

# Staff Report

**TO:** Board of Directors  
**FROM:** Keane Sommers, P.E., Director of Power Systems  
**DATE:** December 13, 2023  
**SUBJECT:** Hydroelectric Department Financial Overview

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## *HYDROELECTRIC*

### **RECOMMENDATION:**

Receive an informational presentation and conduct a workshop on the finances of the Hydroelectric Department.

### **BACKGROUND:**

Staff will present an overview of the financial history of the Hydroelectric Department. The presentation will provide a brief description of historic finances, a summary of revenue/expenditures by powerhouse, an overview of a model quantifying the subsidy the Hydroelectric Department provides to water rate payers, and a discussion the future of the Department.

### **BUDGETARY IMPACT:**

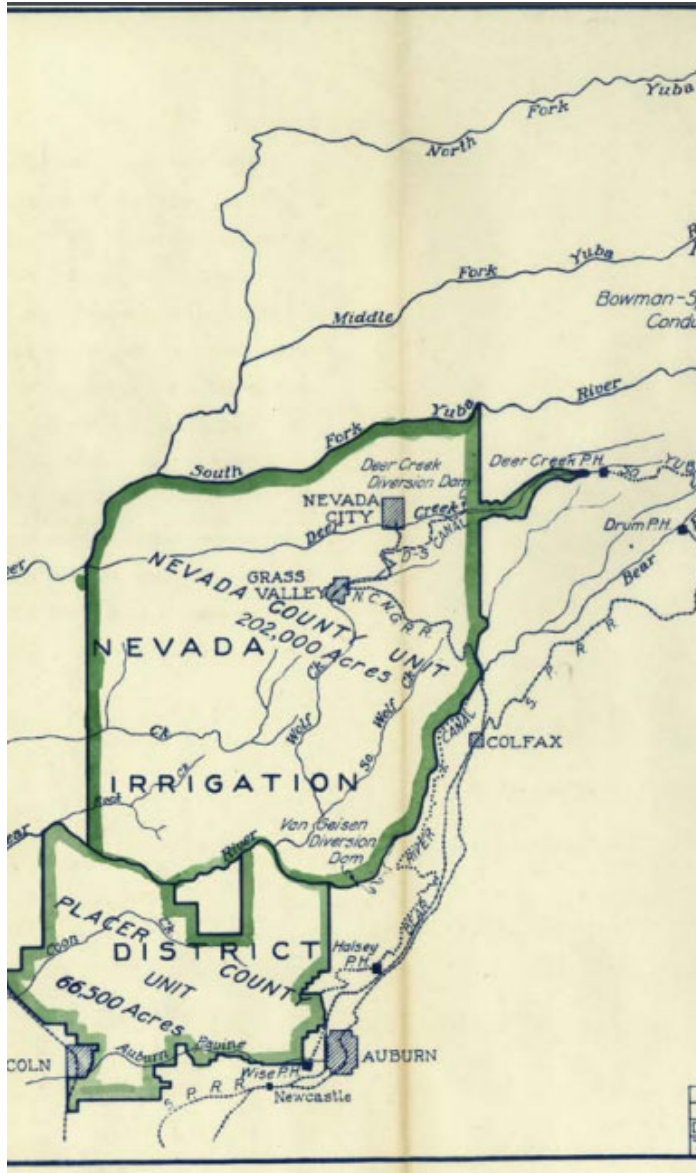
There is no budgetary impact associated with this item.

### Attachments (3)

- Presentation
- Annotated Presentation
- Powerhouse Expense Summary Tables

# Hydroelectric Financial Workshop

DECEMBER 13, 2023





# Outline

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## Part 1 – Financials by the Year

- 1982 to 2012
- 2014 to 2022
- Transfers Out – Water / Recreation

## Part 2 – Financials by Powerhouse

## Part 3 – Water Delivery Related Expenses

## Part 4 – The Future

- Key Risks
- Future Consideration
- Recommendations

# Department Overview

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30 Full Time Staff in 2024

## Dams

13 FERC jurisdictional dams

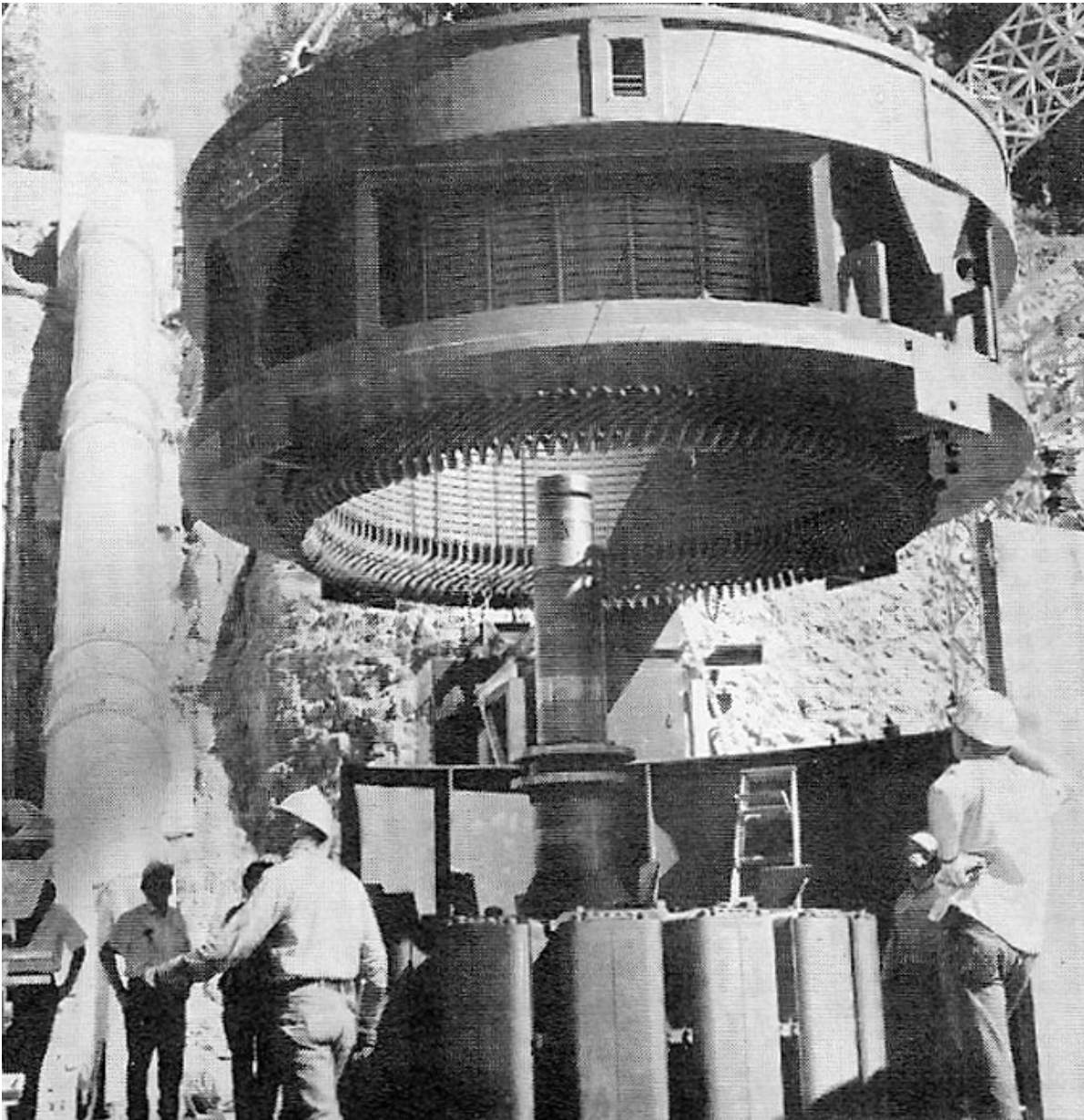
## Water Conveyances

5 Major Conveyances, 8 Diversions

## Power Transmission Line

9.0 miles

Facility	Nameplate Capacity (MW)	2018-2022 Year Historic Average Annual Output (MWh)	Year Constructed
Chicago Park	39	104,203	1965
Dutch Flat #2	24.57	47,417	1965
Rollins	12.15	54,732	1980
Deer Creek	5.5	18,548	1908
Bowman	3.6	10,262	1986
Combie South	1.5	4,458	1984
Scotts Flat	0.85	4,701	1984
Combie North	0.522	1,526	2010
<b>Total</b>	<b>87.692</b>	<b>245,847</b>	



## Part 1: Financials by the Year

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Financial History

Historic Revenue and  
Expenses

# Historic Revenue Structure

## Yuba-Bear Project

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Electricity produced by the Yuba-Bear Project was sold to PG&E for:

- Debt service on bonds
- Costs associated with maintenance and operation of the projects
- Ended July 1, 2013

In addition to the above:

Rollins

- Four mills per kilowatt hour minimum (1 mill per kilowatt hour (kWh) equals 1 dollar per megawatt hour (MWh))
- Fluctuated with rates for qualifying facilities appointed by the CPUC
- Revenue was provided to water fund
- Ended July 1, 2013

Bowman

- Since 1987 Standard Offer Power Purchase Agreement
- Revenue was provided to water fund
- Ended December 31, 2016

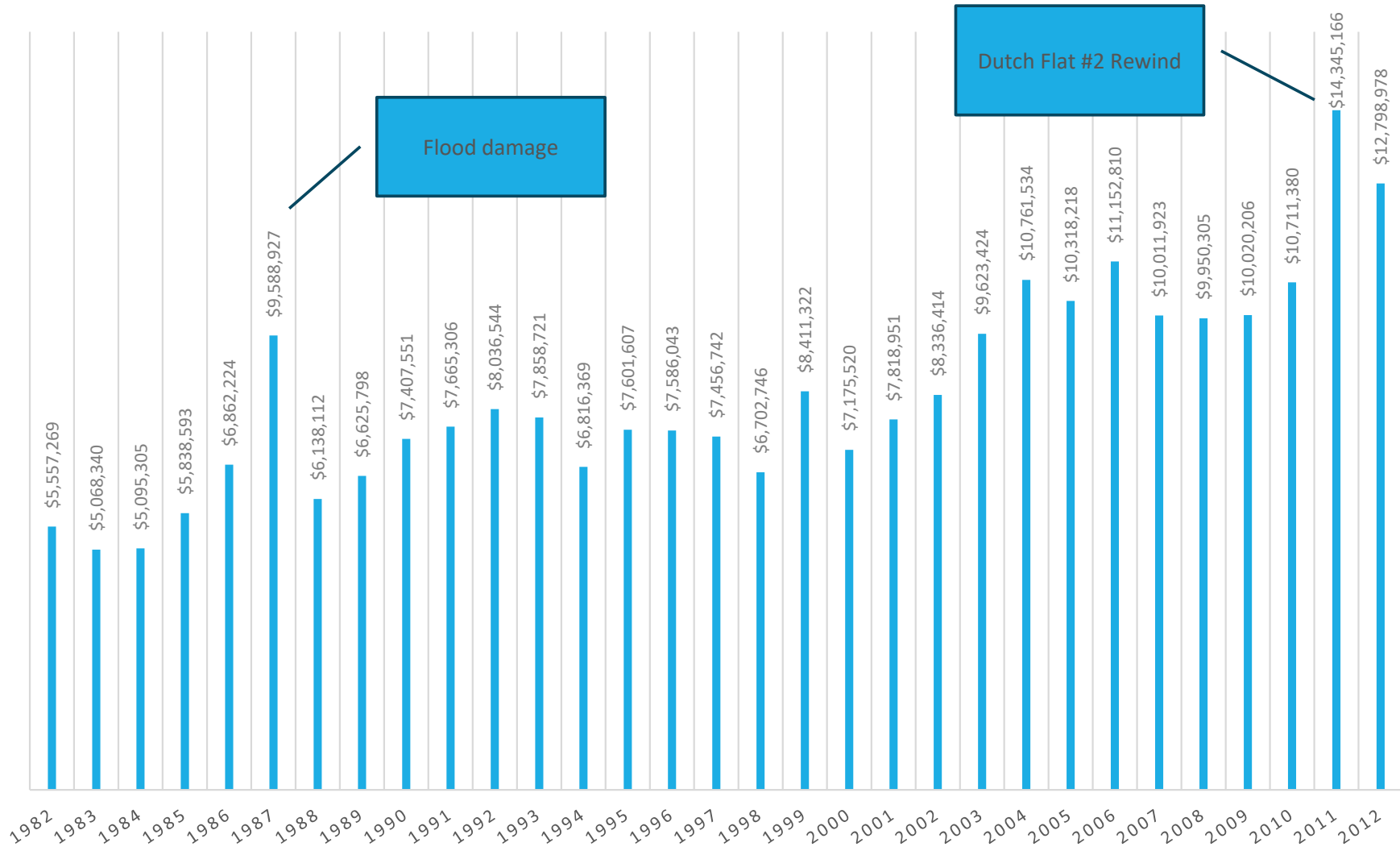
# 1983 Revenue Example

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Category	Revenue
Debt Service	\$3,499,054
Operations and Maintenance	\$1,162,046
Yuba Bear Subtotal	\$4,661,100
Rollins	\$407,240
<b>Total Electric Revenue</b>	<b>\$5,068,340</b>



# Electric Revenue (1982-2012)





# Current Revenue Structure

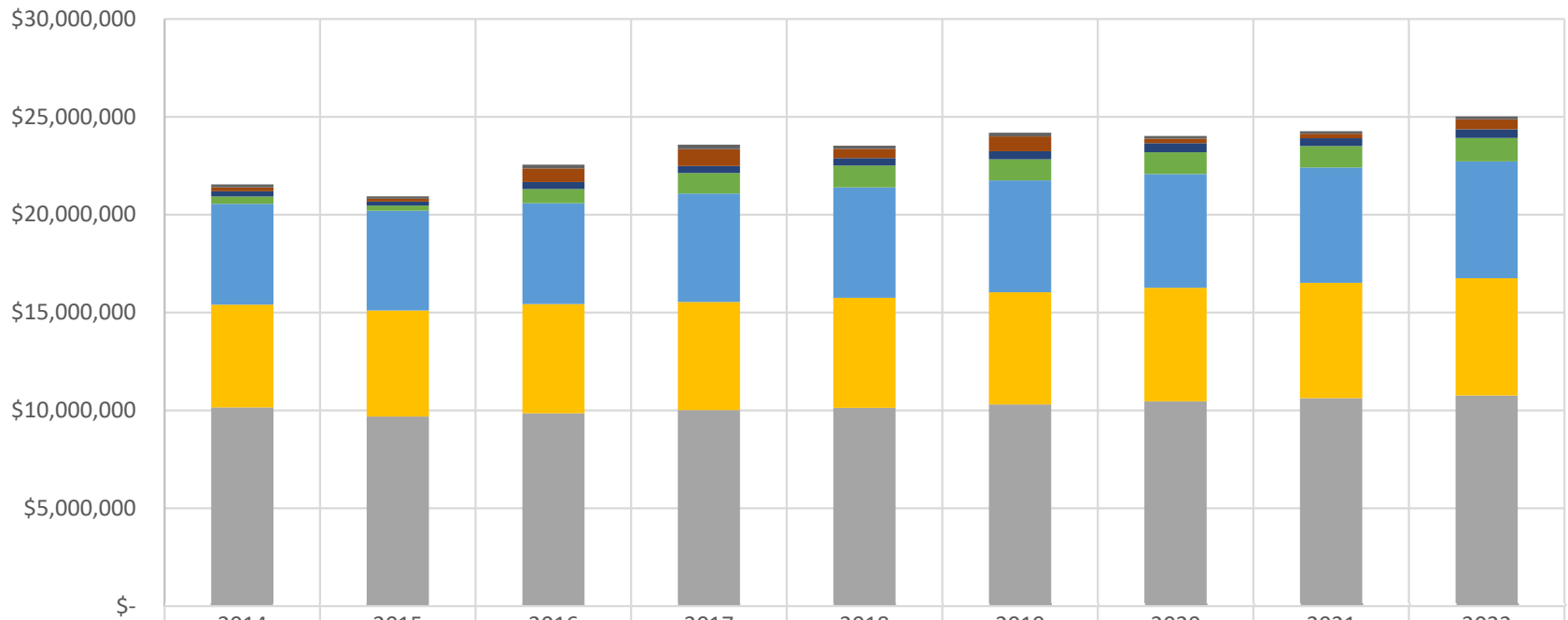
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Facility	Power Purchase Agreement Notes	2022 Revenue
Chicago Park	PG&E, availability based, expires June 30, 2033	\$10,768,136
Dutch Flat #2	PG&E, availability based, expires June 30, 2033	\$5,983,868
Rollins	PG&E, availability based, expires June 30, 2033	\$5,976,365
Deer Creek	NCPA (City of Lodi), market based, expires December 31, 2025	N/A
Bowman	PG&E, availability based, expires June 30, 2033	\$1,191,805
Combie South	NCPA (City of Lodi), market based, expires December 31, 2025	\$509,783
Scotts Flat	RES-BCT tariff. Used to offset District usage.	\$448,306
Combie North	PG&E, fixed pricing based on output, expires October 5, 2024.	\$145,437
<b>Total</b>		<b>\$25,023,701</b>

