



Meridian.

Monthly Operating Report

December 2024

December highlights

In the month to 13 January 2025, national hydro storage decreased from **134%** to **114%** of historical average

South Island storage decreased to **112%** of average and North Island storage increased to **126%** of average by 13 January 2025

Meridian's December 2024 monthly total inflows were **97%** of historical average

Waiau catchment inflows in December 2024 were **96%** of historical average

Meridian's Waitaki catchment water storage at the end of December 2024 was **135%** of historical average

Snow storage in Meridian's Waitaki catchment was **62%** of average in early January 2025

Water storage in Meridian's Waiau catchment was **98%** of average at the end of December 2024

December 2024 was the 5th warmest December on record, with temperatures above average for both islands. Rainfall varied across both islands, with above normal rainfall in the West Coast of the South Island

National electricity demand in December 2024 was **-3.2%** lower than the same month last year

New Zealand Aluminium Smelter's average load during December 2024 was **486MW**

Meridian's retail sales volumes in December 2024 were **+2.6%** higher than December 2023

Compared to December 2023, segment sales increased in small medium business +1.0%, agricultural +6.5%, large business +8.4% and corporate +1.2%, with decreases in residential -0.5%

Q2 highlights

Meridian's Q2 total inflows were **114%** of historical average, **+36%** higher than Q2 last year

Meridian's Waitaki catchment water storage at the end of Q2 was **+66%** higher than Q2 last year

Compared to Q2 last year, Meridian's generation was **+5.2%** higher at a **-76.2%** lower average price

Near term electricity futures prices decreased during Q2

Spring 2024 was warmer than average for much of the country. The southern South Island recorded significant rainfall, while it was very dry in the east of the North Island

NIWA's summer 2024/25 outlook includes a La Niña watch. Average to above average temperatures and rainfall are forecast across the country

National electricity demand in Q2 was **-3.3%** lower than Q2 last year

New Zealand Aluminum Smelter's sales volumes in Q2 were lower than Q2 last year

During the quarter, Meridian made calls on volume under the largest option of the Demand Response Agreement with NZAS

At the end of Q2, Meridian's customer numbers were **+2.9%** higher than the same time last year

Compared to Q2 last year, Meridian's retail sales volumes were **+1.3%** higher at a **+4.4%** higher average price

Sales increased in agriculture and large business segments

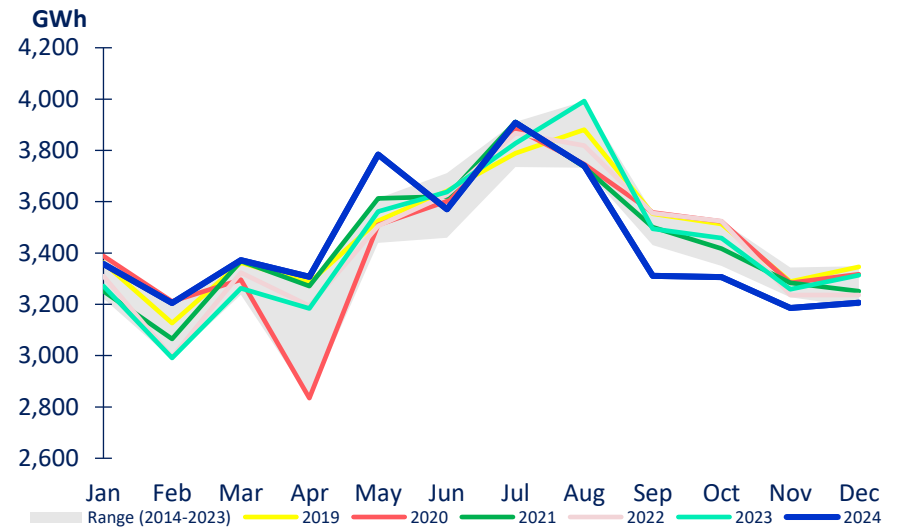
Compared to Q2 last year, total operating costs were **-4.4%** lower

Compared to Q2 last year, total capital expenditure was **-42.1%** lower

Market data

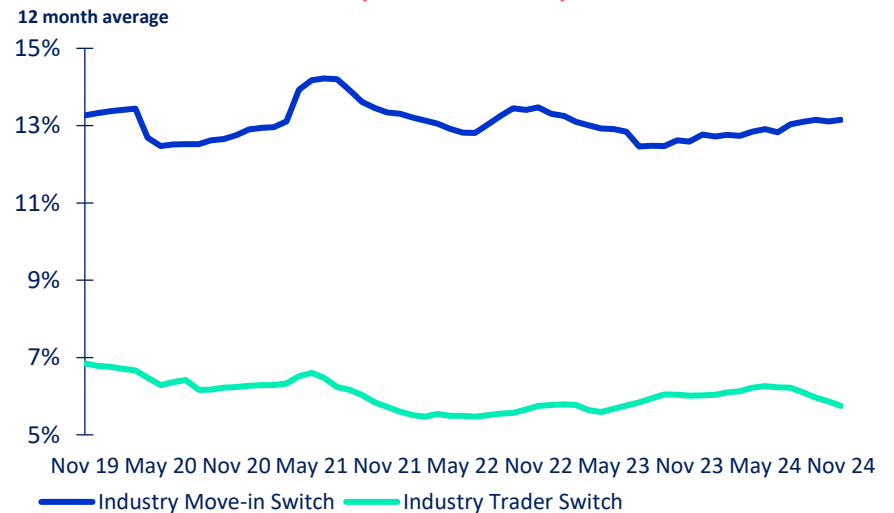
- National electricity demand in December 2024 was -3.2% lower than the same month last year
- New Zealand Aluminium Smelter's average load during December 2024 was 486MW
- December 2024 was the 5th warmest December on record, with temperatures above average for both islands. Rainfall varied across both islands, with above normal rainfall in the West Coast of the South Island
- Demand in the last 12 months was the same level as the preceding 12 months
- 12-month average switching rate of customers changing retailers but not moving ("trader" switch) was 5.8% at the end of November 2024
- 12-month average switching rate of customers moving and changing retailers ("move-in" switch) was 13.1% at the end of November 2024

