotor is removed and major overhaul of bearings and turbine components including replacement of combustion hardware occurs. The inspection went very well and uncovered no major issues. The work was completed on time and slightly over the budgeted amount of \$2,000,000. Also in 2013, WEC Unit 3 underwent its first major inspection wherein the rotor is removed and the steam path is cleaned and inspected, and the steam valves are overhauled. According to the District, all inspections went very well and uncovered no major issues. In 2012, WEC Unit 1 underwent the same. In 2016, WEC had a new, large capacity belt press installed which resulted in higher efficiency of the unit. Many other smaller maintenance efforts and enhancements will occur as is typical for facilities of this type and configuration.

### **Negotiated PG&E Transportation Rate**

After the 2020 Budget was finalized, TID negotiated a revised natural gas transportation rate with PG&E that started in 2020 that runs through 2022. The net effect of the new rate is that it improves the economics of TID's Thermal Fleet as compared to the market, and is projected to increase the amount of thermal generation and reduce market purchases in 2021 and 2022. In December 2022, TID executed a temporary extension of the existing negotiated rates that will terminate months after the effective date of adopted rates for 2023.

## Renewable

### Renewable Hydro

The District also owns and operates the La Grange powerhouse. Completed in 1924, La Grange powerhouse has a total operating capacity of approximately 5.3 MW. Average annual energy production for the last 10 years has been approximately 9 GWh.

The District also owns three hydroelectric generating facilities located on its irrigation canals. The completion dates and operating capacities of these facilities are:

#### Hydroelectric Generating Facilities

Hydro Facility	Completion Date	Capacity
Hickman Power Plant	1979	1.1 MW
Turlock Lake Power Plant	1980	3.3 MW
Dawson Power Plant	1983	5.5 MW

### Tuolumne Wind Project

In November 2008, the District entered into agreements and approved the financing required to acquire a 136.6 MW, 62-wind-turbine-generating facility located near Goldendale, Klickitat County, Washington, along the Columbia River. The project is connected to the Bonneville Power Administration (BPA) transmission system at the Rock Creek Substation and is comprised of 42 Siemens Wind Turbine Generators (WTG) and 20 Repower WTGs. The project achieved commercial operation in May 2009. In 2022, the project produced 374 GWh, with a capacity factor of approximately 31.2 percent. The plant has operated close to expectations. Operating procedures have been developed and refined to maintain close coordination with the Balancing Authority that provides ancillary services to the facility. Wind projects that are connected to BPA's system oftentimes have production that is curtailed due to specific hydrologic conditions that may exist. TID completed the move to the Avangrid Balancing Authority in November 2020. This move will mitigate the TWP exposure to the high wind/high water event curtailments that TWP currently contends with on the BPA system and lower integration costs.

In 2020, curtailments required by BPA continued to be prevalent, especially curtailment requests under the Over Supply Management Protocol (OSMP). TID took steps to move Balancing Services from the BPA Control Area to the Avangrid virtual Control Area, and as such TWP is no longer subject to curtailment requests under the OSMP. On-site operations and maintenance of the project is contracted to EDF Renewable Energy. The 20 RePower/Senvion units O&M service provider has recently filed for bankruptcy and has defaulted on the O&M Services contract in place. TID has a new long term service agreement in place for the 20 Senvion turbines. A 12-year agreement with Siemens for the remaining 42 turbines was executed in 2016.

During 2010 routine monitoring of power transformers (2,200-2,500 KVA) detected an unexplained increase in the production of hydrogen within the main tank of some of the



individual turbine transformers. The OEM worked with a manufacturer to design and produce solid state bushings to address the problem. While there is a high expectation by the OEM as well as TID staff and a third party transformer expert that the new solid-dielectric bushing solution will solve the TWP-specific bushing issues, it is not expected to completely eliminate production of hydrogen in the tank on all units (this remains an industry issue and concern remains unresolved at nearly all wind facilities). TID staff and The ABB Group believe that the industry standard and as yet unsolved issue remains, though the exacerbating problem with the bushings has been solved. TID has procured, installed and tested four power transformers on the worst case Siemens turbines and the results are very positive with no relative hydrogen production in the first year of operation. TID has been replacing 4-5 transformers per year, and expects to complete by 2027.

In 2015, the TWP completed work on installing two split feeders in an effort to allow for better protection of the plant. A spare ~150 MVA 230/34.5 KV transformer for the entire site was purchased and arrived on site in early 2017 and is now in service.