# 2022 Revenue

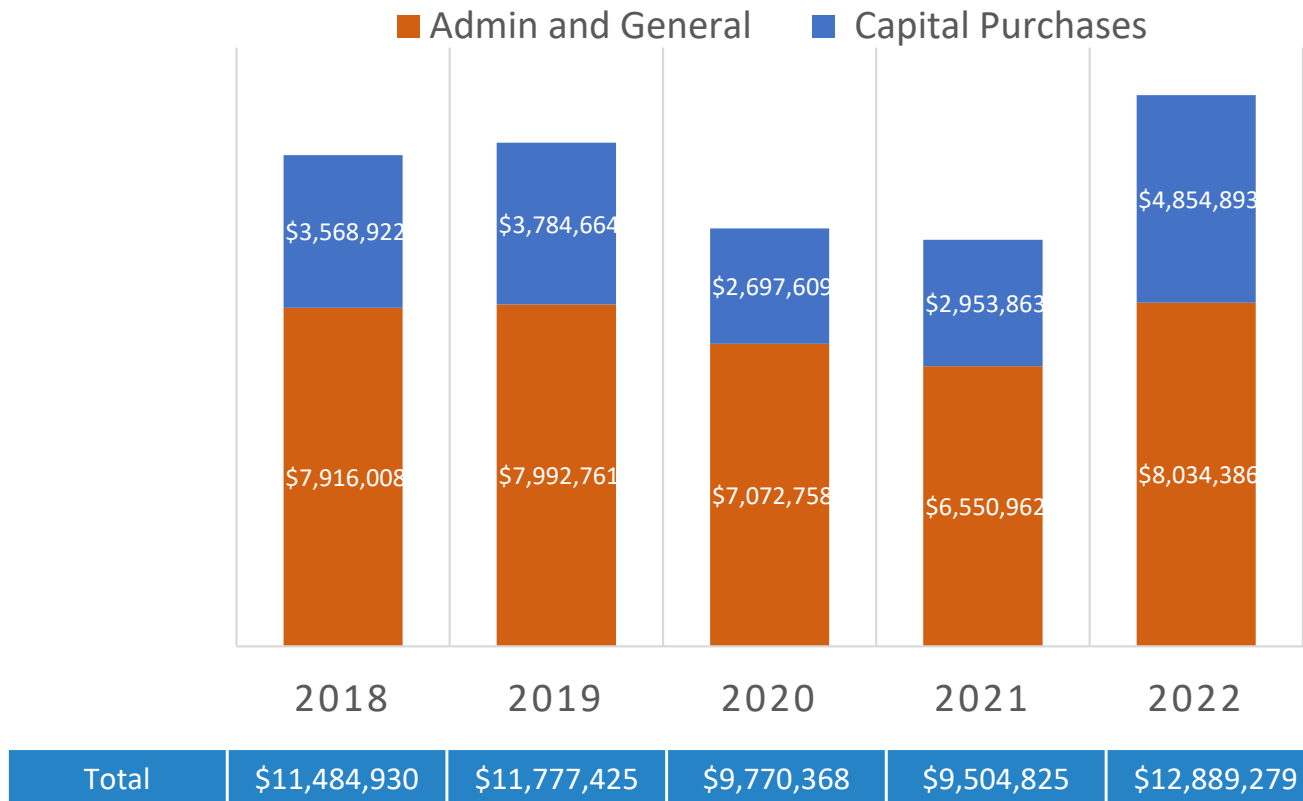
Revenue Source	Total
<b><u>Various Power Purchase Agreements</u></b>	
Yuba-Bear	
Chicago Park	\$10,768,136
Dutch Flat #2	\$5,983,868
Rollins	\$5,976,365
Bowman	\$1,191,805
Combie North	\$145,437
Combie South	\$509,783
Deer Creek	N/A
<b><u>Renewable Energy Self-Generation Bill Credit Transfer (RES-BCT)</u></b>	
Scotts Flat	\$448,306
<b><u>Hydro Support Services</u></b>	
South Sutter Water District	\$312,822
<b><u>Bowman Transmission Line (57.14% Cost Reimbursement)</u></b>	
Grey Rock Hydro (Haypress Powerhouses)	\$68,031
<b><u>Total</u></b>	<b>\$25,404,553</b>

# Powerhouse Electric Revenue (2014-2022)



	2014	2015	2016	2017	2018	2019	2020	2021	2022
■ Combie North Powerhouse	152,041	125,255	195,735	227,850	157,697	193,211	134,073	132,445	145,437
■ Combie South Powerhouse	192,624	141,890	694,311	865,791	476,289	759,043	228,854	230,135	509,783
■ Scotts Flat Powerhouse	274,400	209,302	357,684	355,583	383,750	407,545	467,468	392,942	448,306
■ Bowman Powerhouse	374,415	255,516	722,338	1,043,161	1,110,355	1,081,741	1,118,961	1,100,881	1,191,805
■ Rollins Powerhouse	5,149,273	5,100,484	5,159,473	5,544,927	5,645,458	5,715,035	5,807,549	5,893,076	5,976,365
■ Dutch Flat Powerhouse	5,247,154	5,417,285	5,573,524	5,526,812	5,621,379	5,725,698	5,800,114	5,892,408	5,983,868
■ Chicago Park Powerhouse	\$10,156,075	\$9,688,911	\$9,856,454	\$10,014,437	\$10,131,747	\$10,311,570	\$10,465,264	\$10,626,541	\$10,768,136
<b>Total</b>	<b>\$21,545,982</b>	<b>\$20,938,643</b>	<b>\$22,559,519</b>	<b>\$23,578,561</b>	<b>\$23,526,675</b>	<b>\$24,193,843</b>	<b>\$24,022,283</b>	<b>\$24,268,428</b>	<b>\$25,023,701</b>

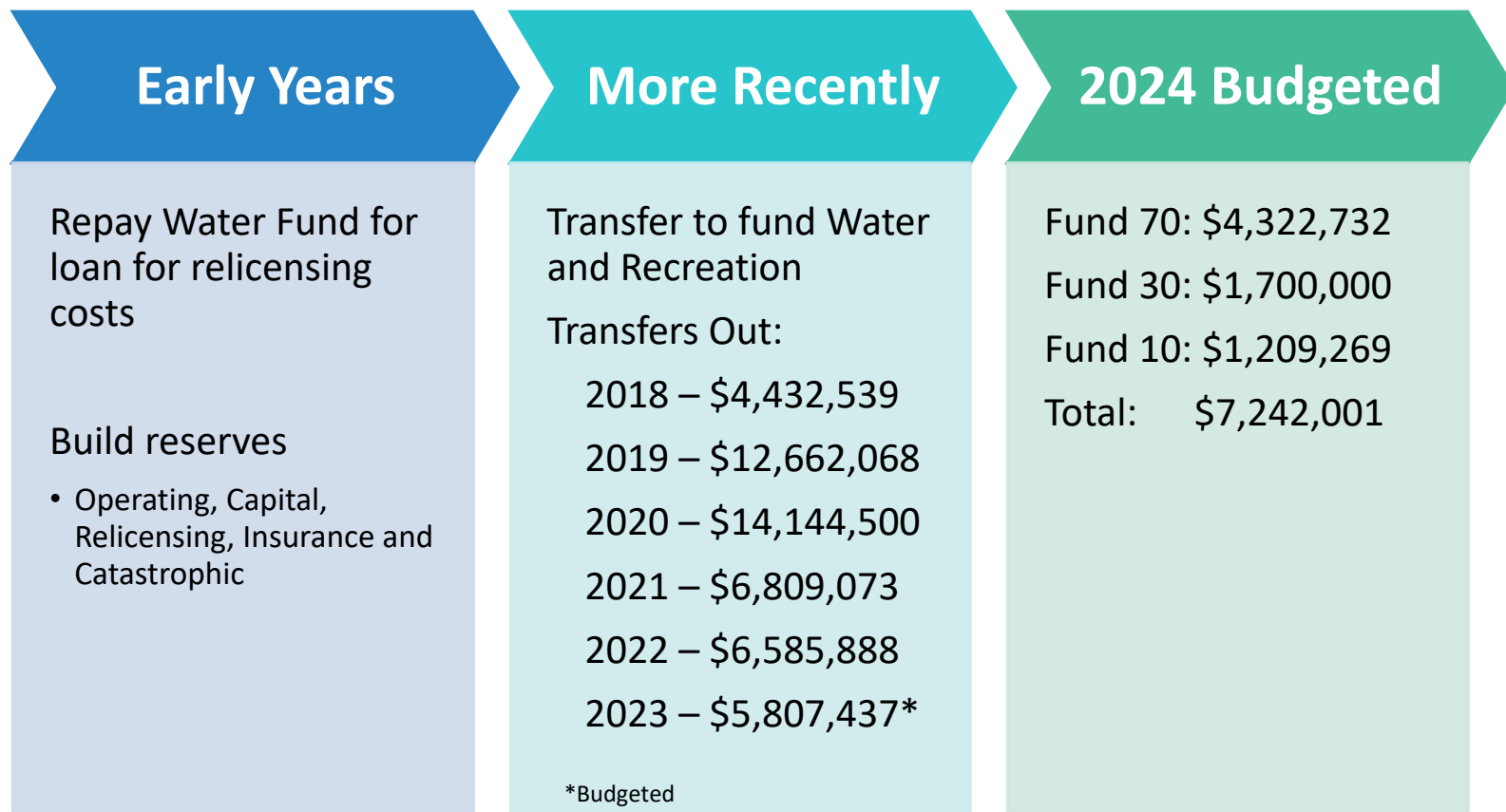
# Hydroelectric Department Expenses 2018-2022



Notes:

1. Does not include transfers out.

# Recent Hydro Revenue Uses Under Current PPAs (Beyond Hydro O&M and Capital)



# Summary

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	2018	2019	2020	2021	2022
Total Revenue	\$23,526,675	\$24,193,843	\$24,022,283	\$24,268,428	\$25,023,701
Operating Expenses	\$7,916,008	\$7,992,761	\$7,072,758	\$6,550,962	\$8,034,386
Capital Purchases	\$3,568,922	\$3,784,664	\$2,697,609	\$2,953,863	\$4,854,893
Transfers Out	\$4,432,539	\$12,662,068	\$14,144,500	\$6,809,073	\$6,585,888
Net	\$7,609,206	\$ (245,650)	\$107,415	\$7,954,530	\$5,548,534



## Part 2: Financials by Powerhouse

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Revenue & Expenses

Future Projects and Areas  
of Concern

# Methodology

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- ▶ Facility codes associated with a powerhouse were identified and a standard SQL transaction analysis report of all expenses from 2018-2022 was created and used to pull general ledger expenses
- ▶ The master project list spreadsheet was reviewed and projects expected to have charges associated with a powerhouse were identified and a standard SQL transaction analysis report of all expenses from 2018-2022 was created and used to pull project ledger expenses
- ▶ Custom reports were developed to isolate operating costs
- ▶ Some projects are attributable to multiple facilities and were split accordingly

## Caveats

- ▶ Reports are only as good as expenses were coded. Data should not be used to compare subcomponents of a powerhouse.
- ▶ Reports are a subset of the Fund 50/55 expenditures and are very difficult to tie out to totals. Make sure to compare apples to apples.
- ▶ No allocation for overhead (Fund 70, Fund 30, Hydro Administration, training, etc.)
- ▶ Reports are difficult to replicate and susceptible to error



# Chicago Park Revenue/Expenses

	2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>	\$ 10,131,747	\$ 10,311,570	\$ 10,465,264	\$ 10,626,541	\$ 10,768,136	\$ 10,460,652
<b>Operating Expenses</b>						
57300 Chicago Park Powerhouse	\$ 541,694	\$ 594,450	\$ 626,643	\$ 584,102	\$ 656,759	
57301 Dutch Flat #2 Afterbay	\$ 103,399	\$ 61,918	\$ 36,763	\$ 64,286	\$ 60,858	
57302 Chicago Park Flume	\$ 17,245	\$ 59,692	\$ 98,957	\$ 44,995	\$ 104,263	
57303 Little York Basin	\$ 634	\$ 14,711	\$ 4,216	\$ 4,025	\$ 12,492	
57304 Chicago Park Forebay	\$ 2,149	\$ 3,903	\$ 27,915	\$ 45,206	\$ 17,336	
<b>Subtotal Operating Expenses</b>	\$ 665,121	\$ 734,675	\$ 794,494	\$ 742,614	\$ 851,707	\$ 757,722
<b>Project Expenses</b>						
6877 CPPH Access Road	\$ 70,322	\$ 35,529	\$ 135,522	\$ 84,662	\$ 29,183	
2484 CPPH Standby Generator			\$ 19,417		\$ 401	
2471 CPPH Electrical Drawing			\$ 50,772			
2006 CPPH Switchboard/Relays	\$ 48,904	\$ 1,437				
2133 CPPH Rough Operating Zone	\$ 203,057					
2164 CPPH Fire Suppression	\$ 8,645	\$ 153,349	\$ 174,223	\$ 171,542	\$ 12,176	
2165 CPPH Balance of Plant PLC	\$ 396,409	\$ 155				
2352 CPPH Switchgear			\$ 551			
2402 CPPH Instrumentation		\$ 3,216	\$ 61,271	\$ 300,005	\$ 1,370	
2551 CPPH Tailrace Repair				\$ 20		
2549 CPPH CAISO Meter Reset			\$ 147	\$ 738		
2353 CPPH Turbine Overhaul				\$ 15,260	\$ 51,644	
2362 CPPH Transformer				\$ 14,660	\$ 48,324	
2383 CPPH Rewind					\$ 52,840	
2598 CPPH RTU Replacement					\$ 3,940	
2006-1 CPPH Relays - Legal		\$ 1,735	\$ 384			
2053 DFAB Low Level Outlet	\$ 91,905	\$ 18,726				
2386 CP Flume Drain			\$ 98			
2511 CP Forebay/Canal Lining			\$ 22,438	\$ 2,870		
<b>Subtotal Project Expenses</b>	\$ 819,244	\$ 214,147	\$ 464,825	\$ 589,757	\$ 199,878	\$ 457,570
<b>Allocated Project Expenses</b>						
201502 SCADA Upgrade (25%)	\$ 50,037	\$ 46,493	\$ 348			
1039 SCADA Upgrade Study (25%)	\$ 57	\$ 981	\$ 64	\$ 2		
2469 Electric Reliability Services (50%)			\$ 31,424	\$ 17,420	\$ 2,568	
6927 Lower Division Prop Acq (50%)	\$ 14,577	\$ 7,172	\$ 4,984	\$ 803		
201308 Lower Division Prop Acq (50%)	\$ 10,650	\$ 63	\$ 4,659	\$ 18		
<b>Subtotal Allocated Project Expenses</b>	\$ 75,321	\$ 54,708	\$ 41,479	\$ 18,242	\$ 2,568	\$ 38,464
<b>Total Expenses</b>	\$ 1,559,686	\$ 1,003,530	\$ 1,300,798	\$ 1,350,614	\$ 1,054,153	\$ 1,253,756
<b>Net Revenue</b>	\$ 8,572,061	\$ 9,308,040	\$ 9,164,466	\$ 9,275,927	\$ 9,713,983	\$ 9,206,895

