

OR Annual Report 2022

Appendices



District heating utilities, hot water supply, water quality and water levels in low-temperature geothermal fields



Table of contents

OR and subsidiaries' area of operations	2
District heating utilities of Veitur Utilities 2022	2
Hot water supplied by Veitur Utilities per month in its distribution area in 2022	3
Chemical analyses of hot water in the capital area 2022	4
Chemical analyses of hot water in South and West Iceland 2022	5
Water production and water levels in wells in the low-temperature fields of Veitur Utilities in the capital area	6
Reykjahlid.....	6
Reykir	7
Ellidaar	8
Laugarnes.....	9

Cover photo: Atli Már Hafsteinsson

OR and subsidiaries' area of operations



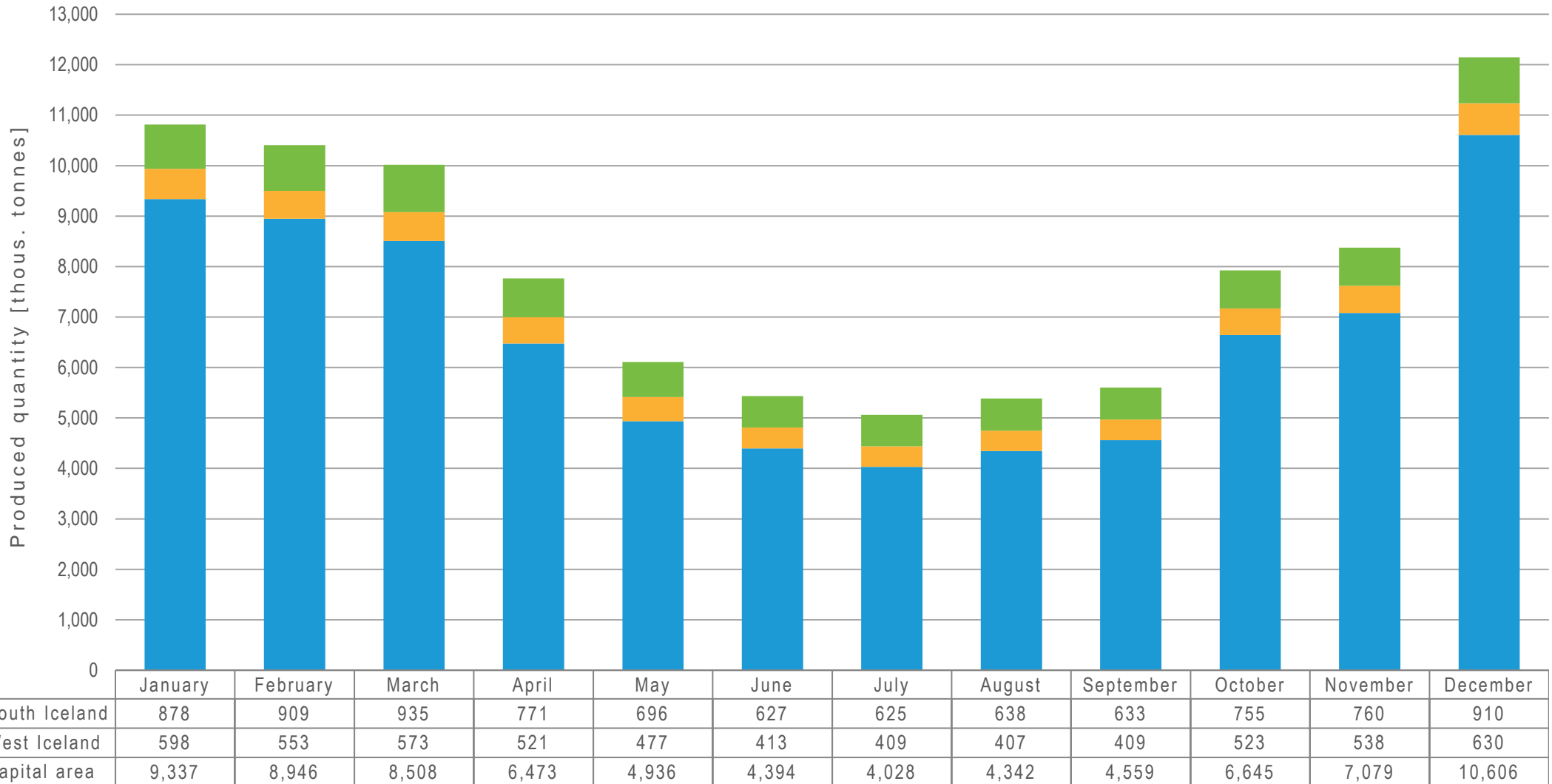
District heating utilities of Veitur Utilities 2022