### **TID Solar PV**

In 2009, TID installed a 70.7-kW array of photovoltaic panels atop the newly renovated parking structure. While it will add some additional renewable energy to the District's portfolio and help to offset a small portion of the energy consumption of the District's administration building, the primary purpose of the installation was for demonstration purposes. The system, which includes 378 Sanyo 210n series panels, is expected to generate a total of 132,460 kWh a year for the District. In 2022, generation was 154,615 kWh.

### **Community Solar**

TID is analyzing building a local medium scale solar farm to support an increasing number of customers that have sustainability goals of their own. This project would provide the subscribed customers an alternative to behind-the-meter solar, as well as helping TID in reaching its renewable and carbon free goals. The concept of floating solar is being evaluated in conjunction with the construction of two additional TID Regulating reservoirs. TID is considering paths forward for the development of floating solar as a pilot Community Solar Project.

### **Project Nexus**

The District is partnering with the California Department of Water Resources (DWR) to pursue implementation of the Solar Panel Pilot Study Project, known as Project Nexus, which will install solar panels that will cover and span various sections of its existing irrigation canal system. The Project will determine the feasibility and evaluate the anticipated benefits of the Project including reduced water evaporation, water quality improvements, reduced canal maintenance, and renewable power generation. In April 2022, the District approved the Project's funding agreement.

### Purchased Power

#### SunPower PPA

In 2014, the District conducted a Renewable Energy Request for Proposals (RFP). Pursuant to the RFP, the District received ten proposals from existing projects and 119 from proposed projects (129 in total) from a total of 29 entities.

In November, 2015, TID announced that it had signed a 20-year power purchase agreement (PPA) with SunPower to purchase renewable solar power. Under the agreement, SunPower started construction on a 54 MW (AC) solar photovoltaic power plant at the company's Rosamond Solar site in Kern County. In total, Rosamond Solar may support up to 300 MW of solar power generation for different offtakers. TID began receiving commercial power from the plant in February of 2017. TID anticipates the plant to generate approximately 155,000 MWh a year. TID estimates the PPA will move the District approximately seven percent closer to meeting the recently increased RPS requirement of 60 percent renewables by 2030.

#### Biomass PPA

SB859 was approved by the California Governor on September 14, 2016 which, among other things, requires local publicly owned electric utilities serving more than 100,000 customers to procure its proportionate share, based on the ratio of the utility's peak demand to the total statewide peak demand, of 125 megawatts of cumulative rated capacity from existing bioenergy projects that commenced operations prior to June 1, 2013. The PPAs must have a term of at least five years. Furthermore, at least 80 percent of the feedstock, on an annual basis, shall be a byproduct of sustainable forestry management, which includes removal of dead and dying trees from Tier 1 and Tier 2 high hazard zones and is not from lands that have been clear cut, and at least 60 percent of this feedstock shall be from Tier 1 and Tier 2 high hazard zones. TID's proportionate share is 1.3 MW. To meet its requirement under SB859, TID jointly executed with the other POU's covered by SB859 an 18 MW five-year power purchase agreement to procure power from the ARP-Loyalton Cogen LLC ("ARP PPA"). TID's proportionate share of the ARP PPA is 0.8 MW. Deliveries under the ARP PPA began on April 20, 2018. To fulfill its remaining obligation under SB859, in March 2020 TID jointly executed with the other POU's covered by SB859 an 11 MW five-year purchase agreement from Roseburg Forest Products Company ("Roseburg PA"). TID's proportionate share of the Roseburg PA is 0.5 MW. Deliveries under the Roseburg PA began in February 2021.

On December 31, 2019, TID received notice from US Bank, Loyalton's letter of credit provider, that they have elected not to renew the letter of credit that will expire on April 5, 2020. SCPPA on behalf of all the PPA participants contacted Loyalton to discuss a replacement letter of credit. On February 18, 2020 Loyalton filed for Chapter 11 bankruptcy. TID and the other participants have not received power under the PPA since February 2020. On March 26, 2020 TID and other participants drew the full amount of the letter of credit from US Bank (funds were received on April 2, 2020). On March 18, 2020, the case was converted to a Chapter 7 bankruptcy filing. On May 7,

2020, the plant was sold to another entity. TID as well as the other participants filed a Proof of Claim on July 30, 2020. TID and the other participants have been monitoring the bankruptcy proceeding and has been in regular contact with the bankruptcy Trustee. The term of the ARP PPA ends in April 2023.

### **City and County of San Francisco (CCSF)**

CCSF generates power at its Hetch Hetchy Water and Power Project located in the upper Tuolumne River basin. CCSF is obligated to provide TID a portion of the energy generated from the Hetch Hetchy Project that is not needed to supply CCSF firm load. Due to changing availability and cost of this energy, the District purchased 0 GWh of energy in 2022 from CCSF.