# Chicago Park

## Future Projects / Concerns

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### Projects in 5 Year Capital Improvement Plan

- Station batteries – complete in late 2023/early 2024 (some batteries arrived damaged from supplier)
- RTU replacement – complete during September 2024 outage
- Powerhouse overhaul
  - 2026 outage for a total of 8 weeks
  - Current cost estimate is \$21.7 million

### Longer Term Planning

- Tailrace and forebay erosion

# Dutch Flat #2

## Revenue/Expenses

	2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>	\$ 5,621,379	\$ 5,725,698	\$ 5,800,114	\$ 5,892,408	\$ 5,983,868	\$ 5,804,693
<b>Operating Expenses</b>						
57200 Dutch Flat #2 Powerhouse	\$ 545,477	\$ 463,253	\$ 582,358	\$ 481,770	\$ 483,143	
57210 Dutch Flat #2 Flume	\$ 37,356	\$ 147,561	\$ 105,309	\$ 98,244	\$ 74,796	
57211 Dutch Flat #2 Forebay	\$ 40,213	\$ 43,562	\$ 49,336	\$ 41,660	\$ 125,727	
<b>Subtotal Operating Expenses</b>	\$ 623,046	\$ 654,376	\$ 737,003	\$ 621,674	\$ 683,666	\$ 663,953
<b>Project Expenses</b>						
2478 DFPH Electrical Drawing			\$ 41,756	\$ 17,322	\$ 5,548	
2348 DFPH Balance of Plant PLC			\$ 362,874	\$ 8,208		
2483 DFPH Standby Generator			\$ 589	\$ 15,227	\$ 20,419	
2355 DFPH-DFFB Fiber Optic			\$ 28,066			
2544 DFPH Cooling Water Upgrade					\$ 17,183	
2240 DFPH Fire Suppression Upgrade	\$ 1,744	\$ 560	\$ 17,505	\$ 8,706	\$ 2,232	
2229 DF Flume Footing Repairs	\$ 6,182	\$ 342,410				
<b>Subtotal Project Expenses</b>	\$ 7,925	\$ 342,969	\$ 450,790	\$ 49,462	\$ 45,382	\$ 179,306
<b>Allocated Project Expenses</b>						
201502 SCADA Upgrade (25%)	\$ 50,037	\$ 46,493	\$ 348			
1039 SCADA Upgrade Study (25%)	\$ 57	\$ 981	\$ 64	\$ 2		
2469 Electric Reliability Services (50%)			\$ 31,424	\$ 17,420	\$ 2,568	
6927 Lower Division Prop Acq (50%)	\$ 14,577	\$ 7,172	\$ 4,984	\$ 803		
201308 Lower Division Prop Acq (50%)	\$ 10,650	\$ 63	\$ 4,659	\$ 18		
<b>Subtotal Allocated Project Expenses</b>	\$ 75,321	\$ 54,708	\$ 41,479	\$ 18,242	\$ 2,568	\$ 38,464
<b>Total Expenses</b>	\$ 706,292	\$ 1,052,054	\$ 1,229,273	\$ 689,378	\$ 731,615	\$ 881,722
<b>Net Revenue</b>	\$ 4,915,087	\$ 4,673,644	\$ 4,570,841	\$ 5,203,030	\$ 5,252,252	\$ 4,922,971

# Dutch Flat #2

## Future Projects / Concerns

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### Projects in 5 Year Capital Improvement Plan

- Backup generator (2024)
- Liner repair upstream of Forebay
- RTU Replacement

### Longer Term Planning

- Mechanical Refurbishment (TSV, Wicket Gates, etc.)

# Rollins

## Revenue/Expenses

	2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>	\$ 5,645,458	\$ 5,715,035	\$ 5,807,549	\$ 5,893,076	\$ 5,976,365	\$ 5,807,497
Operating Expenses						
57400 Rollins Powerhouse	\$ 356,051.00	\$ 402,652.06	\$ 473,557.53	\$ 486,964.75	\$ 411,479.07	
<b>Subtotal Operating Expenses</b>	\$ 356,051	\$ 402,652	\$ 473,558	\$ 486,965	\$ 411,479	\$ 426,141
Project Expenses						
2351 RPH OCB Replacement			\$ 16,927.18	\$ 232,038.55	\$ 269.08	
2393 RPH Balance of Plant			\$ 1,037.27	\$ 323,762.63	\$ 897.64	
2392 RPH Governor Replacement					\$ 272.24	
2394 RPH Relay Protection Upgrade			\$ 1,903.91	\$ 32,249.03	\$ 188,596.19	
<b>Subtotal Project Expenses</b>	\$ -	\$ -	\$ 19,868	\$ 588,050	\$ 190,035	\$ 159,591
Allocated Project Expenses						
201502 SCADA Upgrade (25%)	\$ 50,037.41	\$ 46,492.72	\$ 348.20			
1039 SCADA Upgrade Study (25%)	\$ 56.85	\$ 981.26	\$ 63.85	\$ 1.59		
<b>Subtotal Allocated Project Expenses</b>	\$ 50,094	\$ 47,474	\$ 412	\$ 2	\$ -	\$ 19,596
<b>Total Expenses</b>	\$ 406,145	\$ 450,126	\$ 493,838	\$ 1,075,017	\$ 601,514	\$ 605,328
<b>Net Revenue</b>	\$ 5,239,312	\$ 5,264,909	\$ 5,313,711	\$ 4,818,059	\$ 5,374,851	\$ 5,202,169

# Rollins

## Future Projects / Concerns

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### Projects in 5 Year Capital Improvement Plan

- Governor Replacement
- RTU Replacement

### Longer Term Planning

- N/A

# Bowman Revenue/Expenses

		2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>		\$ 1,110,355	\$ 1,081,741	\$ 1,118,961	\$ 1,100,881	\$ 1,191,805	\$ 1,120,749
Operating Expenses							
57100	Bowman Powerhouse	\$ 253,621	\$ 331,624	\$ 343,497	\$ 385,182	\$ 266,503	
57111	Bowman Transmission Line (42.86%)	\$ 42,947	\$ 134,168	\$ 87,216	\$ 37,040	\$ 44,968	
	<b>Subtotal Operating Expenses</b>	<b>\$ 296,568</b>	<b>\$ 465,791</b>	<b>\$ 430,713</b>	<b>\$ 422,222</b>	<b>\$ 311,471</b>	<b>\$ 385,353</b>
Project Expenses							
2234	BPH Governor		\$ 3,200	\$ 125,326	\$ -		
2354	Bowman Intertie BRKR Rplc (42.86%)			\$ 1,645	\$ 794	\$ 131	
2556	JAN-21 BTL Wind Storm Rpr (42.86%)				\$ 57,663		
	<b>Subtotal Project Expenses</b>	<b>\$ -</b>	<b>\$ 3,200</b>	<b>\$ 126,971</b>	<b>\$ 58,457</b>	<b>\$ 131</b>	<b>\$ 37,752</b>
Allocated Project Expenses							
N/A	N/A						
	<b>Subtotal Allocated Project Expenses</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Total Expenses</b>		<b>\$ 296,568</b>	<b>\$ 468,991</b>	<b>\$ 557,683</b>	<b>\$ 480,679</b>	<b>\$ 311,602</b>	<b>\$ 423,105</b>
<b>Net Revenue</b>		<b>\$ 813,787</b>	<b>\$ 612,750</b>	<b>\$ 561,278</b>	<b>\$ 620,202</b>	<b>\$ 880,203</b>	<b>\$ 697,644</b>



# Bowman

## Future Projects / Concerns

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### Projects in 5 Year Capital Improvement Plan

- Intertie Breaker Replacement (42.68%)

### Longer Term Planning

- Automation of canal headgate and improved remote operation capability
- Transmission line poles to be evaluated in late 2023 to mid 2024



# Combie South Revenue/Expenses

	2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>	\$ 476,289	\$ 759,043	\$ 228,854	\$ 230,135	\$ 509,783	\$ 440,821
Operating Expenses						
57700 Combie South Powerhouse	\$ 177,522	\$ 181,639	\$ 246,225	\$ 204,270	\$ 262,102	
<b>Subtotal Operating Expenses</b>	\$ 177,522	\$ 181,639	\$ 246,225	\$ 204,270	\$ 262,102	\$ 214,351
Project Expenses						
2163 CSPH Trash Rack	\$ 812,576	\$ 1,407				
2168 CSPH Electrical Upgrade	\$ 27,675	\$ 14,148	\$ 155,541	\$ 95,636	\$ 9,138	
2554 CSPH Fire Detection Upgrade				\$ 21,593	\$ 6,266	
2210 CSPH CAISO Mtr/Swtchgr	\$ 7,693	\$ 146,002	\$ 48,239			
<b>Subtotal Project Expenses</b>	\$ 847,943	\$ 161,557	\$ 203,780	\$ 117,229	\$ 15,404	\$ 269,183
Allocated Project Expenses						
N/A N/A						
<b>Subtotal Allocated Project Expenses</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Expenses</b>	\$ 1,025,465	\$ 343,196	\$ 450,005	\$ 321,499	\$ 277,506	\$ 483,534
<b>Net Revenue</b>	\$ (549,176)	\$ 415,847	\$ (221,151)	\$ (91,364)	\$ 232,278	\$ (42,713)

# Combie South

## Future Projects / Concerns

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### Projects in 5 Year Capital Improvement Plan

- N/A

### Longer Term Planning

- Recent profitability impacted by large capital projects in 2018 and 2020
- Powerhouse is “run-of-river” so revenue is significantly impacted by hydrology
- Future profitability could be improved by improving remote operation capabilities
- Current operations result in many start/stop cycles that will impact long term maintenance requirements
- Penstock coating and corrosion is being monitored

### Other Consideration

- Continue to consider short term market-based power purchase agreements

# Scotts Flat Revenue/Expenses

		2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>		\$ 383,750	\$ 407,545	\$ 467,468	\$ 392,942	\$ 448,306	\$ 420,002
Operating Expenses							
57900	Scotts Flat Powerhouse	\$ 222,510	\$ 188,507	\$ 188,065	\$ 236,919	\$ 299,511	
	<b>Subtotal Operating Expenses</b>	\$ 222,510	\$ 188,507	\$ 188,065	\$ 236,919	\$ 299,511	\$ 227,103
Project Expenses							
2232	SFPH Instrument Upgrade	\$ 54	\$ 672				
2233	SFPH Exciter Replacement		\$ 68,775				
2406	SFPH Balance of Plant PLC					\$ 17,894	
2552	SFPH Fire Detection Upgrade				\$ 48,608	\$ 25,106	
2470	SF PG&E 12KV Line Outage			\$ 8,567			
2306	SFPH CAISO Meter		\$ 34,523	\$ 2,027			
	<b>Subtotal Project Expenses</b>	\$ 54	\$ 103,971	\$ 10,594	\$ 48,608	\$ 42,999	\$ 41,245
Allocated Project Expenses							
N/A	N/A						
	<b>Subtotal Allocated Project Expenses</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Expenses</b>		\$ 222,565	\$ 292,478	\$ 198,659	\$ 285,527	\$ 342,510	\$ 268,348
<b>Net Revenue</b>		\$ 161,186	\$ 115,068	\$ 268,809	\$ 107,415	\$ 105,796	\$ 151,655

# Scotts Flat

## Future Projects / Concerns

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### Projects in 5 Year Capital Improvement Plan

- Penstock Pipe Seismic Upgrade

### Longer Term Planning

- Future profitability could be improved by improving remote operation capabilities

### Other Considerations

- Operations would be required even without powerhouse. Historic Operations only costs below.