Veitur's heating utilities with quantities of water produced, comments and improvements. Some actions were undertaken in West and South Iceland to ensure the operability of district heating utilities. Numbers in table are rounded to the nearest thousand tons.

Utility	Production field	No. of wells	Annual production thous. tons	L/s	Comments	Improvements
Capital area						
Capital area	Laugarnes	10	3,736	118	Field rested for part of summer	
	Ellidaar	8	2,557	81	Field rested for part of summer	
	Reykir	22	9,840	312	Wholesale to Mosfellsbaer	
	Reykjahlid	12	13,102	415	Wholesale to Mosfellsbaer	
	Nesjavellir	21	31,685	1,005		
	Hellisheidi	47	18,935	600		Thermal production capacity increased by 50%
West Iceland						
HAB	Deildartunga hot spring	1	4,259	135		Further research to provide hot water to continue in 2022
	Wells at Baeir	2	1	0		
Skorradalur	Well in Stora Drageyri	1	280	9		
Munadarnes	Well in Munadarnes	1	213	7		
Nordurardalur Utility	Wells at Svartagil	1	497	16		
	Well at Bifrost	1	12	0,4		
Stykkisholmur	Wells in Stykkisholmur	2	789	25	One injection well and back-up power	
South Iceland						
Hveragerdi	Wells in Hveragerdi	5	1,135	36	Steam utility and closed-circuit systems	Work on improvements regarding the reservoir
Olfus	Bakki II	1	403	13	Production capacity increased	
Thorlakshofn	Bakki I	2	1,563	50	Production capacity increased	
Austurveita Utility	Wells in Gljufurarholt	3	487	15	Most of the water used in Hveragerdi.	
Grimsnes Utility	Wells in Ondverdarnes	3	1,854	59	Production capacity increased	Two wells in process of utilization
Hlidarveita Utlity	Wells at Efri-Reykir	1	496	16	The well provides water for two utilities	
Ranga Utility	Wells at Kaldarholt	2	2,440	77		Work on production capacity and prepare research to provide hot water
	Wells at Laugaland	3	563	18		

Hot water supplied by Veitur Utilities per month in its distribution area in 2022

Granting everyone access to a hot water utility with negligible outages is one of the prerequisites for the health of residents and flourishing economic activity in a modern society, as stated in the Sustainable Development Goals (SDGs) of the United Nations.



Chemical analyses of hot water in the capital area 2022

By analysing the chemical properties in wells, it can be monitored how production fields react to utilization.

Unit	Laugarnes	Ellidaar	Reykir	Reykjahlid	Nesjavellir	Hellisheidi	
	RV-10	RV-39	MG-25	MG-33	Heated groundwater	Heated groundwater	
Date	26.1.2022	11.1.2022	4.2.2022	24.1.2022	1.11.2022	31.10.2022	
Sample no.	22-5035	22-5006	22-5046	22-5025	22-5255	22-5252	
Water temp.	°C	131.8	82.7	92.2	94.1	80	80
Flow rate	L/s	16.7	44.9	34	93.7		
pH (acidity)	pH	9.53	9.54	9.74	9.80	8.46	8.65
CO ₂	mg/kg	17.7	27.2	21.5	25.1	47.8	24.2
H ₂ S	mg/kg	0.52	0.02	0.65	1.76	0.55	0.44
SiO ₂	mg/kg	157.1	70.8	93.5	100.0	43.3	39.0
Na	mg/kg	61.6	43.1	44.3	46.8	19.0	10.0
K	mg/kg	2.49	0.86	0.89	1.02	2.87	1.84
Ca	mg/kg	2.95	3.19	2.45	1.96	10.76	4.92
Mg	mg/kg	0.0020	0.0050	0.0020	0.0030	5.48	2.838
Fe	mg/kg	0.001	0.013	0.007	0.007	0.011	0.006
Al	mg/kg	0.202	0.121	0.153	0.177	0.066	0.026
Cl	mg/kg	41.9	25.1	17.9	14.1	15.1	10.4
SO ₄	mg/kg	25.4	12.9	16.1	18.9	14.0	4.4
F	mg/kg	1.087	0.297	0.652	0.917	0.169	0.154
B	mg/kg	0.058	0.017	0.035	0.046	0.098	0.020
Dissolved O ₂	µg/kg	0	200	0	0	0	0