NATIONAL DEMAND



Source: Electricity Authority (reconciled demand)

MARKET ICP SWITCHING (ALL RETAILERS)

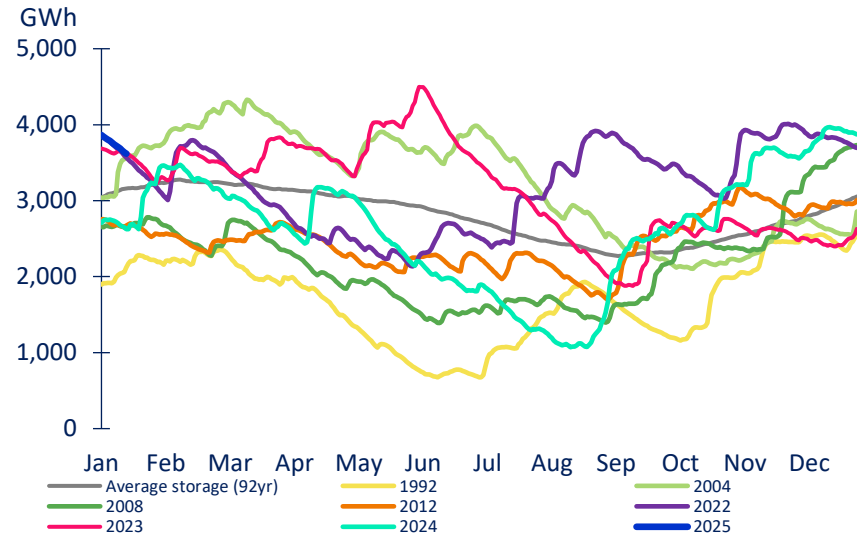


Source: Electricity Authority

Market data

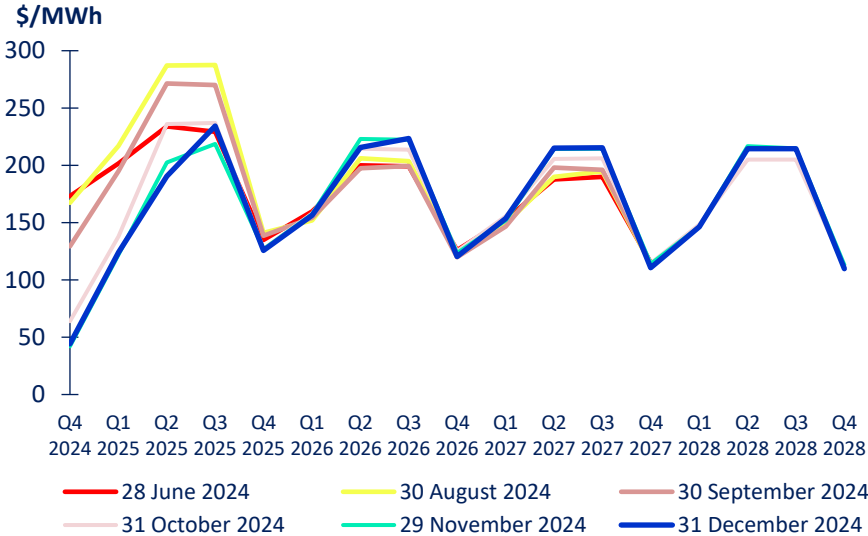
- December 2024 saw little movement in ASX electricity futures prices
- National storage decreased from 134% of average on 10 December 2024 to 114% of average on 13 January 2025
- South Island storage decreased to 112% of historical average by 13 January 2025. North Island storage increased to 126% of average

NATIONAL HYDRO STORAGE (13 January 2025)