### **Northern California Power Agency (NCPA)**

The District has purchased from several members of NCPA, on a take-or-pay basis, participation shares equal to 6.33 percent (6.4 MW in 2014) of the capacity and associated energy from NCPA's Geothermal Plants No. 1 and No. 2. As steam supply changes, the District expects its share of available capacity and energy to change from approximately 44.6 GWh in 2023 to 36.4 GWh in 2035. The participation shares run for the life of the plant.

During 2011, the District elected to withdraw from the NCPA effective April 1, 2011. The District retained its share of the NCPA Geothermal Project and continues to participate in the Facilities Committee that oversees geothermal expenditures.

### **Western Area Power Administration**

The District purchased 5.1 MW of firm Central Valley Project (CVP) power from Western through December 31, 2004, including 2 MW assigned to the District by the Patterson Irrigation District (PID) as of December 8, 2003. A new Base Resource Contract became effective on January 1, 2005, between Western and the District, allocating to the District 0.27342 percent of Western's available capacity and energy from January 2005 through December 2024. In addition, the District has taken assignment of PID's Base Resource Contract allocation of 0.1328 percent, which is used to offset TID's obligation to serve PID's electric load. Beginning January 1, 2015 TID's allocation increased to 0.3348 percent. In 2022, the District received approximately 4 GWh under this contract.

### **Small Hydroelectric Power Development**

In addition to the small hydroelectric projects within its service area, the District operates five small hydroelectric power plants outside of its service area with an aggregate installed capacity of 12.9 MW. Located in and owned by the neighboring Merced Irrigation District, and the South San Joaquin Irrigation District, the power from these five power plants is sold into the CAISO market and delivered to TID. In 2022, these projects generated 10 GWh and were sold to a third party and not delivered to TID.

### **Northwest Power Pool**

In order to better manage reserve requirements, the District has joined the Northwest Power Pool (NWPP). Participation in the NWPP Reserve Sharing Group (RSG) has reduced the District's reserve requirements by between 30 MW and 70 MW, depending on the real-time rating of and schedules on TID's share of the COTP. During 2008, TID put in place the necessary contractual arrangements to implement reserve sharing with other members of the NWPP and trained the real-time operators and schedulers. TID began active participation in the reserve sharing group March 9, 2009. BANC also joined the RSG in 2009, which increases the benefit of the RSG to TID. TID will be able to share reserves with BANC even when there are transmission limitations on the transmission link to the Northwest.

### **Transmission and Interconnection**

TID has transmission interconnection operating agreements with its two neighboring Balancing Authorities, the CAISO and BANC. TID has interconnection agreements with and direct access to Modesto Irrigation District, Merced Irrigation District, Western Area Power Administration, City and County of San Francisco, and PG&E.

Through its ownership interest in the COTP, TID can also transact directly with other owners of the project, as well as Northwest organizations that have transmission rights to the California-Oregon border, including (but not limited to) Bonneville Power Administration, Portland General Electric, Sierra Pacific Corp., Seattle City Light, PowerEx, and PacifiCorp. In 2008, TID negotiated to increase its share of the COTP scheduling rights by purchasing a share of the City of Vernon's rights (17 MW, effective April 9, 2009) and acquiring, via short-term layoff agreements, an additional 40 MW (15 MW from Roseville effective July 1, 2008 and 25 MW from the City of Palo Alto effective August 1, 2008). The short-term layoffs have been converted to a 15-year layoff agreement of 36 MW beginning February 1, 2009. The increased transmission capability provides greater access to non-CAISO markets, including wind resources, and further insulates TID from CAISO tariff changes.

TID acquired an additional 37 MW of COTP transmission rights through a long-term layoff agreement with Silicon Valley Power and NCPA members. The layoff is in place as of July 1, 2014 and will remain in place for 25 years.

## **Power Sales**

### **Merced Irrigation District (MeID)**

The District negotiated a ten-year Power Sale Agreement with Merced that began May 1, 2017. The agreement calls for TID to provide all the energy requirements for MeID load within the TID BAA with the exception of power delivered under MeID's agreement with WAPA. Merced is also permitted to participate with Foster Farms to build a generating facility. Energy sold to Merced under this Power Sale Agreement is priced based on the appropriate NP-15 day ahead hourly index plus an adder or based on actual costs if purchased from the CAISO. Merced is responsible for any renewable

energy and capacity requirements. Either District has the right to terminate the agreement effective May 2021 with two years notice.