Chemical analyses of hot water in South and West Iceland 2022

By analysing the chemical properties in wells, it can be monitored how production fields react to utilization.

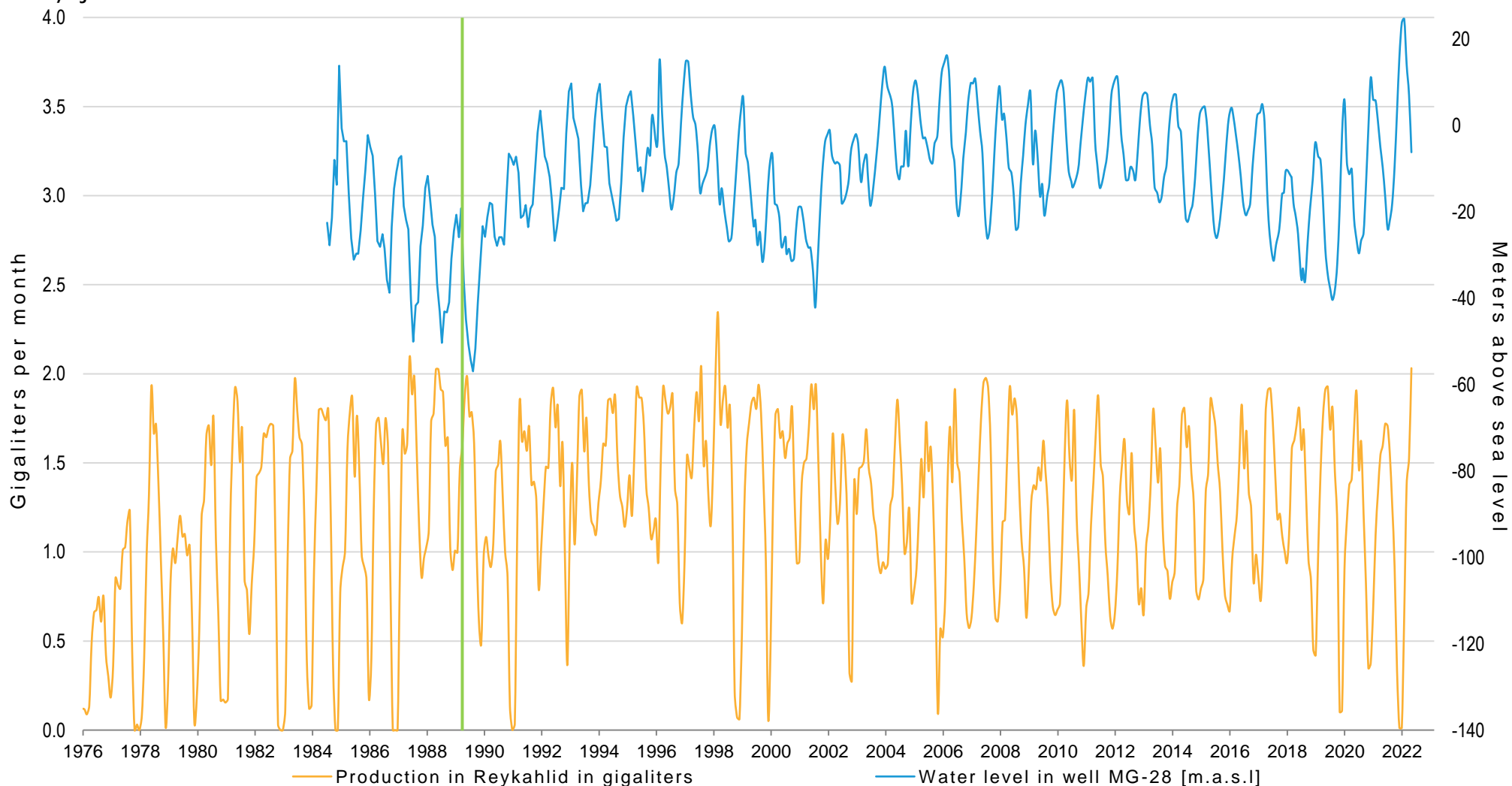
	Unit	Akranes and Borgarfjörður heating utility		Rangá utility		Thorlaks-höfn utility	Ölfus utility	Austur-veita utility	Grimsnæs utility	Hlídar-veita utility	Munadarnes utility	Norðurárdalur utility	Stykkisholmur utility
		Deildartunga hot spring	LH-1	KH-37	LL-6	BA-01	EB-01	GH-4	ÖN-29	ER-23	MN-8	SG-3	HO-1
Date		5.1.2022	5.1.2022	2.12.2021	2.12.2021	2.3.2022	2.2.2022	3.2.2022	16.12.2021	22.2.2021	4.2.2021	5.4.2022	9.2.2021
Sample no.		22-5003	22-5001	21-5286	21-5287	22-5085	22-5042	22-5045	21-5064	21-5059	21-5040	22-5105	21-5049
Water temp.	°C	93.5	88.7	65.5	93.8	123.7	122.0	115.5	79.7		88.4	60.8	84.2
Flow rate	L/s	157.5	37.6	47.8	19.3	19.0	13.6	9.8	51.0	26.7	7.3	9.2	33.7
pH (acidity)	pH	9.53	9.26	10.39	9.88	8.84	8.94	8.95	9.52	9.48	9.38	9.18	8.31