2018	2019	2020	2021	2022
\$86,188	\$93,091	\$58,949	\$87,544	\$86,454



# Combie North Revenue/Expenses

		2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>		\$ 157,697	\$ 193,211	\$ 134,073	\$ 132,445	\$ 145,437	\$ 152,573
Operating Expenses							
57600	Combie North Powerhouse	\$ 137,541	\$ 138,361	\$ 108,240	\$ 117,920	\$ 145,456	
	<b>Subtotal Operating Expenses</b>	\$ 137,541	\$ 138,361	\$ 108,240	\$ 117,920	\$ 145,456	\$ 129,504
Project Expenses							
2553	CNPH Fire Detection Upgrade			\$ 9,368	\$ 6,545		
2581	CNPH Capacitor Bank Upgrade			\$ 148	\$ 1,544		
	<b>Subtotal Project Expenses</b>	\$ -	\$ -	\$ -	\$ 9,516	\$ 8,089	\$ 3,521
Allocated Project Expenses							
N/A	N/A						
	<b>Subtotal Allocated Project Expenses</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Expenses</b>		\$ 137,541	\$ 138,361	\$ 108,240	\$ 127,437	\$ 153,546	\$ 133,025
<b>Net Revenue</b>		\$ 20,156	\$ 54,849	\$ 25,833	\$ 5,008	\$ (8,108)	\$ 19,548

# Combie North

## Future Projects / Concerns

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### Projects in 5 Year Capital Improvement Plan

- N/A

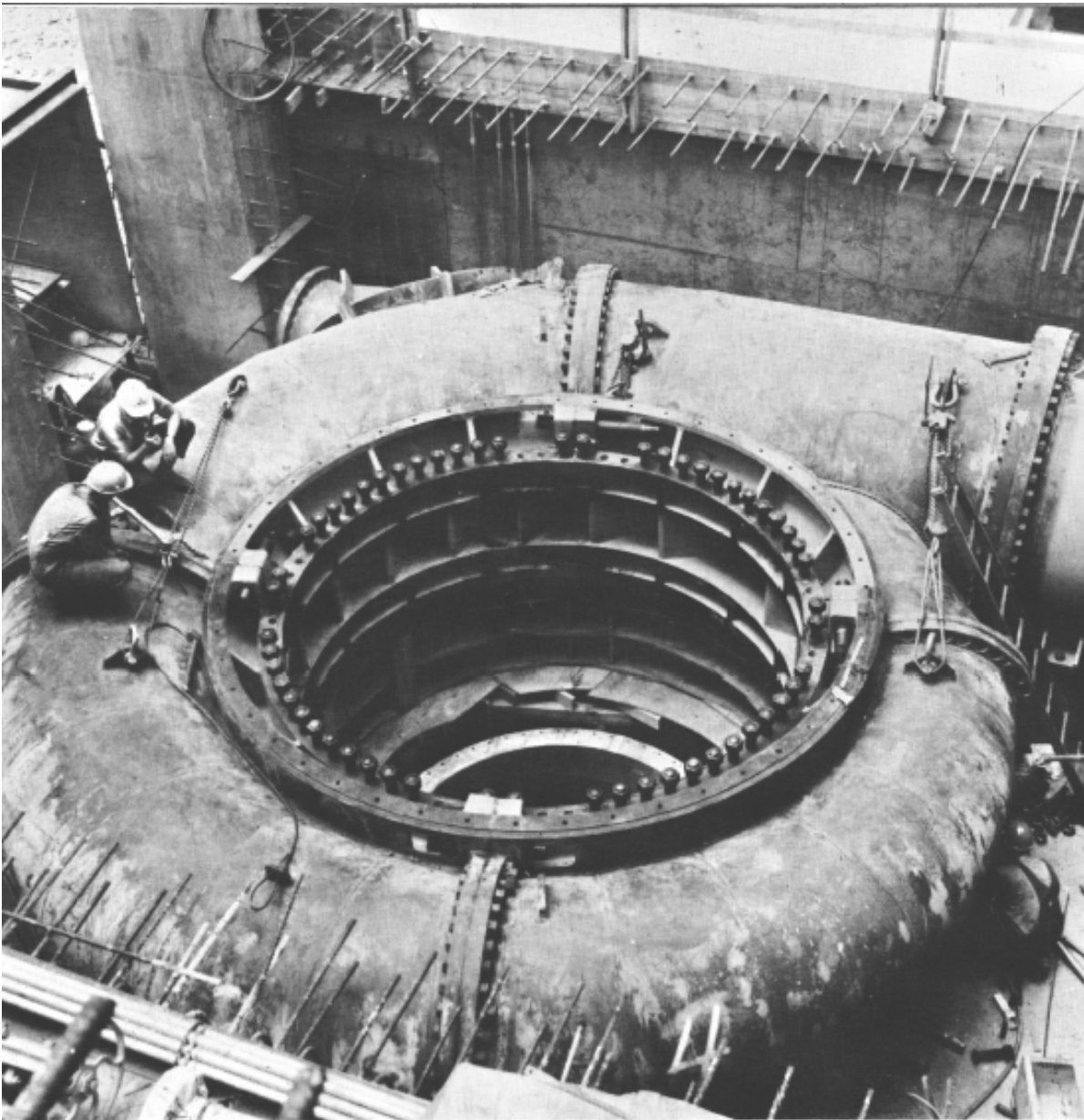
### Longer Term Planning

- Powerhouse is experiencing recent failures in ancillary equipment that is negatively impacting generation (capacitors, actuators, etc)
- PPA expiration requires meter upgrade. Estimated capital cost is \$165,000 including internal labor.
- Under new PPA average revenue is expected to average \$109,000 annually
- Need to consider other sales options
  - RES-BCT – would require partnership with external agencies
  - Cryptocurrency
  - Hydrogen generation
- Future profitability could be improved by improving remote operation capabilities

### Other Considerations

- Operations would be required even without powerhouse. Historic Operations only costs below.

2018	2019	2020	2021	2022
\$70,930	\$53,417	\$39,938	\$53,985	\$54,785



## Part 3: Water Delivery Related Expenses

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Quantify Hydro Subsidy  
to Water Ratepayers



# Current Water Subsidy

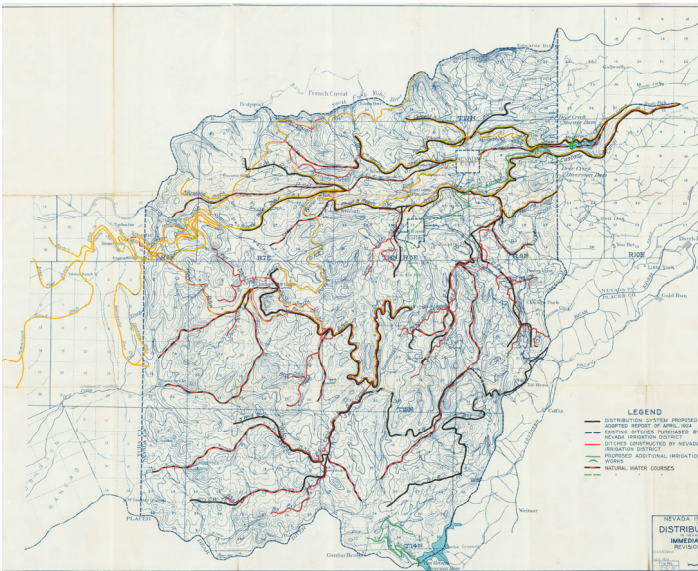
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## Question:

- If NID had never built the powerhouses, how much would ratepayers have to fund to operate and maintain the system of dams and conveyances necessary to deliver water to, and store water in, the lower division?

## Methodology:

- Line by line review of the 2023 budget.
- Water (cost would exist even if the powerhouses did not, e.g. DSOD fees, expenses on Bowman-Spauding Canal)
- Power (expense is related entirely to power function of Department, e.g. FERC, NERC)





Position	2023 Budget	Water (Would Exist Without Power Generation)
<b>Hydro Administration</b>		
Associate Engineer	1	1
Senior Engineer Dam Safety	1	1
Project Manager	1	0.5
Hydroelectric Compliance Analyst	1	0
Hydroelectric Compliance Technician	1	0.5
Administrative Analyst	1	0.5
Director of Power Systems	1	0
<b>Subtotal</b>	<b>7</b>	<b>3.5</b>
<b>Hydro Operations</b>		
Hydroelectric Water Systems Operator	3	3
Hydroelectric Generation Superintendent	1	0
Senior Hydroelectric Plant Operator	2	0
Hydroelectric Plant Operator	4	0
Senior Hydrographer	1	1
<b>Subtotal</b>	<b>11</b>	<b>4</b>
<b>Hydro Maintenance</b>		
Hydroelectric Compliance & Protection Systems Specialist	1	0
Hydroelectric Systems Technician	1	0
Supervising Electrical Systems Technician	1	0
Hydroelectric Communication Technician	2	0.5
Hydroelectric Electrical Machinist	2	0
Hydroelectric Maintenance Tech	3	2
Utility Worker	1	3
Senior Hydroelectric Systems Technican	1	0
Senior Hydroelectric Maintenance Technican	1	1
Supervising Mechanical/Civil Foreman	1	1
Hydroelectric Maintenance Superintendent	1	0
Senior Hydroelectric Electric Machinist	1	0
<b>Subtotal</b>	<b>16</b>	<b>7.5</b>
<b>Total</b>	<b>34</b>	<b>15</b>

# Labor Breakdown

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<b>50112-52608: FED/ST/CO FEES</b>	<b>2023 Budget (\$)</b>	<b>Water (Would Exist Without Power Generation (\$))</b>	<b>Power (Attributable Solely to Power Generation (\$))</b>
Water Rights Fees	150,000	75,442	74,558
FERC Admin Fees	131,250	-	131,250
FERC Land Fees	183,750	183,750	-
Hazardous Waste Fees	5,000	-	5,000
SYC/DCPH Taxes	200,000	200,000	-
USDA Forest Service	10,000	10,000	-
USGS	76,650	-	76,650
CA Water Resources Dam Fees	483,000	421,000	62,000
Other Fees (WREGIS, DMV, CAISO, FCC)	5,000	2,000	3,000
<b>Total</b>	<b>1,244,650</b>	<b>892,192</b>	<b>352,458</b>

# Sample Breakdown of Costs



**Bowman-Spaulding  
Canal, Clear Creek  
Tunnel 1925**

# Results

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Little or no change to employee counts associated with the Board, Administration, Human Resources, Finance, Safety, Communications, Purchasing

- Likely some possibility of reduction in Information Technology, Engineering, Fleet

Eliminates payment to Fund 70 with little reduction to overall Fund 70 costs

If NID had never built the powerhouses, water ratepayers would have had to budget **\$12,636,143 in 2023** to operate and maintain the system of dams and conveyances necessary to deliver water to, and store water in, the lower division.

Similar amounts would be included in all future budgets



# Part 4: The Future

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Key Risks

Future Considerations

Recommendations

# Key Risks

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## People and Training

- Attrition:
  - 2018 – 2022 = 7-16% attrition rate
  - Approximately 22% of department was eligible to retire at beginning of 2023
- Succession Planning: Recruiting problems makes succession planning critical
- Staffing Levels: PCWA, SFWP, and YWA average 5 people per facility (dam or powerhouse). NID averages 2 (excludes 60kV line, diversions, and SYC/DCPH).

## Regulatory Environment

- Unimpaired flows
- Relicensing
- Increasing regulatory requirements
  - Dam Safety
  - Aquatic Invasive Species
  - NERC

# Key Risks

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## Infrastructure & Technology

- Increasing IT/OT Demand
- Maintenance Tracking
- OT Workload and Staffing
- Cybersecurity
- Physical Security

## Operating Environment

- Capacity Planning – Capital Projects
- Portfolio Growth (Deer Creek & South Yuba Canal)
- Climate Change

## Electricity Revenue

- Supply chain constraints and inflationary factors have placed upward pressure on installed cost of competing electricity generation resources

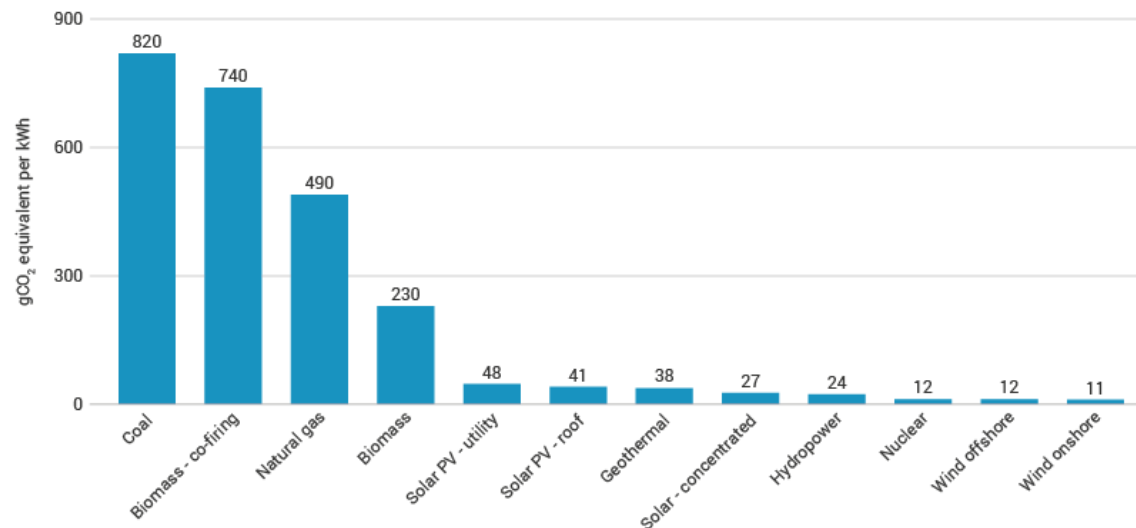
# Future Considerations

U.S. Department of Energy – Office of Energy Efficiency & Renewable Energy – August 24, 2023

- Key to Resilience in Extreme Weather
- Grid Recovery – “Black Start”
- Key to Energy Independence and Local Jobs

United Nations (UN) Intergovernmental Panel on Climate Change (IPCC)

- On a life-cycle basis, hydropower is among the lowest producers of CO<sub>2</sub> equivalent per kWh of electricity produced



# Future Considerations

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## Market Trends

- Karbone – October 31, 2023 – CAISO Summary
  - 2023 PCC1 transactions continued to climb, hitting a reported all time high peak of Index + \$74.00 this month, an increase of \$4.00 from September.
  - Fears do exist among some load servers that the increase in RPS procurement costs and seeming impossibility of finding sufficient supply, coupled with similar trends in the RA market, will lead to either regulatory intervention (which could undermine the efficacy of both programs), excessively high power rates, or even the failure of some load servers over time.
- CAISO – Q2 2023 Report on Market Issues and Performance – 11/16/2023
  - Natural gas prices fell from extraordinarily high levels in December, averaging less than Q2 2022. Average gas prices at Henry Hub, the national index, were less than one third of prices in the same quarter of last year, while prices at both California hubs fell to less than 60 percent (Figure E.1). This resulted in lower system marginal energy prices across the market.
  - Prices were significantly lower than the same quarter of 2022 (Figure E.2). Day-ahead and real-time prices fell by half in most areas due to lower natural gas prices and higher renewable generation.
  - Hydroelectric generation almost doubled, substituting for both natural gas generation and lower net imports. Hydroelectric generation was higher than 2020, 2021, or 2022.





# Recommendations

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Identify and develop relationships with consultants and vendors to begin early planning for Yuba-Bear Power Purchase Agreement

Pilot alternative sales models at Combie North Powerhouse

Continue progress on Hydro Master Plan as identified in NID Strategic Plan (due by end of 2025)

Continue coordination with IT on IT/OT Master Plan

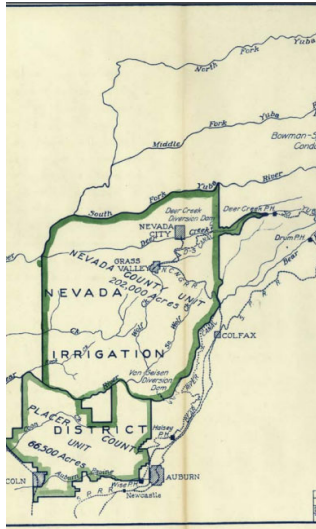
Regularly monitor and update risks and strategies used to mitigate them

# Questions and Discussion

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**Rollins Powerhouse Equipment being delivered, 1979**



# Hydroelectric Financial Workshop

DECEMBER 13, 2023





## Outline

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### Part 1 – Financials by the Year

- 1982 to 2012
- 2014 to 2022
- Transfers Out – Water / Recreation

### Part 2 – Financials by Powerhouse

### Part 3 – Water Delivery Related Expenses

### Part 4 – The Future

- Key Risks
- Future Consideration
- Recommendations

This slide provides an outline of the presentation. The year 2013 was excluded from all financial analyses because it was the transition year between the Partnership Agreement with Pacific Gas & Electric (PG&E) and the current Yuba-Bear Power Purchase Agreement (PPA). With the exception of the Bowman Powerhouse the transition occurred on July 1, 2013. The Bowman Powerhouse was converted to the PPA on January 1, 2017.