Merced and TID have also negotiated an interconnection agreement that includes cost based rates for transmission and ancillary services analogous to the standard Open Access Transmission Tariff promulgated by the FERC.

## **Historic Power Supply Summary**

The District relies on three categories of power supply: District-owned generation, long term purchases, and the -short-term market. In 2022, energy produced from District owned- generation and outside small hydros was 2,309 GWh, up 6.3 percent from the previous year. Purchases of long-term power amounted to 207 GWh, up 11.5 percent from the previous year. Short-term market purchases were down 21 percent from the previous year. Hydrologic conditions led to the percentage of retail load supplied by Don Pedro generation being roughly 6.8 percent in 2022 versus roughly 19 percent in an average hydrologic year.

Selected power supply statistics are shown in the following table:

## 2022 ANNUAL OPERATIONS REVIEW

### Selected Power Supply Statistics

Resources (MWh)	Years			Percent Change	
	2022	2021	2020	2022-2021	2021-2020
<b>District-Owned:</b>					
Hydro					
Don Pedro	153,252	174,264	224,607	-12.1%	-22.4%
Thermal					
Walnut Energy Center	1,466,996	1,163,355	1,253,066	26.1%	-7.2%
Almond	80,690	123,937	65,821	-34.9%	88.3%
Almond 2	209,377	285,342	181,658	-26.6%	57.1%
Walnut Gas Turbine	(76)	302	(21)	-125.2%	-1538.1%
Renewable					
La Grange	5,982	7,345	13,643	-18.6%	-46.2%
Small Hydro	18,864	15,543	20,845	21.4%	-25.4%
Tuolumne Wind Project	374,110	401,250	422,364	-6.8%	-5.0%
TID Solar	129	125	124	3.2%	0.8%
<b>Total District Owned</b>	<b>2,309,324</b>	<b>2,171,463</b>	<b>2,182,107</b>	<b>6.3%</b>	<b>-0.5%</b>
<b>Long-Term Purchased Power:</b>					
Biomass PPA	0	0	4	0.0%	-100.0%
CCSF	0	0	0	0.0%	0.0%
NCPA	48,413	49,674	46,765	-2.5%	6.2%
PRC	0	0	0	0.0%	0.0%
Solar PPA	154,615	126,569	124,502	22.2%	1.7%
Western	3,724	9,112	18,727	-59.1%	-51.3%
<b>Total Long-Term</b>	<b>206,752</b>	<b>185,355</b>	<b>189,998</b>	<b>11.5%</b>	<b>-2.4%</b>
<b>Short-Term Market Purchases</b>	<b>962,837</b>	<b>1,219,403</b>	<b>1,054,996</b>	<b>-21.0%</b>	<b>15.6%</b>
<b>Total Purchases</b>	<b>1,169,589</b>	<b>1,404,758</b>	<b>1,244,994</b>	<b>-16.7%</b>	<b>12.8%</b>
<b>Total Supplied</b>	<b>3,478,913</b>	<b>3,576,221</b>	<b>3,427,101</b>	<b>-2.7%</b>	<b>4.4%</b>
<b>Less: Power Sales and Wholesale Adjustments</b>	<b>1,098,092</b>	<b>1,124,759</b>	<b>1,307,447</b>	<b>-2.4%</b>	<b>-14.0%</b>
<b>Total Energy Delivered to System</b>	<b>2,380,821</b>	<b>2,451,462</b>	<b>2,119,654</b>	<b>-2.9%</b>	<b>15.7%</b>
<b>Less: District Losses</b>	<b>74,722</b>	<b>88,909</b>	<b>76,811</b>	<b>-16.0%</b>	<b>15.8%</b>
<b>Less: Interdepartmental Sales</b>	<b>53,557</b>	<b>49,925</b>	<b>48,470</b>	<b>7.3%</b>	<b>3.0%</b>
<b>Total Energy Delivered at Retail</b>	<b>2,252,542</b>	<b>2,312,628</b>	<b>1,994,373</b>	<b>-2.6%</b>	<b>16.0%</b>

## NERC Compliance

In 2007, the North American Electric Reliability Corporation (NERC) promulgated new electric reliability standards that continue to be monitored and enforced by a number of Regional Reliability Organizations (RRO). For TID, the RRO is the Western Electricity Coordinating Council (WECC). The standards are intended to enhance the reliability of North America's bulk power system by establishing enforceable requirements for power system planning, generation, coordination, notification, operation, and various other related electric utility activities. The District developed an Internal Compliance Program with the goal of ensuring the District's compliance with the mandatory electric reliability standards, with Department Managers and subject matter experts managing affected areas such as electric operations, system planning, generation, critical infrastructure protection, scheduling, and more. The Standards continuously evolve and the District regularly participates in ongoing compliance-awareness activities to ensure that it remains at the forefront of readiness. In April of 2020, the WECC conducted its latest triennial compliance audit of TID on behalf of NERC, which resulted in a very successful "no findings of non-compliance". As demonstrated by that successful audit, the District continues to employ its robust Internal Compliance Program and continues to promote a dedicated culture of compliance.