CO ₂	µS/cm	27.0	13.8	11.4	20.1	11.4	9.3	41.2	15.8	25.6	14.2	57.55	7.95
H ₂ S	°C	1.21	0.71	0.13	0.09	0.47	0.65	0.19	0.11	3.47	0.47	0.06	0.05
SiO ₂	mg/kg	134.8	119.0	86.9	91.9	129.9	118.7	138.1	81.8	230.9	114.5	88.9	75.51
Na	mg/kg	76.5	107.5	64.4	83.7	351.8	274.9	119.1	101.2	108.3	89.8	66.99	707.39
K	mg/kg	2.29	2.56	0.65	1.64	17.08	12.54	3.74	2.45	6.54	2.57	1.02	18.16
Ca	mg/kg	3.02	13.70	2.73	2.82	62.61	42.93	4.53	6.42	1.96	6.94	3.06	1160.65
Mg	mg/kg	0.020	0.012	N.D.	N.D.	0.018	0.005	0.005	0.010	0.001	0.005	0.005	0.527
Fe	mg/kg	0.063	0.01	N.D.	N.D.	0.037	0.009	0.006	0.02	0.016	0.019	0.012	0.017
Al	mg/kg	0.148	0.020	0.126	0.217	0.065	0.073	0.143	0.061	0.501	0.053	0.016	N.D.
Cl	mg/kg	35.5	115.5	28.0	45.3	601.1	410.0	116.0	0.1	60.2	73.7	29.88	2780.69
SO ₄	mg/kg	56.3	73.9	23.3	62.5	109.1	125.1	53.1	0.6	59.8	57.6	33.37	323.85
F	mg/kg	2.666	2.123	2.748	1.259	0.554	0.559	0.949	112.12	2.79	1.893	0.709	1.795
B	mg/kg	0.252	0.22	0.09	0.21	0.232	0.242	0.292	42.31	0.178	0.222	0.217	0.092
Dissolved O ₂	mg/kg	30	40	0	0	0	0	0	0	0	0	40	0