# Department Overview

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Facility	Nameplate Capacity (MW)	2018-2022 Year Historic Average Annual Output (MWh)	Year Constructed
Chicago Park	39	104,203	1965
Dutch Flat #2	24.57	47,417	1965
Rollins	12.15	54,732	1980
Deer Creek	5.5	18,548	1908
Bowman	3.6	10,262	1986
Combie South	1.5	4,458	1984
Scotts Flat	0.85	4,701	1984
Combie North	0.522	1,526	2010
<b>Total</b>	<b>87.692</b>	<b>245,847</b>	

30 Full Time Staff in 2024

**Dams**

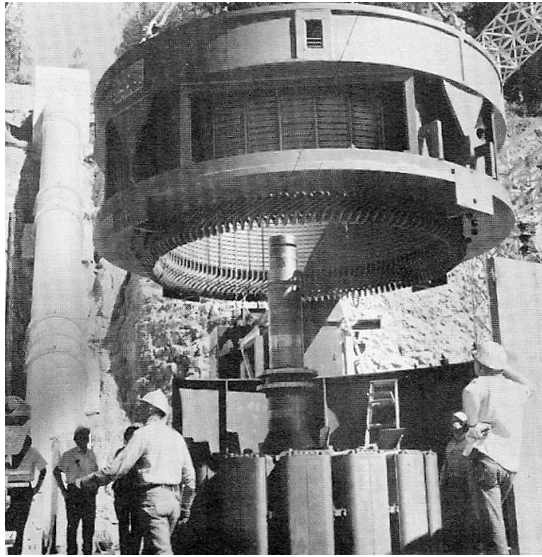
13 FERC jurisdictional dams

**Water Conveyances**

5 Major Conveyances, 8 Diversions

**Power Transmission Line**

9.0 miles




## Part 1: Financials by the Year

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Financial History

Historic Revenue and  
Expenses



## Historic Revenue Structure Yuba-Bear Project

Electricity produced by the Yuba-Bear Project was sold to PG&E for:

- Debt service on bonds
- Costs associated with maintenance and operation of the projects
- Ended July 1, 2013

In addition to the above:

Rollins

- Four mills per kilowatt hour minimum (1 mill per kilowatt hour (kWh) equals 1 dollar per megawatt hour (MWh)
- Fluctuated with rates for qualifying facilities appointed by the CPUC
- Revenue was provided to water fund
- Ended July 1, 2013

Bowman

- Since 1987 Standard Offer Power Purchase Agreement
- Revenue was provided to water fund
- Ended December 31, 2016

This slide provides an overview of historic revenue from the powerhouses. The most significant source of revenue for the Department was reimbursement of operations and maintenance (O&M) and capital expenses from PG&E. Years with high expenses (such as floods or years with high capital investments) therefore appear as high revenue years. The revenue example from 1983 which is provided on a following slide is for context.

Revenue from Combie North, Combie South or Scotts Flat facilities is not included. Electricity generated at these facilities was sold directly to PG&E and revenue went directly to the Water Department. All expenses were paid for by the Water Department. Hydroelectric Department involvement was minimal.

## 1983 Revenue Example

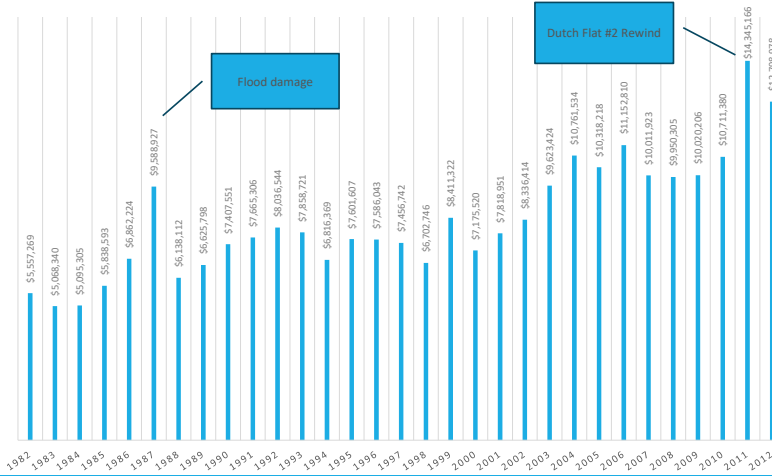
Category	Revenue
Debt Service	\$3,499,054
Operations and Maintenance	\$1,162,046
Yuba Bear Subtotal	\$4,661,100
Rollins	\$407,240
<b>Total Electric Revenue</b>	<b>\$5,068,340</b>



Staff reviewed approximately 40 years of District audits in preparation for this presentation. The most recent audit that clearly quantified the historic breakdown of the components of Hydroelectric Department revenue was 1983. The relative contributions of the revenue components can be determined from this slide.



# Electric Revenue (1982-2012)



The relative impact of large O&M or capital expenses can be seen from this figure.

## Current Revenue Structure

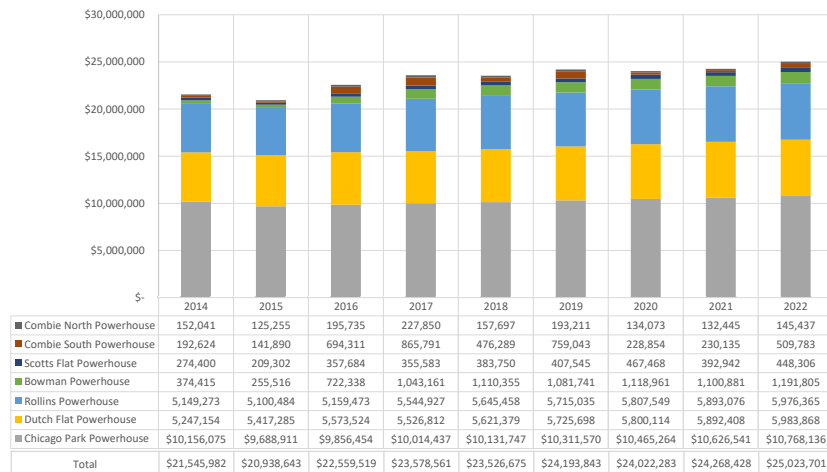
Facility	Power Purchase Agreement Notes	2022 Revenue
Chicago Park	PG&E, availability based, expires June 30, 2033	\$10,768,136
Dutch Flat #2	PG&E, availability based, expires June 30, 2033	\$5,983,868
Rollins	PG&E, availability based, expires June 30, 2033	\$5,976,365
Deer Creek	NCPA (City of Lodi), market based, expires December 31, 2025	N/A
Bowman	PG&E, availability based, expires June 30, 2033	\$1,191,805
Combie South	NCPA (City of Lodi), market based, expires December 31, 2025	\$509,783
Scotts Flat	RES-BCT tariff. Used to offset District usage.	\$448,306
Combie North	PG&E, fixed pricing based on output, expires October 5, 2024.	\$145,437
<b>Total</b>		<b>\$25,023,701</b>

## 2022 Revenue

Revenue Source	Total
<b>Various Power Purchase Agreements</b>	
Yuba-Bear	
Chicago Park	\$10,768,136
Dutch Flat #2	\$5,983,868
Rollins	\$5,976,365
Bowman	\$1,191,805
Combie North	\$145,437
Combie South	\$509,783
Deer Creek	N/A
<b>Renewable Energy Self-Generation Bill Credit Transfer (RES-BCT)</b>	
Scotts Flat	\$448,306
<b>Hydro Support Services</b>	
South Sutter Water District	\$312,822
<b>Bowman Transmission Line (57.14% Cost Reimbursement)</b>	
Grey Rock Hydro (Haypress Powerhouses)	\$68,031
<b>Total</b>	<b>\$25,404,553</b>

Revenue from 2022 is provided as a recent example. Total Hydroelectric Department revenue includes receipts from South Sutter Water District for the O&M associated with the Camp Far West Powerhouse and Grey Rock Hydro for their portion of the Bowman Transmission Line.

## Powerhouse Electric Revenue (2014-2022)



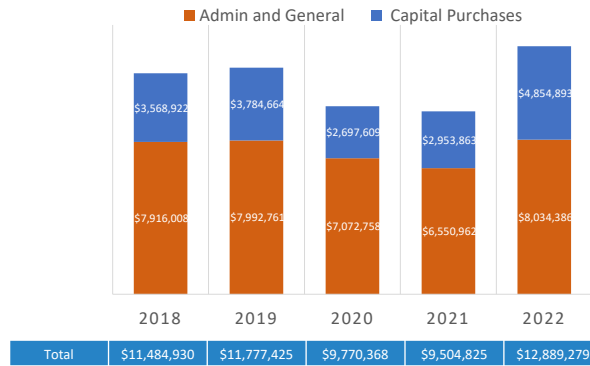
The Chicago Park Powerhouse accounts for nearly half of the District’s total Hydroelectric revenue annually. Rollins and Dutch Flat #2 have the same Unit Allocation Factor in the Yuba-Bear PPA and contribute nearly equal amounts to the overall financial picture of the Department.

As the only true run-of-river powerhouse the District owns and operates, revenue from the Combie South Powerhouse is highly dependent on hydrologic conditions. For comparison purposes, 2018 was a near average water year.

The maximum revenue available under the Yuba-Bear Power Purchase Agreement increases at a rate of 1.5% annually.

The increase in revenue at Bowman in 2017 is due to the conversion to the Yuba-Bear PPA.

## Hydroelectric Department Expenses 2018-2022



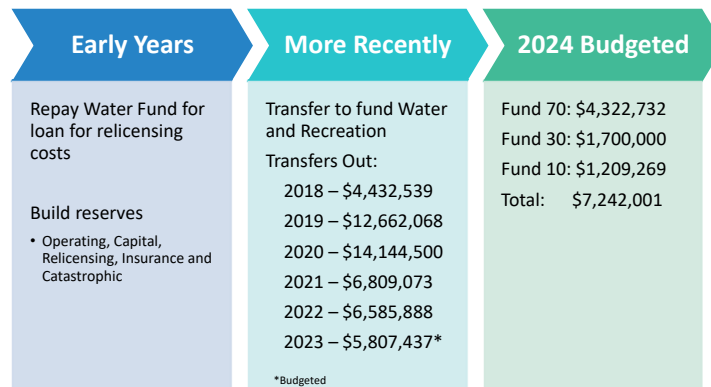
Notes:  
1. Does not include transfers out.

The figure above does not include Other Post Employment Benefits (OPEB) or Pension Unfunded Actuarial Accrued Liability. For comparison to the current accounting system, historic Admin and General costs are similar to Fund 50 and Capital Purchases are similar to Fund 55.

Aside from a brief drop during the COVID 19 pandemic, Hydroelectric Department Administration and General Expenses have remained relatively constant over the five-year period. The increase between actual Administration and General costs between 2018 and 2022 is approximately 1.5%.

Increased capital costs in 2022 are related to costs associated with the Scotts Flat Spillway Repair and the purchase of the Whitcomb Building.

## Recent Hydro Revenue Uses Under Current PPAs (Beyond Hydro O&M and Capital)



Beginning in approximately 2009 the Hydroelectric Department began borrowing money from the Water General Fund to pay for costs associated with relicensing. When the Hydroelectric Department began to earn revenue under the Yuba-Bear PPA that loan was repaid. In addition to repaying, loan reserves were built using excess revenues.

Prior to the establishment of the various Funds, transfers to Water were largely based on the Board’s desire to balance the budget. The 2019 budget notes, “Following recommendations from the Water Rates Committee, the District will use a substantial amount of its’ Hydroelectric reserves (\$10.4 million) this fiscal year to support rate payers during our transition to a 50% base rate.” That trend continues into 2020 where the budget notes, “The Hydroelectric Fund’s fiscal plan projects a negative net income of \$9.6 million as it continues to subsidize the Water Fund’s operations. Ostensibly, subsidies of this magnitude are having a negative impact on hydroelectric operations by continuing to use reserves that are necessary for long-term Hydroelectric, capital projects.”

## Summary

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	2018	2019	2020	2021	2022
Total Revenue	\$23,526,675	\$24,193,843	\$24,022,283	\$24,268,428	\$25,023,701
Operating Expenses	\$7,916,008	\$7,992,761	\$7,072,758	\$6,550,962	\$8,034,386
Capital Purchases	\$3,568,922	\$3,784,664	\$2,697,609	\$2,953,863	\$4,854,893
Transfers Out	\$4,432,539	\$12,662,068	\$14,144,500	\$6,809,073	\$6,585,888
Net	\$7,609,206	\$ (245,650)	\$107,415	\$7,954,530	\$5,548,534

This slide presents a summary of the data described on previous slides.



## Part 2: Financials by Powerhouse

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Revenue & Expenses

Future Projects and Areas  
of Concern



# Methodology

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- ▶ Facility codes associated with a powerhouse were identified and a standard SQL transaction analysis report of all expenses from 2018-2022 was created and used to pull general ledger expenses
- ▶ The master project list spreadsheet was reviewed and projects expected to have charges associated with a powerhouse were identified and a standard SQL transaction analysis report of all expenses from 2018-2022 was created and used to pull project ledger expenses
- ▶ Custom reports were developed to isolate operating costs
- ▶ Some projects are attributable to multiple facilities and were split accordingly

## Caveats

- ▶ Reports are only as good as expenses were coded. Data should not be used to compare subcomponents of a powerhouse.
- ▶ Reports are a subset of the Fund 50/55 expenditures and are very difficult to tie out to totals. Make sure to compare apples to apples.
- ▶ No allocation for overhead (Fund 70, Fund 30, Hydro Administration, training, etc.)
- ▶ Reports are difficult to replicate and susceptible to error

# Chicago Park Revenue/Expenses

	2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>	\$ 10,131,787	\$ 10,311,970	\$ 10,462,264	\$ 10,626,441	\$ 10,768,136	\$ 10,466,928
<b>Operating Expenses</b>						
57300 Chicago Park Powerhouse	\$ 541,694	\$ 594,450	\$ 626,643	\$ 584,102	\$ 656,759	
57301 Dutch Flat #2 Afterbay	\$ 103,399	\$ 61,818	\$ 36,763	\$ 64,286	\$ 60,858	
57302 Chicago Park Flume	\$ 17,245	\$ 59,692	\$ 98,957	\$ 44,895	\$ 104,263	
57303 Little York Basin	\$ 634	\$ 14,711	\$ 4,216	\$ 4,025	\$ 12,492	
57304 Chicago Park Forebay	\$ 2,149	\$ 3,903	\$ 27,815	\$ 45,206	\$ 17,336	
<b>Subtotal Operating Expenses</b>	\$ 665,121	\$ 734,675	\$ 794,494	\$ 742,614	\$ 851,707	\$ 752,722
<b>Project Expenses</b>						
6877 CPH Access Road	\$ 70,322	\$ 35,529	\$ 135,522	\$ 84,662	\$ 29,183	
2484 CPH Standby Generator			\$ 19,417		\$ 402	
2471 CPH Electrical Drawing			\$ 50,772			
2006 CPH Switchboard/Relays	\$ 48,904	\$ 1,437				
2131 CPH Rough Operating S&M	\$ 263,097					
2164 CPH Fire Suppression	\$ 8,445	\$ 33,389	\$ 174,223	\$ 374,542	\$ 13,176	
2165 CPH Balance of Plant PLC	\$ 396,499	\$ 155				
2352 CPH Switchgear			\$ 553			
2692 CPH Instrumentation		\$ 2,316	\$ 61,271	\$ 300,005	\$ 3,370	
2551 CPH Tailrace Repair			\$ 147	\$ 20		
2549 CPH CARGO Meter Reset			\$ 147	\$ 738		
2353 CPH Turbine Overhaul				\$ 15,269	\$ 53,644	
2362 CPH Transformer				\$ 14,660	\$ 48,324	
2383 CPH Rewind					\$ 52,840	
2598 CPH RTU Replacement					\$ 3,940	
2006-1 CPH Relay - Legal		\$ 1,735	\$ 384			
2053 DFAB Low Level Outlet	\$ 91,905	\$ 18,726				
2386 CP Flume Drain			\$ 98	\$ 2,870		
2111 CP Forebay/Canal Lining			\$ 22,438			
<b>Subtotal Project Expenses</b>	\$ 819,244	\$ 214,147	\$ 464,825	\$ 589,757	\$ 199,878	\$ 457,570
<b>Allocated Project Expenses</b>						
201502 SCADA Upgrade (25%)	\$ 50,037	\$ 46,493	\$ 348			
1039 SCADA Upgrade (50%)	\$ 57	\$ 981	\$ 64	\$ 7		
2469 Electric Reliability Services (50%)			\$ 31,434	\$ 17,420	\$ 2,568	
6927 Lower Division Prop Acq (50%)	\$ 14,577	\$ 7,172	\$ 4,984	\$ 803		
201308 Lower Division Prop Acq (50%)	\$ 10,650	\$ 63	\$ 4,659	\$ 18		
<b>Subtotal Allocated Project Expenses</b>	\$ 75,321	\$ 54,708	\$ 41,479	\$ 18,242	\$ 2,568	\$ 38,464
<b>Total Expenses</b>	\$ 1,559,686	\$ 1,003,530	\$ 1,300,798	\$ 1,350,614	\$ 1,054,133	\$ 1,253,756
<b>Net Revenue</b>	\$ 8,572,061	\$ 9,308,040	\$ 9,164,466	\$ 9,275,927	\$ 9,713,983	\$ 9,206,895

The Chicago Park Powerhouse includes five facilities. The Dutch Flat #2 afterbay is the diversion for the Chicago Park Flume. The Little York Basin and Chicago Park Forebay are both part of the system used solely to transport water to the powerhouse.