In 2013, the District hired its first cyber-security analyst followed by a second analyst hired in 2015. With a third cyber-security analyst added in 2016 and a fourth in 2018, the District remains committed to maintaining robust and trend-setting compliance with all of the highly visible Critical Infrastructure Protection standards.

## Wholesale Power and Natural Gas Activities

In the period 2020 through 2022, the District's wholesale power sales averaged 1,177 GWh, approximately 53.8 percent of the average total energy delivered at retail. Since initial operation of the WEC, the District has had substantial surplus energy resources at non-peak times. The addition of the Almond II power plant in July 2012 further enhances the District's opportunity to make wholesale sales of capacity, ancillary services, and energy. In 2022, the District sold 1,098 GWh of energy in the wholesale market and some capacity and ancillary services as well. The energy sold constituted 32.8 percent of total power generated and purchased by the District.

In order to manage the risk of the short- and intermediate-term surpluses, the District extended its contract with the MeID (see above). The District actively markets anticipated surplus power and capacity in the wholesale market when its resources are not required to supply the District's customers.

Since it operates several natural gas-fired power plants, the District actively purchases and sells natural gas in the wholesale markets. In order to manage its fuel supply and price risk, the District has entered into fuel management agreements and several industry standard natural gas purchase and sale agreements. The District also has enabling agreements so it has the ability to hedge its natural gas price risk through financial hedges. The District also has ownership interest in natural gas production

facilities in Pinedale, Wyoming and in the Barnett Shale fields in West Texas that can provide approximately 7 percent of the gas consumed to serve retail load.

### Renewable Portfolio Standard

Established in 2002 under Senate Bill (SB) 1078, accelerated in 2006 under SB 107 and expanded in 2011 under SB 2, California's Renewables Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country. The RPS program requires IOUs, electric service providers, community choice aggregators, and POU's to gradually increase procurement from eligible renewable energy by 2020. In 2015, a new RPS bill, SB350, was passed increasing the RPS target to 50 percent by 2030. In 2018, SB100 was passed further increasing the RPS target to 60 percent by 2030 and a statewide planning goal of 100 percent zero carbon resources by December 31, 2045. In 2022, TID fully complied with renewable energy requirements by using generation from its current renewable resources and through the use of prior years' qualifying energy and credits. Renewable energy credits above the interim requirements can be carried forward enabling the District to meet requirements through 2022-2024 depending on the performance of the TWP units, the District's other eligible renewable resources, and actual retail load. Although energy produced by Don Pedro is renewable, large hydroelectric power plants are not considered eligible renewable resources by the CEC and as such do not contribute to meeting TID's RPS requirement but is a zero carbon resource. TID has reviewed a Request For Proposal (RFP) for the next layer of renewable procurement, and, due to a variety of market factors including supply chain issues and market demand, did not award a contract and instead entered into agreements for short term renewable purchases in 2022. Staff anticipates issuing another RFP in the 2023-2024 time frame.

### Climate Change

In 2006, the California legislature passed and Governor Schwarzenegger signed Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006, which set the 2020 GHG emissions reduction goal into law. The subsequent Scoping Plan and its updates adopted by the California Air Resources Board (CARB) adopted several important measures to reduce GHG emissions in the state, most notably for the District, CARB adopted a regulation that establishes a market-based system of tradable emission allowances as a function of declining annual aggregate emission limits for sources or categories of sources that emit GHG emissions, applicable from January 1, 2012, to December 31, 2020. SB 32 was passed in 2016 that established a goal to reduce CA statewide emissions to at least 40 percent below 1990 levels by December 31, 2030. Subsequent to the passing of SB 32, AB 398 was passed which extended the role of the current cap and trade program until December 31, 2030. CARB has adopted a new Scoping Plan and is in the process of developing related regulations for the 2021 to 2030 period to implement the goal established by SB 32 and extension of the current cap and trade program as provided for in AB 398.