* Samples not collected in winter 2020-21

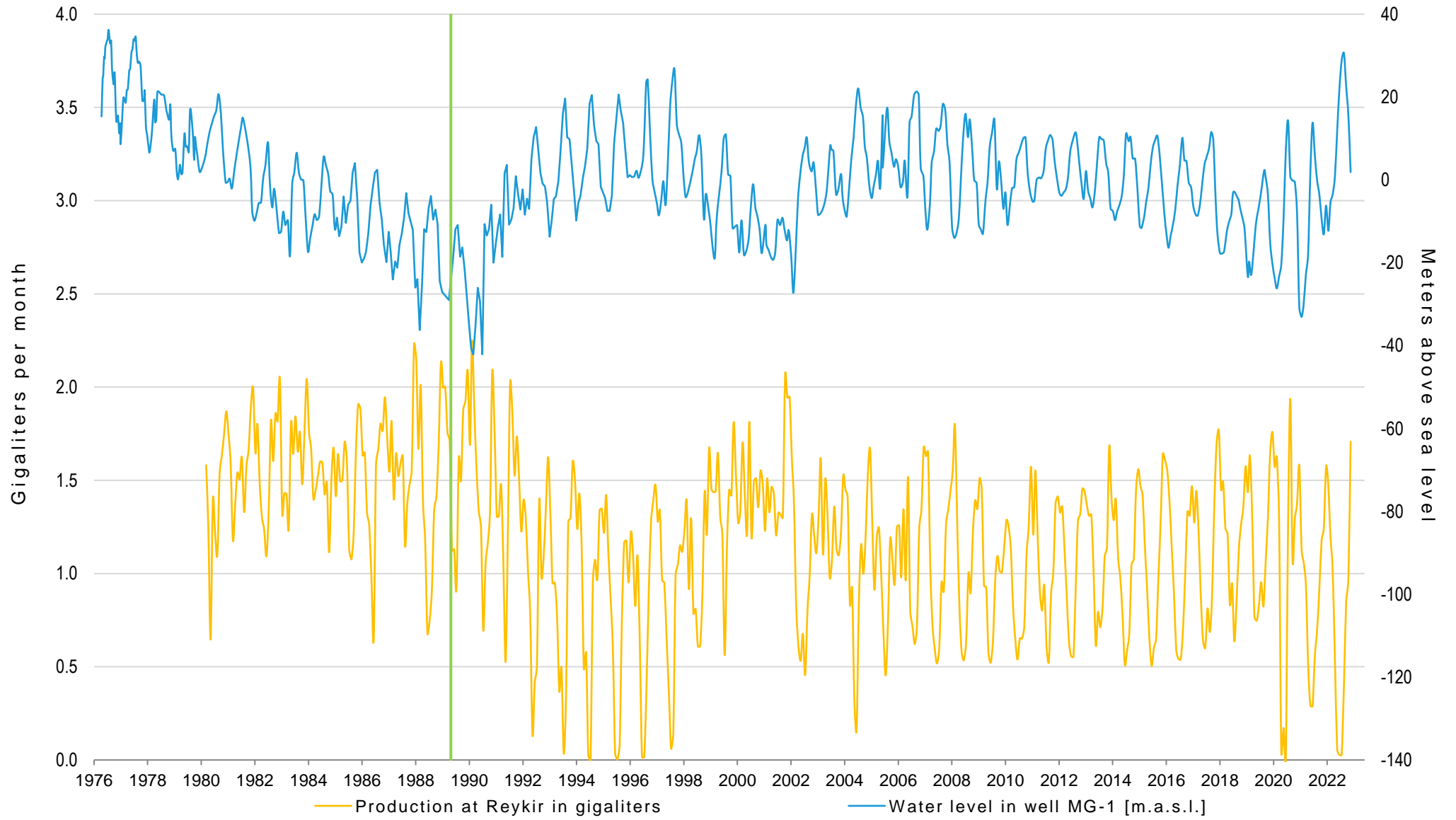
Water production and water levels in wells in the low-temperature fields of Veitur Utilities in the capital area

By measuring water levels and quantity of water produced it is monitored how production fields react to utilization. In the greater capital area, there are the production fields of Reykjahlid and Reykir in Mosfellsbaer and Ellidaardalur and Laugarnes in Reykjavik. The vertical green line marks when the thermal plant at the Nesjavellir geothermal power plant began operations. As a result, water production in low-temperature fields in the capital area was significantly reduced, which positively affected water levels in production fields.