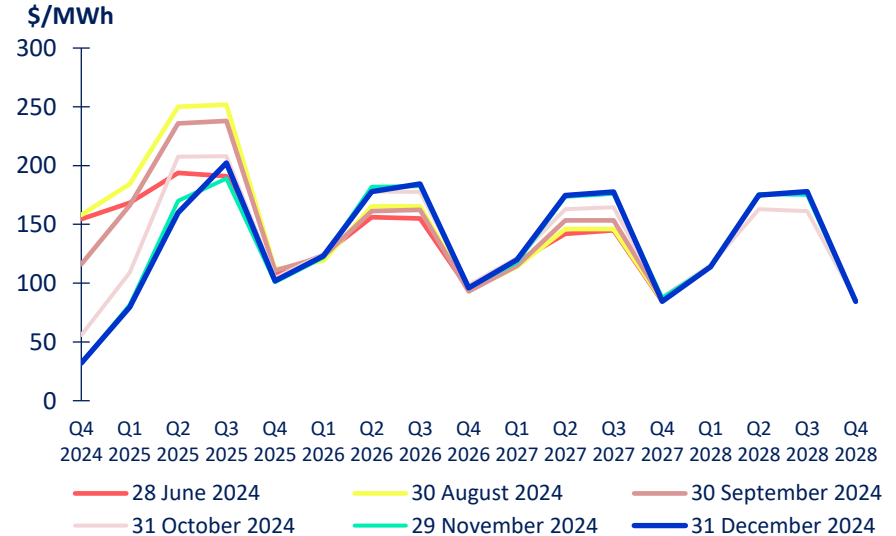
Source: NZX

OTAHUHU ASX FUTURES SETTLEMENT PRICE



Source: ASX

BENMORE ASX FUTURES SETTLEMENT PRICE

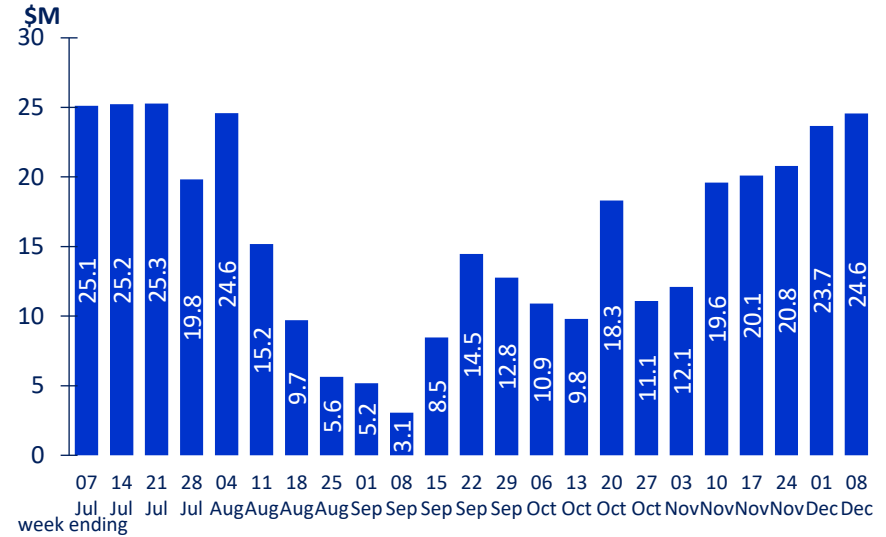


Source: ASX

Market data

- Since July 2024 the Electricity Authority has been reporting “Energy Margin” from information provided by six generators
- This excludes operational costs such as staffing, maintenance, debt servicing, depreciation and levies
- Information provided by Meridian has not been assured or audited by the company’s auditors and is different to and not intended to replace information Meridian reports in its financial statements and operating reports

MERIDIAN ELECTRICITY AUTHORITY REPORTED MARGIN



Source: Meridian, Electricity Authority

Meridian Electricity Authority Reported Margin

	<u>Wholesale generation revenue</u>	<u>Ancillary market revenue</u>	<u>Other generation revenue</u>	<u>Spot electricity costs</u>	<u>Total</u>
<u>Week ending</u>					
17 Nov	10.3	0.1	19.3	-9.6	20.1
24 Nov	2.1	0.1	20.6	-2.0	20.8
01 Dec	6.5	0.1	23.8	-6.7	23.7
08 Dec	10.6	0.1	23.9	-10.0	24.6

See: <https://public.tableau.com/app/profile/electricity.authority/viz/Energymargin/Energymargin>

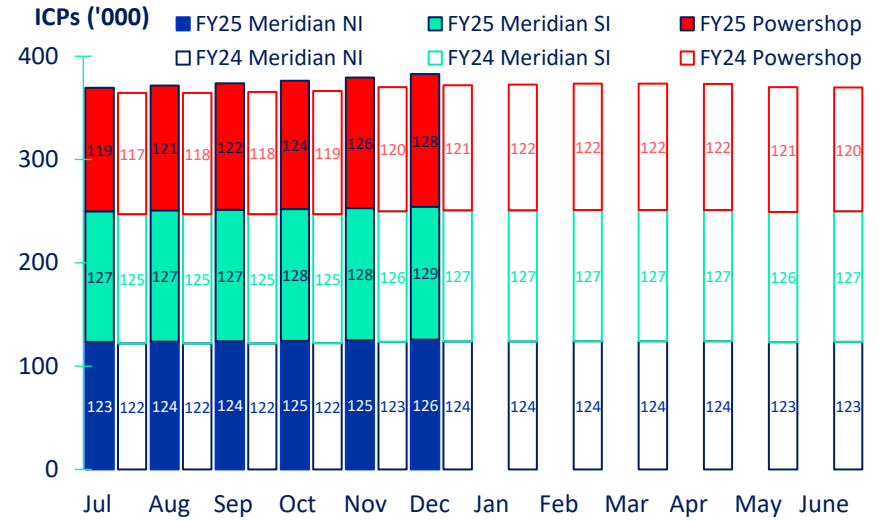
Source: Meridian, Electricity Authority

Meridian retail

- Meridian’s customer connection numbers increased +0.9% during December 2024 and have increased +2.9% since December 2023
- Retail sales volumes in December 2024 were +2.6% higher than December 2023
- Compared to December 2023, segment sales increased in small medium business +1.0%, agricultural +6.5%, large business +8.4% and corporate +1.2%, with decreases in residential -0.5%
- To date this financial year, retail sales volumes are -1.2% lower than the same period last year
- This reflects increased segment sales in agriculture +0.7 and large business +8.4%, with decreases in residential -0.6%, small medium business -0.2% and corporate -4.1%