Beginning in 2012, GHG allowances were distributed and an auction mechanism was established as a means to monetize those allowances and to purchase additional



allowances if needed. The District participates in the auctions to acquire allowances to support wholesale sales. The District's resource plans reflect likely regulatory scenarios and the expectation that the District may need to purchase some allowances as the number of allowances allocated to it decreases. However, at this time the District reports that it does not foresee any issues to comply with its GHG requirements nor will it incur significant compliance costs through 2024.

The time consuming process of reporting GHG emissions to the CARB, and complying with regulations continues. The District expects the CARB to refine its policies, practices, and regulations, however it anticipates continued uncertainty as to the cap and trade market and surrounding regulatory environment.

### **Assembly Bill 2514**

Assembly Bill 2514 (AB 2514) is a California state law that requires POU's to determine if it is appropriate to establish procurement targets for energy storage based on a determination of viability and cost effectiveness. To comply with AB 2514, the District prepared a report submitted to the CEC in September 2014 that assessed and modeled scenarios involving the addition of various energy storage technologies, namely lithium ion batteries, flywheels and thermal storage systems. The study concluded that the benefits of deploying storage systems on the District's system did not exceed the capital costs of the various systems currently and that the District should not adopt procurement targets at this time. However the District stated that it believes energy storage could eventually become cost-effective in the future and that it intends to re-evaluate the efficacy of energy storage on its system periodically. An updated study was presented to the TID Board and submitted to the CEC in September 2017. Although the updated study identified certain storage applications to be cost effective, it was noted that certain assumptions used in the study may change in the near future that could affect the results of the study and that storage costs are projected to decline substantially in the near future. Due to the noted items, the District did not adopt energy storage at this time but plans to continually evaluate energy storage systems in the future.

### **Senate Bill 350**

Senate Bill 350 (SB 350) became law on October 7, 2015 which among other things requires the governing board of POU's, with an annual electric demand exceeding 700 GWh of load, determined on a three-year average as of 2013, to adopt an integrated resource plan (IRP) by January 1, 2019 and a process for updating the plan at least once every five years. The plan needs to ensure 1) that the utility achieves the GHG emissions reduction targets established by the CARB, 2) ensure procurement of at least 50% renewable resources by 2030, 3) just and reasonable rates, 4) minimize impact on ratepayer bills, 5) system and local reliability, 6) the diversity, sustainability, and resilience of the bulk transmission and distribution systems, and local communities, 7) enhancement of the distribution systems and demand-side energy management, and 8) minimize local air pollutants and greenhouse gas emissions, with early priority on disadvantage communities. Furthermore, the plan must address the following: 1) energy efficiency and demand response requirements pursuant to Section 9615 of the CA PUC, 2) the energy storage mandates pursuant to Chapter 7.7 of the CA PUC, 3)

transportation electrification, 4) the diversity of the utility’s procurement portfolio, and the 5) resource adequacy requirements pursuant to Section 9620 of the CA PUC. SB 350 also requires the POU to submit the adopted IRP to the CEC for review to ensure it meets the requirements of the SB 350. As provided for in SB 350 the CEC adopted guidelines to govern the submission of the IRP. On December 4, 2018 the TID Board adopted an IRP for the period 2018-2030 that addresses all the requirements described above which was submitted to the CEC on April 25, 2019 in compliance with the CEC guidelines. On December 11, 2019, the CEC Commission approved the CEC Executive Director’s determination that TID’s IRP was determined to be consistent with the requirements of SB 350.

### **Energy Imbalance Market**

TID has fully implemented the software, processes, and training required to enable participation in the Western Energy Imbalance Market (EIM), which went live for TID on March 25, 2021. The EIM enables TID to automate transactions in the intra-hour energy imbalance market that currently includes over 75% of the Western Interconnection. Previously, a Board workshop was held on (or about) January 17, 2017, regarding the market. Preliminary analyses indicated that annual savings could be on the order of \$1 million, with start-up costs less than \$2 million. It was concluded that TID should refine the estimate of projected production cost benefits, review in greater detail the investments and other costs related to participating in the market, look for opportunities to coordinate with other entities to lower costs and put TID in a position where it could be prepared to join the EIM as early as 2020. TID Staff updated the 2017 analysis, which shows estimated benefits of around \$2.2 million annually, with an estimated cost of \$5 million. A board workshop was conducted on March 19, 2019. On March 26, 2019, the Board adopted Resolution 2019-12, authorizing the execution of Agreements and the appointment of a Project Manager necessary for preparing the District for participation in the EIM. The actual cost of the TID EIM implementation project was approximately \$5.7 million. The actual EIM benefit realized by TID in 2022 was approximately \$10.8 million.