Projects 2353, 2362, and 2383 were recently combined into one project for future accounting purposes.

Projects related to SCADA upgrade were evenly allocated between the Chicago Park Powerhouse, Dutch Flat #2 Powerhouse, Rollins Powerhouse and Overhead.

Small charges on some projects (2551 for example) may be related to previous accounting direction which required establishment of a project number for any project that may be included in the five-year plan or represent projects with little activity that were scheduled for later years.

Project 2469 was created in an effort to track costs associated with NERC compliance and is allocated between the Chicago Park and Dutch Flat #2 Powerhouses. Projects 6927 and 2013098 were created to track costs associated with acquiring rights on PG&E parcels that underlaid NID facilities. As a result of PG&E's first bankruptcy they were forced to donate land or place conservation easements on retained land. NID has facilities on some of the

land. Costs associated with the District's activities to protect or secure necessary rights are allocated between the Chicago Park and Dutch Flat #2 Powerhouses.



# Chicago Park

## Future Projects / Concerns

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### Projects in 5 Year Capital Improvement Plan

- Station batteries – complete in late 2023/early 2024 (some batteries arrived damaged from supplier)
- RTU replacement – complete during September 2024 outage
- Powerhouse overhaul
  - 2026 outage for a total of 8 weeks
  - Current cost estimate is \$21.7 million

### Longer Term Planning

- Tailrace and forebay erosion

## Dutch Flat #2 Revenue/Expenses

	2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>	<b>\$ 5,621,379</b>	<b>\$ 5,725,698</b>	<b>\$ 5,800,114</b>	<b>\$ 5,892,408</b>	<b>\$ 5,983,868</b>	<b>\$ 5,804,693</b>
<b>Operating Expenses</b>						
57200 Dutch Flat #2 Powerhouse	\$ 545,477	\$ 463,253	\$ 582,358	\$ 481,770	\$ 483,143	
57210 Dutch Flat #2 Flume	\$ 37,356	\$ 147,561	\$ 105,309	\$ 88,244	\$ 74,796	
57211 Dutch Flat #2 Forebay	\$ 40,213	\$ 43,562	\$ 49,336	\$ 41,660	\$ 125,727	
<b>Subtotal Operating Expenses</b>	<b>\$ 623,046</b>	<b>\$ 654,376</b>	<b>\$ 737,003</b>	<b>\$ 621,674</b>	<b>\$ 683,666</b>	<b>\$ 663,953</b>
<b>Project Expenses</b>						
2478 DFPH Electrical Drawing			\$ 41,756	\$ 17,322	\$ 5,548	
2348 DFPH Balance of Plant PLC			\$ 362,874	\$ 8,208		
2483 DFPH Standby Generator			\$ 589	\$ 15,227	\$ 20,419	
2355 DFPH-DFFB Fiber Optic			\$ 28,066			
2544 DFPH Cooling Water Upgrade					\$ 17,183	
2240 DFPH Fire Suppression Upgrade	\$ 1,744	\$ 560	\$ 17,505	\$ 8,706	\$ 2,232	
2229 DF Flume Footing Repairs	\$ 6,182	\$ 342,410				
<b>Subtotal Project Expenses</b>	<b>\$ 7,925</b>	<b>\$ 342,969</b>	<b>\$ 450,790</b>	<b>\$ 49,462</b>	<b>\$ 45,382</b>	<b>\$ 179,306</b>
<b>Allocated Project Expenses</b>						
201502 SCADA Upgrade (25%)	\$ 50,037	\$ 46,493	\$ 348			
1039 SCADA Upgrade Study (25%)	\$ 57	\$ 981	\$ 64	\$ 2		
2469 Electric Reliability Services (50%)			\$ 31,424	\$ 17,420	\$ 2,568	
6927 Lower Division Prop Acq (50%)	\$ 14,577	\$ 7,172	\$ 4,984	\$ 803		
201308 Lower Division Prop Acq (50%)	\$ 10,650	\$ 63	\$ 4,659	\$ 18		
<b>Subtotal Allocated Project Expenses</b>	<b>\$ 75,321</b>	<b>\$ 54,708</b>	<b>\$ 41,479</b>	<b>\$ 18,242</b>	<b>\$ 2,568</b>	<b>\$ 38,464</b>
<b>Total Expenses</b>	<b>\$ 706,292</b>	<b>\$ 1,052,054</b>	<b>\$ 1,229,273</b>	<b>\$ 689,378</b>	<b>\$ 731,615</b>	<b>\$ 881,722</b>
<b>Net Revenue</b>	<b>\$ 4,915,087</b>	<b>\$ 4,673,644</b>	<b>\$ 4,570,841</b>	<b>\$ 5,203,030</b>	<b>\$ 5,252,252</b>	<b>\$ 4,922,971</b>

The Dutch Flat #2 Powerhouse includes three facilities. The Dutch Flat #2 Flume and Forebay are integral to the powerhouse and do not serve a purpose for water ratepayers. The Dutch Flat #2 Powerhouse consistently produces a profit.

Project 2544 was completed in September of 2023.

Project allocations are based on the methodology described on the Chicago Park Revenue and Expenses slide.

## Dutch Flat #2

### Future Projects / Concerns

---



#### Projects in 5 Year Capital Improvement Plan

- Backup generator (2024)
- Liner repair upstream of Forebay
- RTU Replacement

#### Longer Term Planning

- Mechanical Refurbishment (TSV, Wicket Gates, etc.)

# Rollins Revenue/Expenses

	2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>	\$ 5,645,458	\$ 5,715,035	\$ 5,807,549	\$ 5,893,076	\$ 5,976,365	\$ 5,807,497
<b>Operating Expenses</b>						
57400 Rollins Powerhouse	\$ 356,051.00	\$ 402,652.06	\$ 473,557.53	\$ 486,964.75	\$ 411,479.07	
<b>Subtotal Operating Expenses</b>	\$ 356,051	\$ 402,652	\$ 473,558	\$ 486,965	\$ 411,479	\$ 426,141
<b>Project Expenses</b>						
2351 RPH OCB Replacement			\$ 16,927.18	\$ 232,038.55	\$ 269.08	
2393 RPH Balance of Plant			\$ 1,037.27	\$ 323,762.63	\$ 897.64	
2392 RPH Governor Replacement					\$ 272.24	
2394 RPH Relay Protection Upgrade			\$ 1,903.91	\$ 32,249.03	\$ 188,596.19	
<b>Subtotal Project Expenses</b>	\$ -	\$ -	\$ 19,868	\$ 588,050	\$ 190,035	\$ 159,591
<b>Allocated Project Expenses</b>						
201502 SCADA Upgrade (25%)	\$ 50,837.41	\$ 46,492.72	\$ 349.20			
1039 SCADA Upgrade Study (25%)	\$ 56.85	\$ 981.26	\$ 63.83	\$ 1.59		
<b>Subtotal Allocated Project Expenses</b>	\$ 50,894	\$ 47,474	\$ 412	\$ 2	\$ -	\$ 19,596
<b>Total Expenses</b>	\$ 406,145	\$ 450,126	\$ 493,838	\$ 1,075,017	\$ 601,514	\$ 605,328
<b>Net Revenue</b>	\$ 5,239,312	\$ 5,264,909	\$ 5,313,711	\$ 4,818,059	\$ 5,374,851	\$ 5,202,169

Only expenses associated with the Rollins Powerhouse are included on this summary. For the purposes of this analysis the Rollins Dam is considered a water related facility. The Rollins Powerhouse consistently produces a profit.

# Rollins

## Future Projects / Concerns

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### Projects in 5 Year Capital Improvement Plan

- Governor Replacement
- RTU Replacement

### Longer Term Planning

- N/A



# Bowman Revenue/Expenses

	2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>	\$ 1,110,355	\$ 1,081,741	\$ 1,118,961	\$ 1,100,881	\$ 1,191,805	\$ 1,120,749
<b>Operating Expenses</b>						
57100 Bowman Powerhouse	\$ 253,621	\$ 331,624	\$ 343,497	\$ 385,182	\$ 266,503	
57111 Bowman Transmission Line (42.86%)	\$ 42,947	\$ 134,168	\$ 87,216	\$ 37,040	\$ 44,968	
<b>Subtotal Operating Expenses</b>	\$ 296,568	\$ 465,791	\$ 430,713	\$ 422,222	\$ 311,471	\$ 385,353
<b>Project Expenses</b>						
2234 BPH Governor	\$ -	\$ 3,200	\$ 125,326	\$ -	\$ -	
2354 Bowman Intertie BRKR Rplc (42.86%)	\$ -	\$ -	\$ 1,645	\$ 794	\$ 131	
2556 JAN-21 BTL Wind Storm Rpr (42.86%)	\$ -	\$ -	\$ -	\$ 57,663	\$ -	
<b>Subtotal Project Expenses</b>	\$ -	\$ 3,200	\$ 126,971	\$ 58,457	\$ 131	\$ 37,752
<b>Allocated Project Expenses</b>						
N/A N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Subtotal Allocated Project Expenses</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Expenses</b>	\$ 296,568	\$ 468,991	\$ 557,683	\$ 480,679	\$ 311,602	\$ 423,105
<b>Net Revenue</b>	\$ 813,787	\$ 612,750	\$ 561,278	\$ 620,202	\$ 880,203	\$ 697,644

This slide presents expenses associated with the Powerhouse and the NID portion of the Bowman Transmission Line (42.86%). The remaining portion of the transmission line costs are billed to Grey Rock Hydro and are shown as revenue.

Operating expenses at the Bowman Powerhouse are high due to the remote nature of the powerhouse however, the powerhouse consistently produces a profit.



# Bowman

## Future Projects / Concerns

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### Projects in 5 Year Capital Improvement Plan

- Intertie Breaker Replacement (42.68%)

### Longer Term Planning

- Automation of canal headgate and improved remote operation capability
- Transmission line poles to be evaluated in late 2023 to mid 2024

## Combie South Revenue/Expenses

	2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>	\$ 476,289	\$ 759,043	\$ 228,854	\$ 330,135	\$ 509,783	\$ 440,821
<b>Operating Expenses</b>						
57700 Combie South Powerhouse	\$ 177,522	\$ 181,639	\$ 246,225	\$ 204,270	\$ 262,102	
<b>Subtotal Operating Expenses</b>	\$ 177,522	\$ 181,639	\$ 246,225	\$ 204,270	\$ 262,102	\$ 214,351
<b>Project Expenses</b>						
2163 CSPH Trash Rack	\$ 812,576	\$ 1,407				
2168 CSPH Electrical Upgrade	\$ 27,675	\$ 14,148	\$ 155,541	\$ 95,636	\$ 9,138	
2554 CSPH Fire Detection Upgrade				\$ 21,593	\$ 6,266	
2210 CSPH CAISO Mtrr/Swtchgr	\$ 7,693	\$ 146,002	\$ 48,239			
<b>Subtotal Project Expenses</b>	\$ 847,943	\$ 161,557	\$ 203,780	\$ 117,229	\$ 15,404	\$ 269,183
<b>Allocated Project Expenses</b>						
N/A N/A						
<b>Subtotal Allocated Project Expenses</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Expenses</b>	\$ 1,025,465	\$ 343,196	\$ 450,005	\$ 321,499	\$ 277,506	\$ 483,534
<b>Net Revenue</b>	\$ (549,176)	\$ 415,847	\$ (221,151)	\$ (91,364)	\$ 232,278	\$ (42,713)

Only expenses associated with the Combie South Powerhouse are included on this summary. For the purposes of this analysis the Van Giesen (Combie) Dam is considered a water related facility.

Revenue at the Combie South Powerhouse is highly variable due to the run-of-river nature of the powerhouse. For the purposes of comparison, 2018 can be considered an average year from a hydrologic standpoint. Revenue comparisons across years are complicated by way in which PG&E imports water into the watershed which can vary significantly year to year.

The District completed two large capital projects during the 2018-2022. The first was a new trashrack at the intake. The new trashrack has a life expectancy of at least 30-50 years. The second was a replacement transformer and the upgrades

necessary to sell power on the CAISO market. The new transformer should last 30-50 years. It is difficult to estimate the lifespan of the CAISO upgrades as new rules may change metering/monitoring requirements.

Combie South is expected to be profitable in nearly all future years.