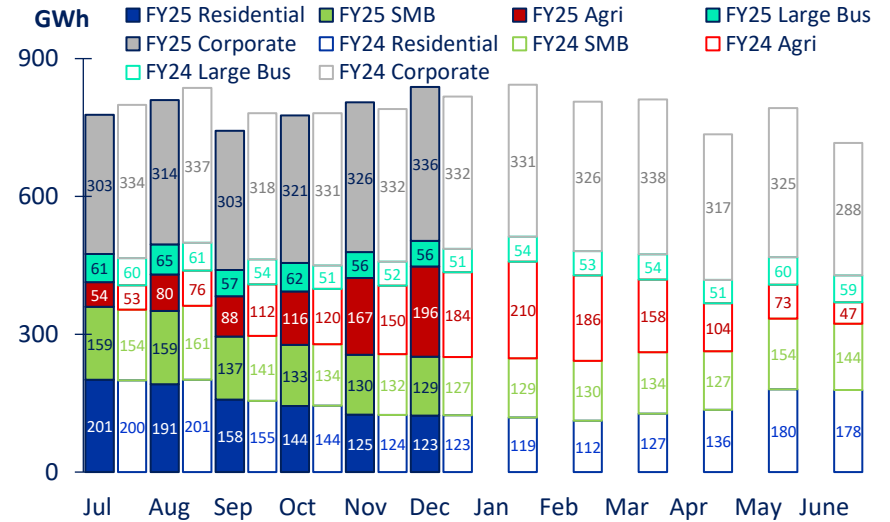
*excludes volumes sold to New Zealand Aluminium Smelters and CFDs

MERIDIAN'S CUSTOMER CONNECTIONS



Source: Meridian

MERIDIAN'S RETAIL SALES VOLUME*

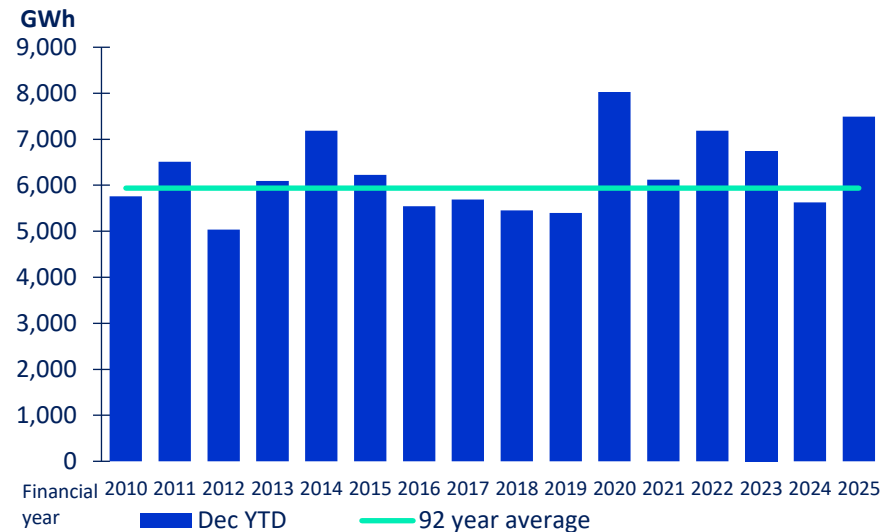


Source: Meridian

Meridian inflows and storage

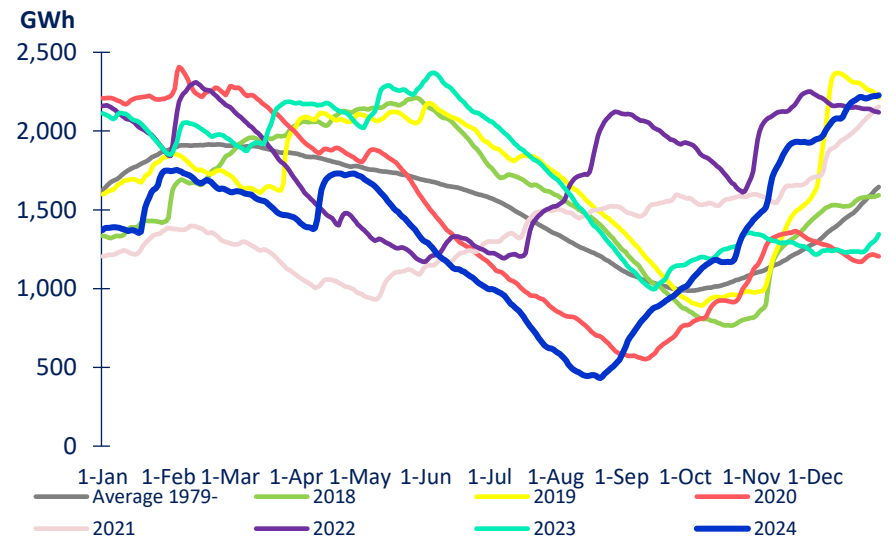
- December 2024 monthly inflows were 97% of historical average
- Waiau catchment inflows in December 2024 were 96% of historical average, 15% higher than the same month last year
- To date this financial year, inflows are 126% of historical average
- Meridian’s Waitaki catchment water storage moved from 1,934GWh to 2,227GWh during December 2024
- Waitaki water storage at the end of December 2024 was 135% of historical average and 66% higher than the same time last year
- Snow storage in Meridian’s Waitaki catchment was 62% of average in early January
- Water storage in Meridian’s Waiau catchment was 98% of average at the end of December 2024