## **Other Issues**

### **Strategic Plan**

In 2015, TID prepared a Strategic Plan that, among other things, defined a vision of core values to guide the organization going forward. The Plan also detailed the results of a ‘SWOT’ analysis (i.e. strengths, weaknesses, opportunities and threats) and established five separate operating strategies in the areas of water and electric supply and distribution, finance and rates, workforce, customer service and government/community relations. In 2019, TID staff held a strategic planning workshop with the Board to facilitate a new strategic plan. Subsequent to this workshop, staff has developed a draft 2020-2025 strategic plan, which was presented to and adopted by the Board of Directors on September 1, 2020.

## **Debt Ratings**

There were no bond issues or refundings in 2022. At December 31, 2022, the District's bond ratings were A2 from Moody's, AA- from Fitch and AA- from Standard & Poor's.

## **Debt Policy**

In February 2018, the District formalized and adopted its Debt Policy. The purpose of the Policy is to identify debt policy objectives, improve the quality of decision-making processes, provide a basis for the determination of the appropriate debt structures and to demonstrate a commitment to best practices in debt management planning and execution. The District is required to have an adopted debt policy under California law, SB 1029.

## **Staffing**

As is the case with many electric utilities, the District must plan for maintaining and expanding its electric system operations and maintenance workforce. Many in the current workforce are approaching retirement and the competition for trained workers is challenging. To meet the challenge, the District monitors employee status and has recruited qualified candidates into both professional positions and the District's apprentice program.

## **Risk Management**

In late 2001, the Board adopted a risk management policy that defines internal policies and procedures for monitoring and controlling the exposure to the volatility of the wholesale power and natural gas markets. This policy has been implemented and has helped the District manage its exposure to the volatility of the wholesale power and natural gas markets. The policy sets limits on the volume of purchases that can be exposed to market forces during the upcoming twelve-month period, and also establishes a Value at Risk limit which further limits TID's exposure to market forces. The District continues to review this policy for necessary improvements.

Each month, the District updates its monthly operating plan to supply anticipated firm commitments (including native load) for the balance of the current year and the next calendar year. In doing so, the District continually makes purchases or sales as necessary to stay within the bounds of its Risk Policy. In December 2022 the natural gas markets in California saw dramatic increases in natural gas prices that caused large swings in prices from day to day. Staff and the Board worked together for the District remain in compliance with its Risk Policy and Procedures throughout 2022. The requirements to hedge purchases of gas and power, under those procedures reduced the effect of volatility in the gas and power prices on TID.

TID has always recognized that locking in future costs can be disadvantageous in a declining market but advantageous in a rising market and results in a more stable cost in the long run. The District continues to investigate the advantages of longer-term gas arrangements in order to provide more cost certainty and to continue to employ a variety

of hedging tools, such as the purchase of options, in order to mitigate the effects of wide market changes.

Additionally, the District has, in conjunction with certain members of the Southern California Public Power Authority, acquired a share of natural gas leases and production facilities in Wyoming and Texas to help manage the cost of natural gas supply. Gas is sold in the markets where it is produced and revenues are used as a hedge against gas purchased for District power plants. Some of these leases also produce oil and natural gas liquids, which has allowed the District to benefit from the high prices for such fuels. In addition to the gas coming from the natural gas leases, the District regularly hedges its anticipated natural gas requirements through purchases in the wholesale markets. At the beginning of the year in 2022, the District was hedged about 81 percent of the total power supply requirements including gas supply requirements for generation to serve the District's retail load for the ensuing year. At the end of 2022, the District was hedged about 72 percent for the ensuing 12 months.

TID also uses gas storage to manage its fuel costs. TID has long-term rights to store up to 200,000 MMBtu and to call on that gas when daily market prices warranted. Usually, gas is put into storage in the low demand months of April and May and then taken out of storage in the winter. However, the storage is also helpful when there are limitations in the gas transportation system; at those times the storage can be used to balance the daily gas needs of the generation.

## Cyber Security

Compliance standards and cybersecurity best practices are approaches that TID utilizes to reduce and prevent cybersecurity threats. Automated security patch management programs are in place to keep operating systems and software applications up to date. These updates are completed on a monthly basis and monitored to ensure successful deployment.

TID's registered function as part of the electric grid mandates adherence to North American Electric Reliability Corporation (NERC) standards. NERC Critical Infrastructure Protection (CIP) standards are sets of baseline requirements meant to ensure appropriate measures are in place to protect the bulk electric system.