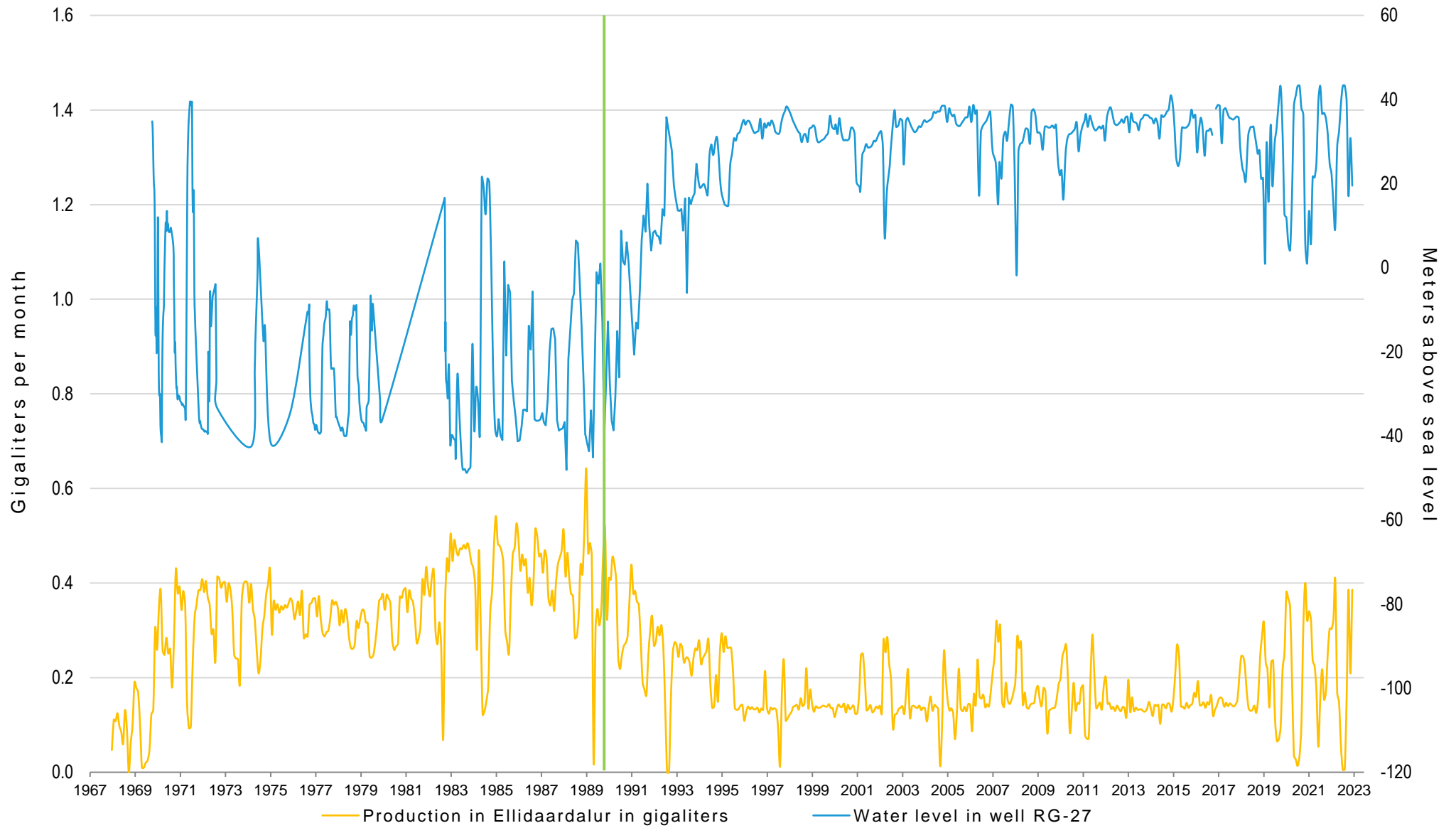
Reykjahlid



Reykir



Ellidaar



Laugarnes