MERIDIAN'S COMBINED CATCHMENT INFLOWS



Source: Meridian

MERIDIAN'S WAITAKI STORAGE



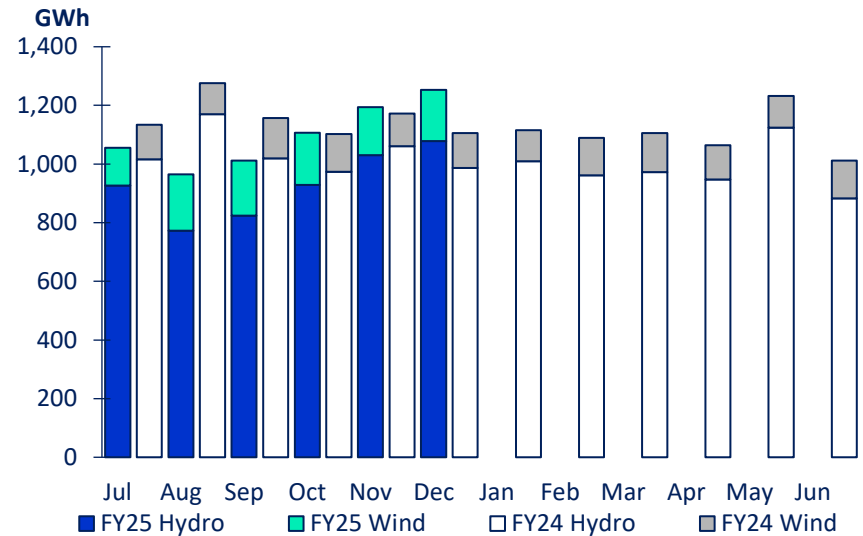
Source: Meridian

Weekly lake storage updates are available on Meridian’s website. See comparative lake levels at: www.meridianenergy.co.nz/power-stations/lake-levels

Meridian generation

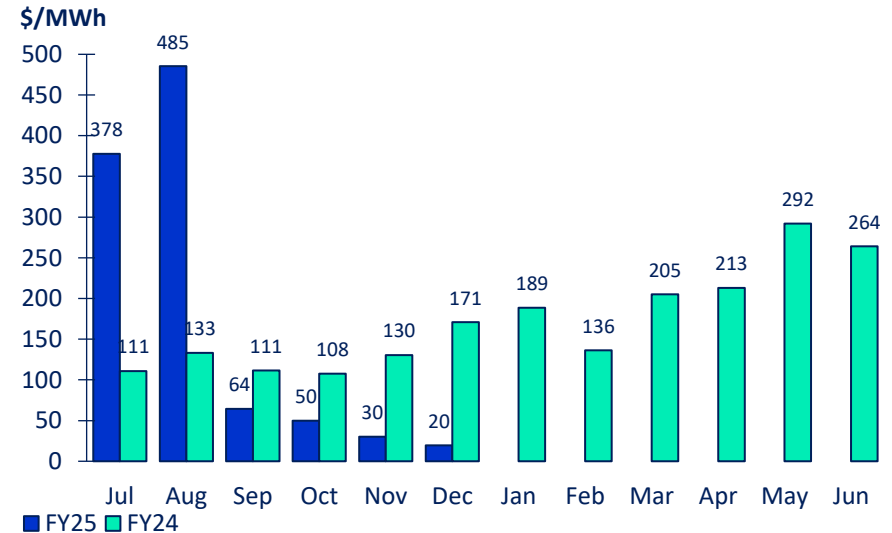
- Meridian’s generation in December 2024 was +13.3% higher than the same month last year, reflecting higher hydro generation and higher wind generation
- To date this financial year, Meridian’s generation is 5.2% lower than the same period last year, reflecting lower hydro generation and higher wind generation
- The average price Meridian received for its generation in December 2024 was -88.5% lower than the same month last year
- The average price Meridian paid to supply customers in December 2024 was -82.9% lower than the same month last year
- To date this financial year, the average price Meridian received for its generation is 24.9% higher than the same period last year and the average price paid to supply customers is 40.3% higher

MERIDIAN'S GENERATION



Source: Meridian

MERIDIAN'S AVERAGE GENERATION PRICE*



*price received for Meridian’s physical generation

Source: Meridian

Monthly operating information

	DECEMBER 2024 MONTH	DECEMBER 2023 MONTH	NOVEMBER 2024 MONTH	OCTOBER 2024 MONTH	6 MONTHS TO DECEMBER 2024	6 MONTHS TO DECEMBER 2023
New Zealand contracted sales						
Residential sales volume (GWh)	123	123	125	144	941	947
Small medium business sales volume (GWh)	129	127	130	133	848	850
Agricultural sales volume (GWh)	196	184	167	116	700	695
Large business sales volume (GWh)	56	51	56	62	357	330
Corporate and industrial sales volume (GWh)	336	332	326	321	1,902	1,984
Retail contracted sales volume (GWh)	839	818	805	776	4,749	4,806
Average retail contracted sales price ¹ (\$NZ/MWh)	\$132.3	\$125.9	\$135.2	\$136.9	\$148.3	\$139.4
NZAS sales volume (GWh)	303	426	275	265	1,663	2,525
Financial contract sales volumes ² (GWh)	212	212	210	192	1,337	1,763
Average wholesale & financial contracts sales price ³ (\$NZ/MWh)	\$65.0	\$57.5	\$70.9	\$76.6	\$96.9	\$69.1
Retail customer supply volumes (GWh)	877	879	858	818	4,998	5,108
Cost to supply retail customers (\$NZ/MWh)	\$27.6	\$186.1	\$36.6	\$62.8	\$182.3	\$142.2
Cost to supply wholesale customers (\$NZ/MWh)	\$19.2	\$171.4	\$23.3	\$49.3	\$181.2	\$126.3
Cost of financial contracts (\$NZ/MWh)	\$25.8	\$166.7	\$33.8	\$63.5	\$197.5	\$124.5
Demand response payments (\$NZm)	-\$8.8	\$0.0	-\$13.2	-\$18.7	-\$89.5	\$0.0
Total New Zealand customer connections ⁴	382,708	371,800	379,348	376,126		