# Combie South

## Future Projects / Concerns

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### Projects in 5 Year Capital Improvement Plan

- N/A

### Longer Term Planning

- Recent profitability impacted by large capital projects in 2018 and 2020
- Powerhouse is "run-of-river" so revenue is significantly impacted by hydrology
- Future profitability could be improved by improving remote operation capabilities
- Current operations result in many start/stop cycles that will impact long term maintenance requirements
- Penstock coating and corrosion is being monitored

### Other Consideration

- Continue to consider short term market-based power purchase agreements

# Scotts Flat Revenue/Expenses

	2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>	\$ 383,750	\$ 407,545	\$ 467,468	\$ 392,942	\$ 448,306	\$ 420,002
<b>Operating Expenses</b>						
57900 Scotts Flat Powerhouse	\$ 222,510	\$ 188,507	\$ 188,065	\$ 236,919	\$ 299,511	
<b>Subtotal Operating Expenses</b>	\$ 222,510	\$ 188,507	\$ 188,065	\$ 236,919	\$ 299,511	\$ 227,103
<b>Project Expenses</b>						
2232 SFPH Instrument Upgrade	\$ 54	\$ 672				
2233 SFPH Exciter Replacement	\$ -	\$ 68,775				
2406 SFPH Balance of Plant PLC					\$ 17,894	
2552 SFPH Fire Detection Upgrade				\$ 48,608	\$ 25,106	
2470 SF PG&E 12KV Line Outage			\$ 8,567			
2306 SFPH CAISO Meter	\$ 34,523	\$ 2,027				
<b>Subtotal Project Expenses</b>	\$ 54	\$ 103,971	\$ 10,594	\$ 48,608	\$ 42,999	\$ 41,245
<b>Allocated Project Expenses</b>						
N/A	N/A					
<b>Subtotal Allocated Project Expenses</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Expenses</b>	\$ 222,565	\$ 292,478	\$ 198,659	\$ 285,527	\$ 342,510	\$ 268,348
<b>Net Revenue</b>	\$ 161,186	\$ 115,068	\$ 268,809	\$ 107,415	\$ 105,796	\$ 151,655

Only expenses associated with the Scotts Flat Powerhouse are included on this summary. For the purposes of this analysis the Scotts Flat Dam is considered a water related facility.

Revenue at Scotts Flat is relatively consistent. Generation is largely driven by water demands which generally occur during periods of peak pricing under the Renewable Energy Self-Generation Bill Credit Transfer (RES-BCT) program.

The Scotts Flat Powerhouse consistently produces a profit.

# Scotts Flat

## Future Projects / Concerns



### Projects in 5 Year Capital Improvement Plan

- Penstock Pipe Seismic Upgrade

### Longer Term Planning

- Future profitability could be improved by improving remote operation capabilities

### Other Considerations

- Operations would be required even without powerhouse. Historic Operations only costs below.

2018	2019	2020	2021	2022
\$86,188	\$93,091	\$58,949	\$87,544	\$86,454

The Scotts Flat and Combie North Powerhouses are unique from the other powerhouses in that there would be costs associated with operating these facilities for water delivery even if the powerhouses did not exist. The cost table shows the costs associated with operations of the facilities only. Maintenance and other expenses have been removed.

# Combie North Revenue/Expenses

	2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>	\$ 157,697	\$ 193,211	\$ 134,073	\$ 132,445	\$ 145,437	\$ 152,573
Operating Expenses						
57600 Combie North Powerhouse	\$ 137,541	\$ 138,361	\$ 108,240	\$ 117,920	\$ 145,456	
<b>Subtotal Operating Expenses</b>	\$ 137,541	\$ 138,361	\$ 108,240	\$ 117,920	\$ 145,456	\$ 129,504
Project Expenses						
2553 CNPH Fire Detection Upgrade				\$ 9,368	\$ 6,545	
2581 CNPH Capacitor Bank Upgrade				\$ 148	\$ 1,544	
<b>Subtotal Project Expenses</b>	\$ -	\$ -	\$ -	\$ 9,516	\$ 8,089	\$ 3,521
Allocated Project Expenses						
N/A N/A						
<b>Subtotal Allocated Project Expenses</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Expenses</b>	\$ 137,541	\$ 138,361	\$ 108,240	\$ 127,437	\$ 153,546	\$ 133,025
<b>Net Revenue</b>	\$ 20,156	\$ 54,849	\$ 25,833	\$ 5,008	\$ (8,108)	\$ 19,548


Only expenses associated with the Combie North Powerhouse are included on this summary. For the purposes of this analysis the Van Giesen (Combie) Dam is considered a water related facility.

There were no large capital projects completed at the powerhouse during the period reviewed. This is to be as expected, as the powerhouse is the newest in the NID fleet. Recently however, the powerhouse has experienced significant failures in the capacitor bank and one of the large value actuators. In 2023 annual generation and the corresponding revenue is expected to be well below average due previously listed equipment failure.



## Combie North Future Projects / Concerns

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**Projects in 5 Year Capital Improvement Plan**

- N/A

**Longer Term Planning**

- Powerhouse is experiencing recent failures in ancillary equipment that is negatively impacting generation (capacitors, actuators, etc)
- PPA expiration requires meter upgrade. Estimated capital cost is \$165,000 including internal labor.
- Under new PPA average revenue is expected to average \$109,000 annually
- Need to consider other sales options
  - RES-BCT – would require partnership with external agencies
  - Cryptocurrency
  - Hydrogen generation
- Future profitability could be improved by improving remote operation capabilities

**Other Considerations**

- Operations would be required even without powerhouse. Historic Operations only costs below.

2018	2019	2020	2021	2022
\$70,930	\$53,417	\$39,938	\$53,985	\$54,785

The future of the Combie North Powerhouse is complicated. While the turbine/generator combination appears to be well made and has not shown signs of excessive wear the ancillary systems have not proven reliable. In recent years the station has been plagued by failures in the capacitor bank which has reduced the ability to operate during shoulder seasons. The bank was replaced in November of 2023 which should significantly improve performance.

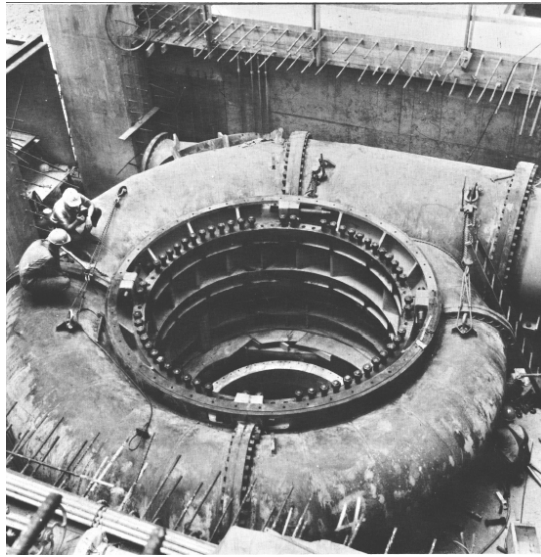
A large capital upgrade is required to sell power on the open market under a new PPA and rates under the new PPA are expected to be lower than those currently earned (approximately \$105/MWh under current PPA vs \$85/MWh under a market based PPA).

Staff has been considering alternative ways to monetize the output from the

powerhouse and recommends using the powerhouse as a pilot to test the three alternatives considered.

- Alternative 1: Seek other large power users and form a Joint Powers Authority. RES-BCT credits could then be monetized by offsetting JPA power usage.
- Alternative 2: Selling the power generated by the powerhouse to a crypto currency miner. Presumably the miner would pay the District for the power produced and a ground lease that would be necessary to locate equipment behind the meter at the powerhouse. This approach has been used effectively at similarly sized generators in the United States. Combie North could be an attractive site due to onsite water which can be used for cooling the necessary equipment.
- Alternative 3: Use power generated to produce green hydrogen. Hydrogen generation requires water and electricity, both of which are available at Combie North. Generated hydrogen would then be sold to a gas supplier and green hydrogen is currently more valuable than hydrogen produced by other technologies. This approach is being piloted at other hydropower agencies in the United States.

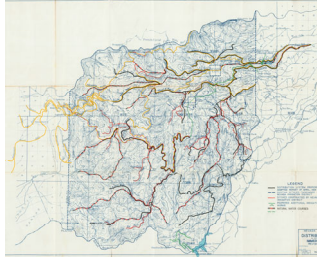
The Scotts Flat and Combie North Powerhouses are unique from the other powerhouses in that there would be costs associated with operating these facilities for water delivery even if the powerhouses did not exist. The cost table shows the costs associated with operations of the facilities only. Maintenance and other expenses have been removed.



Part 3:  
Water Delivery  
Related Expenses

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Quantify Hydro Subsidy  
to Water Ratepayers



# Current Water Subsidy

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## Question:

- If NID had never built the powerhouses, how much would ratepayers have to fund to operate and maintain the system of dams and conveyances necessary to deliver water to, and store water in, the lower division?

## Methodology:

- Line by line review of the 2023 budget.
  - Water (cost would exist even if the powerhouses did not, e.g. DSOD fees, expenses on Bowman-Spaulding Canal)
  - Power (expense is related entirely to power function of Department, e.g. FERC, NERC)

Position	2023 Budget	Water (Would Exist Without Power Generation)
<b>Hydro Administration</b>		
Associate Engineer	1	1
Senior Engineer Dam Safety	1	1
Project Manager	1	0.5
Hydroelectric Compliance Analyst	1	0
Hydroelectric Compliance Technician	1	0.5
Administrative Analyst	1	0.5
Director of Power Systems	1	0
<b>Subtotal</b>	<b>7</b>	<b>3.5</b>
<b>Hydro Operations</b>		
Hydroelectric Water Systems Operator	3	3
Hydroelectric Generation Superintendent	1	0
Senior Hydroelectric Plant Operator	2	0
Hydroelectric Plant Operator	4	0
Senior Hydrographer	1	1
<b>Subtotal</b>	<b>11</b>	<b>4</b>
<b>Hydro Maintenance</b>		
Hydroelectric Compliance & Protection Systems Specialist	1	0
Hydroelectric Systems Technician	1	0
Supervising Electrical Systems Technician	1	0
Hydroelectric Communication Technician	2	0.5
Hydroelectric Electrical Machinist	2	0
Hydroelectric Maintenance Tech	3	2
Utility Worker	1	3
Senior Hydroelectric Systems Technician	1	0
Senior Hydroelectric Maintenance Technician	1	1
Supervising Mechanical/Civil Foreman	1	0
Hydroelectric Maintenance Superintendent	1	0
Senior Hydroelectric Electric Machinist	1	0
<b>Subtotal</b>	<b>16</b>	<b>7.5</b>
<b>Total</b>	<b>34</b>	<b>15</b>

# Labor Breakdown

50112-52608: FED/ST/CO FEES	2023 Budget (\$)	Water (Would Exist Without Power Generation (\$))	Power (Attributable Solely to Power Generation (\$))
Water Rights Fees	150,000	75,442	74,558
FERC Admin Fees	131,250	-	131,250
FERC Land Fees	183,750	183,750	-
Hazardous Waste Fees	5,000	-	5,000
SYC/DCPH Taxes	200,000	200,000	-
USDA Forest Service	10,000	10,000	-
USGS	76,650	-	76,650
CA Water Resources Dam Fees	483,000	421,000	62,000
Other Fees (WREGIS, DMV, CAISO, FCC)	5,000	2,000	3,000
<b>Total</b>	<b>1,244,650</b>	<b>892,192</b>	<b>352,458</b>

## Sample Breakdown of Costs



**Bowman-Spaulding  
Canal, Clear Creek  
Tunnel 1925**

## Results

Little or no change to employee counts associated with the Board, Administration, Human Resources, Finance, Safety, Communications, Purchasing

- Likely some possibility of reduction in Information Technology, Engineering, Fleet

Eliminates payment to Fund 70 with little reduction to overall Fund 70 costs

If NID had never built the powerhouses, water ratepayers would have had to budget **\$12,636,143 in 2023** to operate and maintain the system of dams and conveyances necessary to deliver water to, and store water in, the lower division.

Similar amounts would be included in all future budgets



## Part 4: The Future

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Key Risks

Future Considerations

Recommendations



# Key Risks

## People and Training

- Attrition:
  - 2018 – 2022 = 7-16% attrition rate
  - Approximately 22% of department was eligible to retire at beginning of 2023
- Succession Planning: Recruiting problems makes succession planning critical
- Staffing Levels: PCWA, SFWP, and YWA average 5 people per facility (dam or powerhouse). NID averages 2 (excludes 60kV line, diversions, and SYC/DCPH).

## Regulatory Environment

- Unimpaired flows
- Relicensing
- Increasing regulatory requirements
  - Dam Safety
  - Aquatic Invasive Species
  - NERC

Additional information on the costs associated with relicensing can be found in Item 4 of the July 8, 2020 Board of Directors meeting located at the link below. The Staff Report provides the estimated annual cash flow for implementation of the new FERC license for the Yuba-Bear Project over 40 years. The report provides planning-level detail and estimates on external costs for consultants, materials, and contractors to perform specific license-related efforts (studies, development of mitigation plans, design, construction, specialty operation and inspections, and subject matter expertise support). It is important to note that the report does not include estimates for NID staffing levels (or associated costs) in the analysis.

Link to item #4 from the July 8, 2020 NID Board of Director Meeting:  
[https://www.nidwater.com/files/5a6dd5092/07082020\\_BOD\\_Item\\_4.pdf](https://www.nidwater.com/files/5a6dd5092/07082020_BOD_Item_4.pdf)

# Key Risks

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## Infrastructure & Technology

- Increasing IT/OT Demand
- Maintenance Tracking
- OT Workload and Staffing
- Cybersecurity
- Physical Security

## Operating Environment

- Capacity Planning – Capital Projects
- Portfolio Growth (Deer Creek & South Yuba Canal)
- Climate Change

## Electricity Revenue

- Supply chain constraints and inflationary factors have placed upward pressure on installed cost of competing electricity generation resources

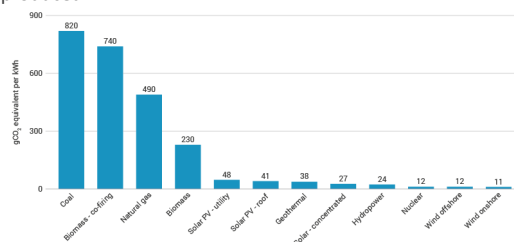
# Future Considerations

U.S. Department of Energy – Office of Energy Efficiency & Renewable Energy – August 24, 2023

- Key to Resilience in Extreme Weather
- Grid Recovery – “Black Start”
- Key to Energy Independence and Local Jobs

United Nations (UN) Intergovernmental Panel on Climate Change (IPCC)

- On a life-cycle basis, hydropower is among the lowest producers of CO<sub>2</sub> equivalent per kWh of electricity produced



Link to U.S. Department of Energy article titled “Hydropower Is Key to a Clean Energy Future—Here’s Why” dated August 24, 2023:

<https://www.energy.gov/eere/water/articles/hydropower-key-clean-energy-future-heres-why>

The graphic shown is from the World Nuclear Association based on data from Annex III of Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (2014).

<https://www.world-nuclear.org/information-library/energy-and-the-environment/carbon-dioxide-emissions-from-electricity.aspx>

[https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc\\_wg3\\_ar5\\_annex-iii.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_annex-iii.pdf)

# Future Considerations

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## Market Trends

- Karbone – October 31, 2023 – CAISO Summary
  - 2023 PCC1 transactions continued to climb, hitting a reported all time high peak of Index + \$74.00 this month, an increase of \$4.00 from September.
  - Fears do exist among some load servers that the increase in RPS procurement costs and seeming impossibility of finding sufficient supply, coupled with similar trends in the RA market, will lead to either regulatory intervention (which could undermine the efficacy of both programs), excessively high power rates, or even the failure of some load servers over time.
- CAISO – Q2 2023 Report on Market Issues and Performance – 11/16/2023
  - Natural gas prices fell from extraordinarily high levels in December, averaging less than Q2 2022. Average gas prices at Henry Hub, the national index, were less than one third of prices in the same quarter of last year, while prices at both California hubs fell to less than 60 percent (Figure E.1). This resulted in lower system marginal energy prices across the market.
  - Prices were significantly lower than the same quarter of 2022 (Figure E.2). Day-ahead and real-time prices fell by half in most areas due to lower natural gas prices and higher renewable generation.
  - Hydroelectric generation almost doubled, substituting for both natural gas generation and lower net imports. Hydroelectric generation was higher than 2020, 2021, or 2022.