TID also maintains compliance to the Payment Card Industry (PCI) standard to protect customer payment information.

TID cybersecurity team regularly meet to discuss security threats and risks to the District. TID's Cybersecurity team also monitors upcoming new compliance standards and changes to existing standards.

Utilities across the country are becoming increasingly concerned about the vulnerability of their infrastructure to cyber-related threats. The District further reports that during 2022 there were no significantly adverse effects from cyber-related attacks.

## **Enterprise Risk Management**

In an effort to effectively manage risk TID has an integrated enterprise risk management program. The program incorporates a consistent approach to risk management into the culture and strategic planning processes of the District that supports decision making and resource allocation. The program is designed to identify, assess, and monitor risks in a variety of categories that impact the District's mission, including strategic, financial, operational, legislative, regulatory and reputational risk.

## **Emergency Preparedness**

TID created an Emergency Preparedness Department to provide a comprehensive and integrated emergency management culture that coordinates District resources and creates partnerships with public and private agencies to protect lives, property and the environment through preparedness, protection, response, mitigation and recovery. This department's responsibilities include drafting, updating, training and exercising Emergency Operations Plans (EOPs) and Incident Action Plans (IAPs) in order to respond to emergencies.

TID follows the National Incident Management System (NIMS), the California Standardized Emergency Management System (SEMS). The District uses an adapted Incident Command System (ICS) for all incident activations. The ICS system provides standardization and is quickly scalable to meet the changing needs of the incident.

TID was able to successfully respond to and mitigate the impacts of a wildfire in the Del Puerto Canyon in August of 2020, because of its resilient Emergency Management Program and its Wild Fire Mitigation Program (noted under Distribution Reliability section). We were fully restored within 2 weeks.

## **Long Term Financial Plan**

In 2019 the District deployed a long-term financial model to provide insight into the business decisions and choices the District will face in the next twenty years. The model allows for scenario development and illustrates the financial repercussions of various financial decisions on the health of the District in the long-term. This information is invaluable in determining appropriate capital plans, resource allocation, debt and treasury levels.

## **Customer to Meter (C2M)**

In 2020 the District went live with the replacement to its legacy utility billing software program, marking the culmination of a multi-year, cross organization effort. The new software includes a state of the art Oracle Customer Information System, Meter Data Management, and other modules that are collectively called the C2M project. This project will act as the foundation for future customer focused technology enhancements such as Customer Self Service.

### Sustainability Plan

In September 2022 the District approved a Sustainability Plan that will serve as the District's guiding document, outlining its vision for the next 15 years as the District continues to implement practices that best serve its customers and the environment. The Plan is guided by an overall philosophy focused on strong themes of stewardship, affordability and reliability, and the Plan will be updated over time to be current with legislative and regulatory goals and policies mandated by the state and federal governments.

### Findings and Conclusions

On March 16, 2023, Leidos conducted its annual interviews with the District, wherein current and future operations were discussed with District staff and managers. Based on our observations, our inquiries about the systems, and certain information about the systems provided to us by the District, we believe that the observations, the responses to inquiries, and the information to be reliable. Furthermore, we believe the use of such information is reasonable for the purposes of this report.

We find both the District's irrigation and power system facilities are capable of meeting current demand. We find that the District is responding to irrigation issues by managing their storage and delivery systems to provide customers with reliable service, and by monitoring and participating, as necessary, within the regulatory environment to assure compliance with a complex array of laws, ordinances, regulations, and standards. We find that the District is responding to continuing changes in the electric industry by broadening its services; by planning for new conventional and renewable generation; making use of improved technologies; addressing issues stemming from customer-sited solar and structuring its operations to enhance efficiency and reliability. The District has enhanced its public benefits programs and retained its competitive position in its retail supply of electricity. From our review of the District's operations contained herein, we are of the opinion that the District maintains and operates the irrigation and electric systems consistent with prudent utility practices. Financial planning should continue to recognize market price volatility and uncertainties with respect to laws and regulations to limit GHG emissions, to conserve water and electricity, and to manage short- and long-term debt. In the near term, the District will need to address the ongoing impacts of varying rainfall and the resultant impacts on the net purchase/sale of power supply. Additionally, increased competition from third party solar providers should be monitored. The District should continue to set retail electric rates to recover electricity costs and not rely on wholesale spot sales activities to support the core retail electricity business. We recommend that the District continue to maintain its operations and maintenance programs in accordance with sound engineering principles and to clearly define internal strategies and to apply sound risk management to hedge against net revenue volatility during that period when the District's plants and contracts together are producing surplus energy and capacity.