See page 12 for footnotes

Monthly operating information

	DECEMBER 2024 MONTH	DECEMBER 2023 MONTH	NOVEMBER 2024 MONTH	OCTOBER 2024 MONTH	6 MONTHS TO DECEMBER 2024	6 MONTHS TO DECEMBER 2023
New Zealand generation						
Hydro generation volume (GWh)	1,079	987	1,030	929	5,561	6,227
Wind generation volume (GWh)	174	119	164	179	1,026	720
Total generation volume (GWh)	1,253	1,106	1,194	1,107	6,587	6,948
Average generation price ⁵ (\$NZ/MWh)	\$19.6	\$170.8	\$29.9	\$49.8	\$158.4	\$127.4
New Zealand hedging						
Hedging volume ⁶ (GWh)	331	458	277	403	2,346	2,860
Hedging cost average price (\$NZ/MWh)	\$125.3	\$110.1	\$134.2	\$196.2	\$186.9	\$124.1
Hedging spot revenue average price (\$NZ/MWh)	\$35.9	\$179.4	\$34.7	\$61.2	\$187.8	\$135.8
Future contract close outs (\$NZm)	\$0.1	\$1.0	\$0.4	\$6.9	-\$16.9	\$18.0

See page 12 for footnotes

Monthly operating information

	DECEMBER 2024 MONTH	DECEMBER 2023 MONTH	NOVEMBER 2024 MONTH	OCTOBER 2024 MONTH	6 MONTHS TO DECEMBER 2024	6 MONTHS TO DECEMBER 2023
New Zealand costs						
Employee and Operating Costs (\$m)	23	24	23	21	148	140
Stay in Business Capital Expenditure (\$m)	6	5	8	6	32	30
Investment Capital Expenditure (\$m)	18	64	8	12	72	184
Total Capital Expenditure (\$m)	24	69	16	18	104	214

Footnotes

- Contracted sales volumes and volume weighted average price received from contracted customers less distribution costs
- Derivatives sold excluding the sell-side of virtual asset swaps
- Average price of both NZAS sales volume and derivative sales volumes
- Meridian Retail and Powershop New Zealand installation control points (ICPs), excluding vacants
- Volume weighted average price received for Meridian's physical generation
- Over the counter and ASX contract volumes excluding the buy-side of virtual asset swaps

FY25 operating information

	Jul 2024	Aug 2024	Sep 2024	Oct 2024	Nov 2024	Dec 2024	Jan 2025	Feb 2025	Mar 2025	Apr 2025	May 2025	Jun 2025	Q1 FY25	YoY change	Q2 FY25	YoY change	Q3 FY25	YoY change	Q4 FY25	YoY change
New Zealand contracted sales																				
Residential sales volume (GWh)	201	191	158	144	125	123							550	-5	392	-1				
Small medium business sales volume (GWh)	159	159	137	133	130	129							456	-1	393	-1				
Agricultural sales volume (GWh)	54	80	88	116	167	196							221	-20	479	+25				
Large business sales volume (GWh)	61	65	57	62	56	56							183	+9	174	+19				
Corporate and industrial sales volume (GWh)	303	314	303	321	326	336							920	-69	983	-12				
Retail contracted sales volume (GWh)	777	810	743	776	805	839							2,330	-87	2,419	+31				
Average retail contracted sales price (\$NZ/MWh)	\$162.4	\$162.9	\$161.6	\$136.9	\$135.2	\$132.3							\$162.3	+\$12.7	\$134.8	+\$5.7				
NZAS sales volume (GWh)	327	261	233	265	275	303							821	-441	842	-421				
Financial contract sales volumes (GWh)	295	222	206	192	210	212							723	-357	614	-70				
Average wholesale & financial contracts sales price (\$NZ/MWh)	\$128.9	\$127.5	\$105.2	\$76.6	\$70.9	\$65.0							\$121.7	+\$43.9	\$70.6	+\$12.1				
Retail customer supply volumes (GWh)	813	866	766	818	858	877							2,444	-117	2,554	+7				
Cost to supply retail customers (\$NZ/MWh)	\$382.7	\$487.4	\$93.0	\$62.8	\$36.6	\$27.6							\$329.0	+\$196.4	\$41.9	-\$110.0				
Cost to supply wholesale customers (\$NZ/MWh)	\$388.9	\$509.9	\$68.2	\$49.3	\$23.3	\$19.2							\$336.4	+\$218.7	\$30.0	-\$105.0				
Cost of financial contracts (\$NZ/MWh)	\$375.3	\$494.8	\$91.1	\$63.5	\$33.8	\$25.8							\$330.9	+\$211.4	\$40.3	-\$92.2				
Demand response payments (\$NZm)	-\$4.7	-\$19.1	-\$25.0	-\$18.7	-\$13.2	-\$8.8							-\$48.7	-\$48.7	-\$40.7	-\$40.7				
Total New Zealand customer connections	369,376	371,479	373,670	376,126	379,348	382,708							373,670	+8,217	382,708	+10,908				
New Zealand generation																				
Hydro generation volume (GWh)	927	773	825	929	1,030	1,079							2,524	-682	3,037	+15				
Wind generation volume (GWh)	129	192	187	179	164	174							509	+147	517	+159				
Total generation volume (GWh)	1,056	965	1,012	1,107	1,194	1,253							3,033	-535	3,554	+174				
Average generation price (\$NZ/MWh)	\$376.2	\$483.8	\$63.8	\$49.8	\$29.9	\$19.6							\$306.2	+\$187.2	\$32.5	-\$103.8				
New Zealand hedging																				
Hedging volume (GWh)	451	451	432	403	277	331							1,334	-168	1,011	-347				
Hedging cost average price (\$NZ/MWh)	\$174.5	\$226.1	\$231.4	\$196.2	\$134.2	\$125.3							\$210.4	+\$72.6	\$156.0	+\$46.9				
Hedging spot revenue average price (\$NZ/MWh)	\$346.6	\$451.9	\$79.1	\$61.2	\$34.7	\$35.9							\$295.5	+\$171.5	\$45.6	-\$103.1				
Future contract close outs (\$NZm)	-\$13.0	-\$13.7	\$2.3	\$6.9	\$0.4	\$0.1							-\$24.4	-43.0	\$7.4	+8.0				
Meridian Group																				
Employee and Operating Costs (\$NZ m)	26	25	30	21	23	23							\$80	+\$11	\$68	-\$3				
Stay in Business Capital Expenditure (\$NZ m)	3	6	4	6	8	6							\$13	-\$0	\$19	+\$3				
Investment Capital Expenditure (\$NZ m)	13	9	11	12	8	18							\$33	-\$17	\$38	-\$45				
Total Capital Expenditure (\$NZ m)	16	15	15	18	16	24							\$46	-\$18	\$57	-\$42				