Link to CAISO report titled “Q2 2023 Report on Market Issues and Performance” dated November 16, 2023: <https://www.aiso.com/Documents/2023-Second-Quarter-Report-on-Market-Issues-and-Performance-Nov-16-2023.pdf>



## Recommendations

Identify and develop relationships with consultants and vendors to begin early planning for Yuba-Bear Power Purchase Agreement

Pilot alternative sales models at Combie North Powerhouse

Continue progress on Hydro Master Plan as identified in NID Strategic Plan (due by end of 2025)

Continue coordination with IT on IT/OT Master Plan

Regularly monitor and update risks and strategies used to mitigate them

## Questions and Discussion

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Rollins Powerhouse Equipment being delivered, 1979

### Chicago Park Powerhouse

		2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>		\$ 10,131,747	\$ 10,311,570	\$ 10,465,264	\$ 10,626,541	\$ 10,768,136	\$ 10,460,652
<b>Operating Expenses</b>							
57300	Chicago Park Powerhouse	\$ 541,694	\$ 594,450	\$ 626,643	\$ 584,102	\$ 656,759	
57301	Dutch Flat #2 Afterbay	\$ 103,399	\$ 61,918	\$ 36,763	\$ 64,286	\$ 60,858	
57302	Chicago Park Flume	\$ 17,245	\$ 59,692	\$ 98,957	\$ 44,995	\$ 104,263	
57303	Little York Basin	\$ 634	\$ 14,711	\$ 4,216	\$ 4,025	\$ 12,492	
57304	Chicago Park Forebay	\$ 2,149	\$ 3,903	\$ 27,915	\$ 45,206	\$ 17,336	
	<b>Subtotal Operating Expenses</b>	\$ 665,121	\$ 734,675	\$ 794,494	\$ 742,614	\$ 851,707	\$ 757,722
<b>Project Expenses</b>							
6877	CPPH Access Road	\$ 70,322	\$ 35,529	\$ 135,522	\$ 84,662	\$ 29,183	
2484	CPPH Standby Generator			\$ 19,417		\$ 401	
2471	CPPH Electrical Drawing			\$ 50,772			
2006	CHPH Switchboard/Relays	\$ 48,904	\$ 1,437				
2133	CPPH Rough Operating Zone	\$ 203,057					
2164	CPPH Fire Suppression	\$ 8,645	\$ 153,349	\$ 174,223	\$ 171,542	\$ 12,176	
2165	CPPH Balance of Plant PLC	\$ 396,409	\$ 155				
2352	CPPH Switchgear			\$ 551			
2402	CPPH Instrumentation		\$ 3,216	\$ 61,271	\$ 300,005	\$ 1,370	
2551	CPPH Tailrace Repair				\$ 20		
2549	CPPH CAISO Meter Reset			\$ 147	\$ 738		
2353	CPPH Turbine Overhaul				\$ 15,260	\$ 51,644	
2362	CPPH Transformer				\$ 14,660	\$ 48,324	
2383	CPPH Rewind					\$ 52,840	
2598	CPPH RTU Replacement					\$ 3,940	
2006-1	CPPH Relays - Legal		\$ 1,735	\$ 384			
2053	DFAB Low Level Outlet	\$ 91,905	\$ 18,726				
2386	CP Flume Drain			\$ 98			
2511	CP Forebay/Canal Lining			\$ 22,438	\$ 2,870		
	<b>Subtotal Project Expenses</b>	\$ 819,244	\$ 214,147	\$ 464,825	\$ 589,757	\$ 199,878	\$ 457,570
<b>Allocated Project Expenses</b>							
201502	SCADA Upgrade (25%)	\$ 50,037	\$ 46,493	\$ 348			
1039	SCADA Upgrade Study (25%)	\$ 57	\$ 981	\$ 64	\$ 2		
2469	Electric Reliability Services (50%)			\$ 31,424	\$ 17,420	\$ 2,568	
6927	Lower Division Prop Acq (50%)	\$ 14,577	\$ 7,172	\$ 4,984	\$ 803		
201308	Lower Division Prop Acq (50%)	\$ 10,650	\$ 63	\$ 4,659	\$ 18		
	<b>Subtotal Allocated Project Expenses</b>	\$ 75,321	\$ 54,708	\$ 41,479	\$ 18,242	\$ 2,568	\$ 38,464
<b>Total Expenses</b>		\$ 1,559,686	\$ 1,003,530	\$ 1,300,798	\$ 1,350,614	\$ 1,054,153	\$ 1,253,756
<b>Net Revenue</b>		\$ 8,572,061	\$ 9,308,040	\$ 9,164,466	\$ 9,275,927	\$ 9,713,983	\$ 9,206,895

### Dutch Flat #2 Powerhouse

		2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>		\$ 5,621,379	\$ 5,725,698	\$ 5,800,114	\$ 5,892,408	\$ 5,983,868	\$ 5,804,693
Operating Expenses							
57200	Dutch Flat #2 Powerhouse	\$ 545,477	\$ 463,253	\$ 582,358	\$ 481,770	\$ 483,143	
57210	Dutch Flat #2 Flume	\$ 37,356	\$ 147,561	\$ 105,309	\$ 98,244	\$ 74,796	
57211	Dutch Flat #2 Forebay	\$ 40,213	\$ 43,562	\$ 49,336	\$ 41,660	\$ 125,727	
	<b>Subtotal Operating Expenses</b>	\$ 623,046	\$ 654,376	\$ 737,003	\$ 621,674	\$ 683,666	\$ 663,953
Project Expenses							
2478	DFPH Electrical Drawing			\$ 41,756	\$ 17,322	\$ 5,548	
2348	DFPH Balance of Plant PLC			\$ 362,874	\$ 8,208		
2483	DFPH Standby Generator			\$ 589	\$ 15,227	\$ 20,419	
2355	DFPH-DFFB Fiber Optic			\$ 28,066			
2544	DFPH Cooling Water Upgrade					\$ 17,183	
2240	DFPH Fire Suppression Upgrade	\$ 1,744	\$ 560	\$ 17,505	\$ 8,706	\$ 2,232	
2229	DF Flume Footing Repairs	\$ 6,182	\$ 342,410				
	<b>Subtotal Project Expenses</b>	\$ 7,925	\$ 342,969	\$ 450,790	\$ 49,462	\$ 45,382	\$ 179,306
Allocated Project Expenses							
201502	SCADA Upgrade (25%)	\$ 50,037	\$ 46,493	\$ 348			
1039	SCADA Upgrade Study (25%)	\$ 57	\$ 981	\$ 64	\$ 2		
2469	Electric Reliability Services (50%)			\$ 31,424	\$ 17,420	\$ 2,568	
6927	Lower Division Prop Acq (50%)	\$ 14,577	\$ 7,172	\$ 4,984	\$ 803		
201308	Lower Division Prop Acq (50%)	\$ 10,650	\$ 63	\$ 4,659	\$ 18		
	<b>Subtotal Allocated Project Expenses</b>	\$ 75,321	\$ 54,708	\$ 41,479	\$ 18,242	\$ 2,568	\$ 38,464
<b>Total Expenses</b>		\$ 706,292	\$ 1,052,054	\$ 1,229,273	\$ 689,378	\$ 731,615	\$ 881,722
<b>Net Revenue</b>		\$ 4,915,087	\$ 4,673,644	\$ 4,570,841	\$ 5,203,030	\$ 5,252,252	\$ 4,922,971



### Rollins Powerhouse

		2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>		\$ 5,645,458	\$ 5,715,035	\$ 5,807,549	\$ 5,893,076	\$ 5,976,365	\$ 5,807,497
Operating Expenses							
57400	Rollins Powerhouse	\$ 356,051.00	\$ 402,652.06	\$ 473,557.53	\$ 486,964.75	\$ 411,479.07	
<b>Subtotal Operating Expenses</b>		\$ 356,051	\$ 402,652	\$ 473,558	\$ 486,965	\$ 411,479	\$ 426,141
Project Expenses							
2351	RPH OCB Replacement			\$ 16,927.18	\$ 232,038.55	\$ 269.08	
2393	RPH Balance of Plant			\$ 1,037.27	\$ 323,762.63	\$ 897.64	
2392	RPH Governor Replacement					\$ 272.24	
2394	RPH Relay Protection Upgrade			\$ 1,903.91	\$ 32,249.03	\$ 188,596.19	
<b>Subtotal Project Expenses</b>		\$ -	\$ -	\$ 19,868	\$ 588,050	\$ 190,035	\$ 159,591
Allocated Project Expenses							
201502	SCADA Upgrade (25%)	\$ 50,037.41	\$ 46,492.72	\$ 348.20			
1039	SCADA Upgrade Study (25%)	\$ 56.85	\$ 981.26	\$ 63.85	\$ 1.59		
<b>Subtotal Allocated Project Expenses</b>		\$ 50,094	\$ 47,474	\$ 412	\$ 2	\$ -	\$ 19,596
<b>Total Expenses</b>		\$ 406,145	\$ 450,126	\$ 493,838	\$ 1,075,017	\$ 601,514	\$ 605,328
<b>Net Revenue</b>		\$ 5,239,312	\$ 5,264,909	\$ 5,313,711	\$ 4,818,059	\$ 5,374,851	\$ 5,202,169

**Bowman Powerhouse**

		2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>		\$ 1,110,355	\$ 1,081,741	\$ 1,118,961	\$ 1,100,881	\$ 1,191,805	\$ 1,120,749
Operating Expenses							
57100	Bowman Powerhouse	\$ 253,621	\$ 331,624	\$ 343,497	\$ 385,182	\$ 266,503	
57111	Bowman Transmission Line (42.86%)	\$ 42,947	\$ 134,168	\$ 87,216	\$ 37,040	\$ 44,968	
<b>Subtotal Operating Expenses</b>		\$ 296,568	\$ 465,791	\$ 430,713	\$ 422,222	\$ 311,471	\$ 385,353
Project Expenses							
2234	BPH Governor		\$ 3,200	\$ 125,326	\$ -		
2354	Bowman Intertie BRKR Rplc (42.86%)			\$ 1,645	\$ 794	\$ 131	
2556	JAN-21 BTL Wind Storm Rpr (42.86%)				\$ 57,663		
<b>Subtotal Project Expenses</b>		\$ -	\$ 3,200	\$ 126,971	\$ 58,457	\$ 131	\$ 37,752
Allocated Project Expenses							
N/A	N/A						
<b>Subtotal Allocated Project Expenses</b>		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Expenses</b>		\$ 296,568	\$ 468,991	\$ 557,683	\$ 480,679	\$ 311,602	\$ 423,105
<b>Net Revenue</b>		\$ 813,787	\$ 612,750	\$ 561,278	\$ 620,202	\$ 880,203	\$ 697,644

### Combie South Powerhouse

		2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>		\$ 476,289	\$ 759,043	\$ 228,854	\$ 230,135	\$ 509,783	\$ 440,821
Operating Expenses							
57700	Combie South Powerhouse	\$ 177,522	\$ 181,639	\$ 246,225	\$ 204,270	\$ 262,102	
<b>Subtotal Operating Expenses</b>		\$ 177,522	\$ 181,639	\$ 246,225	\$ 204,270	\$ 262,102	\$ 214,351
Project Expenses							
2163	CSPH Trash Rack	\$ 812,576	\$ 1,407				
2168	CSPH Electrical Upgrade	\$ 27,675	\$ 14,148	\$ 155,541	\$ 95,636	\$ 9,138	
2554	CSPH Fire Detection Upgrade				\$ 21,593	\$ 6,266	
2210	CSPH CAISO Mtr/Swtchgr	\$ 7,693	\$ 146,002	\$ 48,239			
<b>Subtotal Project Expenses</b>		\$ 847,943	\$ 161,557	\$ 203,780	\$ 117,229	\$ 15,404	\$ 269,183
Allocated Project Expenses							
N/A	N/A						
<b>Subtotal Allocated Project Expenses</b>		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Expenses</b>		\$ 1,025,465	\$ 343,196	\$ 450,005	\$ 321,499	\$ 277,506	\$ 483,534
<b>Net Revenue</b>		\$ (549,176)	\$ 415,847	\$ (221,151)	\$ (91,364)	\$ 232,278	\$ (42,713)

**Scotts Flat Powerhouse**

		2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>		\$ 383,750	\$ 407,545	\$ 467,468	\$ 392,942	\$ 448,306	\$ 420,002
Operating Expenses							
57900	Scotts Flat Powerhouse	\$ 222,510	\$ 188,507	\$ 188,065	\$ 236,919	\$ 299,511	
<b>Subtotal Operating Expenses</b>		\$ 222,510	\$ 188,507	\$ 188,065	\$ 236,919	\$ 299,511	\$ 227,103
Project Expenses							
2232	SFPH Instrument Upgrade	\$ 54	\$ 672				
2233	SFPH Exciter Replacement		\$ 68,775				
2406	SFPH Balance of Plant PLC					\$ 17,894	
2552	SFPH Fire Detection Upgrade				\$ 48,608	\$ 25,106	
2470	SF PG&E 12KV Line Outage			\$ 8,567			
2306	SFPH CAISO Meter		\$ 34,523	\$ 2,027			
<b>Subtotal Project Expenses</b>		\$ 54	\$ 103,971	\$ 10,594	\$ 48,608	\$ 42,999	\$ 41,245
Allocated Project Expenses							
N/A	N/A						
<b>Subtotal Allocated Project Expenses</b>		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Expenses</b>		\$ 222,565	\$ 292,478	\$ 198,659	\$ 285,527	\$ 342,510	\$ 268,348
<b>Net Revenue</b>		\$ 161,186	\$ 115,068	\$ 268,809	\$ 107,415	\$ 105,796	\$ 151,655

### Combie North Powerhouse

		2018	2019	2020	2021	2022	Average
<b>Gross Revenue</b>		\$ 157,697	\$ 193,211	\$ 134,073	\$ 132,445	\$ 145,437	\$ 152,573
Operating Expenses							
57600	Combie North Powerhouse	\$ 137,541	\$ 138,361	\$ 108,240	\$ 117,920	\$ 145,456	
<b>Subtotal Operating Expenses</b>		\$ 137,541	\$ 138,361	\$ 108,240	\$ 117,920	\$ 145,456	\$ 129,504
Project Expenses							
2553	CNPH Fire Detection Upgrade				\$ 9,368	\$ 6,545	
2581	CNPH Capacitor Bank Upgrade				\$ 148	\$ 1,544	
<b>Subtotal Project Expenses</b>		\$ -	\$ -	\$ -	\$ 9,516	\$ 8,089	\$ 3,521
Allocated Project Expenses							
N/A	N/A						
<b>Subtotal Allocated Project Expenses</b>		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Expenses</b>		\$ 137,541	\$ 138,361	\$ 108,240	\$ 127,437	\$ 153,546	\$ 133,025
<b>Net Revenue</b>		\$ 20,156	\$ 54,849	\$ 25,833	\$ 5,008	\$ (8,108)	\$ 19,548