FY24 operating information

	Jul 2023	Aug 2023	Sep 2023	Oct 2023	Nov 2023	Dec 2023	Jan 2024	Feb 2024	Mar 2024	Apr 2024	May 2024	Jun 2024	Q1 FY24	YoY change	Q2 FY24	YoY change	Q3 FY24	YoY change	Q4 FY24	YoY change
New Zealand contracted sales																				
Residential sales volume (GWh)	200	201	155	144	124	123	119	112	127	136	180	178	555	-9	392	+2	358	+14	494	+27
Small medium business sales volume (GWh)	154	161	141	134	132	127	129	130	134	127	154	144	457	+9	393	-5	393	+18	425	+14
Agricultural sales volume (GWh)	53	76	112	120	150	184	210	186	158	104	73	47	241	+27	454	+29	554	+135	225	+34
Large business sales volume (GWh)	60	61	54	51	52	51	54	53	54	51	60	59	175	+2	155	+17	161	+17	170	+13
Corporate and industrial sales volume (GWh)	334	337	318	331	332	332	331	326	338	317	325	288	989	+19	995	+45	995	+1	930	-74
Retail contracted sales volume (GWh)	800	836	781	781	790	818	843	806	811	735	793	717	2,417	+48	2,389	+88	2,461	+186	2,244	-15
Average retail contracted sales price (\$NZ/MWh)	\$149.2	\$151.2	\$148.2	\$131.5	\$130.1	\$125.9	\$136.4	\$135.9	\$139.5	\$155.7	\$161.3	\$157.2	\$149.6	+\$15.5	\$129.1	+\$6.4	\$137.3	+\$7.9	\$158.1	+18
NZAS sales volume (GWh)	426	426	411	426	412	426	426	398	421	412	426	394	1,262	+1	1,263	+1	1,245	+9	1,232	-18
Financial contract sales volumes (GWh)	338	371	371	221	250	212	275	206	272	311	297	293	1,080	+433	683	-101	753	+76	901	-88
Average wholesale & financial contracts sales price (\$NZ/MWh)	\$78.6	\$78.4	\$76.4	\$56.2	\$61.9	\$57.5	\$75.0	\$68.8	\$74.1	\$91.7	\$89.7	\$87.9	\$77.8	+\$18.9	\$58.5	+\$3.0	\$72.8	+\$4.1	\$89.8	+13
Retail customer supply volumes (GWh)	845	892	825	829	838	879	884	851	850	778	847	733	2,561	+61	2,546	+82	2,584	+188	2,359	+46
Cost to supply retail customers (\$NZ/MWh)	\$128.6	\$144.9	\$123.3	\$124.3	\$143.3	\$186.1	\$201.4	\$155.1	\$213.8	\$230.0	\$312.3	\$284.0	\$132.6	+\$57.9	\$151.9	+\$101.1	\$190.2	+\$45.1	\$276.3	+191
Cost to supply wholesale customers (\$NZ/MWh)	\$109.2	\$132.9	\$110.7	\$105.1	\$128.5	\$171.4	\$187.1	\$136.4	\$202.5	\$212.8	\$286.4	\$269.6	\$117.7	+\$55.0	\$135.0	+\$97.2	\$176.1	+\$36.1	\$256.4	+188
Cost of financial contracts (\$NZ/MWh)	\$109.5	\$132.6	\$115.5	\$105.8	\$127.1	\$166.7	\$181.8	\$134.9	\$202.2	\$212.6	\$285.6	\$271.0	\$119.5	+\$41.4	\$132.5	+\$89.8	\$176.3	+\$48.0	\$255.7	+179
Demand response payments (\$NZm)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	+\$0.0	\$0.0	+\$0.0	\$0.0	+\$0.0	\$0.0	+0
Total New Zealand customer connections	364,389	364,631	365,453	366,320	370,087	371,800	372,604	373,536	373,332	373,161	369,980	369,667	365,453	-3,294	371,800	+4,864	373,332	+8,072	369,667	+6,332
New Zealand generation																				
Hydro generation volume (GWh)	1,016	1,170	1,020	974	1,061	987	1,010	962	972	948	1,124	883	3,206	-94	3,022	-252	2,943	+250	2,955	-480
Wind generation volume (GWh)	118	107	138	128	111	119	106	127	134	117	108	128	362	+31	358	+49	367	+76	353	+82
Total generation volume (GWh)	1,134	1,276	1,157	1,102	1,172	1,106	1,116	1,089	1,106	1,064	1,232	1,011	3,567	-63	3,380	-203	3,311	+326	3,308	-397
Average generation price (\$NZ/MWh)	\$110.8	\$133.0	\$111.4	\$107.8	\$130.4	\$170.8	\$188.6	\$136.4	\$205.0	\$212.0	\$291.8	\$262.6	\$119.0	+\$56.8	\$136.3	+\$95.7	\$176.9	+\$45.7	\$257.2	+\$187.5
New Zealand hedging																				
Hedging volume (GWh)	505	539	458	496	404	458	504	438	504	470	490	516	1,502	+297	1,358	+304	1,446	+170	1,476	+244
Hedging cost average price (\$NZ/MWh)	\$142.4	\$132.3	\$139.1	\$110.9	\$105.6	\$110.1	\$127.4	\$131.9	\$139.1	\$145.0	\$151.2	\$147.7	\$137.8	+\$14.0	\$109.1	+\$8.2	\$132.9	+\$4.4	\$148.0	+\$12.6
Hedging spot revenue average price (\$NZ/MWh)	\$115.7	\$134.3	\$121.2	\$123.7	\$144.7	\$179.4	\$192.6	\$156.1	\$207.6	\$219.9	\$293.9	\$258.2	\$124.1	+\$51.1	\$148.8	+\$102.7	\$186.8	+\$45.4	\$257.8	+\$174.5
Future contract close outs (\$NZm)	\$14.0	\$3.2	\$1.4	-\$0.7	-\$0.9	\$1.0	\$2.1	\$0.0	-\$1.5	-\$1.6	-\$3.2	-\$2.2	\$18.6	-13.7	-\$0.6	-19.5	\$0.6	-\$6.7	-\$6.9	-\$7.9
Meridian Group																				
Employee and Operating Costs (\$NZ m)	23	24	22	22	24	24	20	24	22	22	23	30	\$69	+9	\$71	+9	\$66	+\$6	\$76	+\$8
Stay in Business Capital Expenditure (\$NZ m)	3	6	4	4	7	5	6	9	8	5	7	8	\$13	+3	\$16	+5	\$23	+\$14	\$20	+\$5
Investment Capital Expenditure (\$NZ m)	16	20	15	16	54	13	12	36	35	21	35	3	\$51	+20	\$83	-36	\$84	-\$6	\$59	-\$2
Total Capital Expenditure (\$NZ m)	19	26	19	20	61	18	18	45	44	26	42	11	\$64	+23	\$99	-31	\$107	+\$8	\$79	+\$3

Glossary

Hedging volumes	buy-side electricity derivatives excluding the buy-side of virtual asset swaps
Average generation price	the volume weighted average price received for Meridian’s physical generation
Average retail contracted sales price	volume weighted average electricity price received from retail customers, less distribution costs
Average wholesale contracted sales price	volume weighted average electricity price received from wholesale customers (including NZAS) and financial contracts
Combined catchment inflows	combined water inflows into Meridian’s Waitaki and Waiau hydro storage lakes
Cost of hedges	volume weighted average price Meridian pays for derivatives acquired
Cost to supply contracted sales	volume weighted average price Meridian pays to supply contracted customer sales and financial contracts
Contracts for Difference (CFDs)	an agreement between parties to pay the difference between the wholesale electricity price and an agreed fixed price for a specified volume of electricity. CFDs do not result in the physical supply of electricity
Customer connections	number of installation control points, excluding vacants
GWh	gigawatt hour. Enough electricity for 125 average New Zealand households for one year
Historic average inflows	the historic average combined water inflows into Meridian’s Waitaki and Waiau hydro storage lakes over the last 85 years
Historic average storage	the historic average level of storage in Meridian’s Waitaki catchment since 1979
HVDC	high voltage direct current link between the North and South Islands of New Zealand
ICP	New Zealand installation control points, excluding vacants
ICP switching	the number of installation control points changing retailer supplier, recorded in the month the switch was initiated
MWh	megawatt hour. Enough electricity for one average New Zealand household for 46 days
National demand	Electricity Authority’s reconciled grid demand www.emi.ea.govt.nz
NZAS	New Zealand Aluminium Smelters Limited
Retail sales volumes	contract sales volumes to retail customers, including both non half hourly and half hourly metered customers
Financial contract sales	sell-side electricity derivatives excluding the sell-side of virtual asset swaps
Virtual Asset Swaps (VAS)	CFDs Meridian has with Genesis Energy and Mercury New Zealand. They do not result in the physical supply of electricity