

## HYDROGENERATORS REFERENCE LIST

ITEM	SUPPLIED TO	POWER STATION	PCS	CAPACITY (kVA)	VOLTAGE (V)	FREQ (Hz)	RATED SPEED (rpm)	RUNAWAY SPEED (rpm)	mD <sup>2</sup> (m <sup>2</sup> )	TURBINE TYPE	YEAR OF MANUFACTURE	TYPE OF CONSTRUCTION	UPGRADING FROM (kVA)	REMARKS
1	SERBIA	BAJINA BAŠTA	2	315000	11000	50	428,6	650	6000,0	FRANCIS	1980	VERT.,-COOP.T		Motor generator stator only
2	SERBIA	BERDAP I	3	190000	15750	50	71,5	180	83000,0	KAPLAN	1970/71	VERT.,S-U Type		
3	NIGERIA	SHIRORO	4	176500	16000	50	150,0	300	18000,0	FRANCIS	1983/84	VERT.,S-U Type		OEM, regular maintenance and overhauls of generators
4	ZAMBIA	KARIBA	4	167000	18000	50	136,4	235	27000,0	FRANCIS	1974/75	VERT.,U Type		
5	CROATIA	ZAKUČAC	4	160000	16000	50	333,3	590	4000,0	FRANCIS	2012 / 2013 / 2014/ 2016	VERT.,S Type	2 x 120000 2 x 140000	
6	CROATIA	VELEBIT	2	155000	15750	50	600,0	910	1044,0	FRANCIS	1984	VERT.,R.,S Type		Motor generator
7	CROATIA	ZAKUČAC II	2	140000	16000	50	333,3	575	4150,0	FRANCIS	1978	VERT.,S Type		
8	CROATIA	DUBROVNIK B	1	140000	14400	50	300,0	506	4200,0	FRANCIS	2012	VERT.,S Type	120000	New rotor poles
9	CROATIA	DUBROVNIK A	1	140000	14400	50	300,0	506	4200,0	FRANCIS	2015	VERT.,S Type	120000	New stator and new rotor poles
10	IRAQ	HADITHA	6	128000	15750	50	100,0	305	22000,0	KAPLAN	1986/87	VERT.,S Type		
11	MONTENEGRO	MRATINJE	3	120000	15750	50	250,0	455	6000,0	FRANCIS	1974	VERT.,S Type		
12	CROATIA	ZAKUČAC I	2	120000	16000	50	300,0	558	4000,0	FRANCIS	1960/61	VERT.,S Type		
13	BIH	VIŠEGRAD	3	115000	15750	50	136,4	376	16248,0	KAPLAN	1989	VERT.,S-U Type		
14	SERBIA	BAJINA BAŠTA	4	100000	15650	50	136,4	265	16000,0	FRANCIS	1965/68	VERT.,U Type		
15	BIH	RAMA	2	100000	15650	50	375,0	660	1560,0	FRANCIS	2012/14	VERT.,S Type	90000	Upgrading, new stators and re-insulation of rotor poles
16	GREECE	MESSOCHORA	2	90000	15750	50	333,3	605	2182,0	FRANCIS	1999	VERT.S-U Type		
17	BIH	RAMA	2	90000	15650	50	375,0	660	1560,0	FRANCIS	1967	VERT.,S Type		
18	SWEDEN	HÄLLBY G1	1	88500	11000	50	115,4	340	12467,0	KAPLAN	*	VERT.		New generator shaft, new lower bracket
19	SLOVENIA	ZLATOLIČJE	2	85000	10000	50	125,0	345	13500,0	KAPLAN	2008/2009	VERT.,U Type	74000	
20	GREECE	STRATOS	2	84000	15750	50	107,0	215	15000,0	FRANCIS	1988/89	VERT.,U Type		
21	CROATIA	ORLOVAC	3	83000	10500	50	500,0	835	630,0	FRANCIS	1972/73	VERT.,S Type		
22	FINLAND	SEITAKORVA	1	80000	13500	50	115,4	345	11800,0	KAPLAN	2014	VERT.,S Type	60000	Upgrading, new stator
23	CROATIA	SENJ	3	80000	10500	50	600,0	1050	400,0	FRANCIS	1965	VERT.,S Type		
24	SWEDEN	HJÄLTA G1	1	79000	14000	50	187,5	365	5608,0	FRANCIS	*	VERT.,S TYPE	72000	Upgrading, new stator
25	BIH	SALAKOVAC	3	75000	13800	50	150,0	455	7700,0	FRANCIS	1981	VERT.,U Type		
26	SLOVENIA	SREDNJA DRAVA I	2	74000	10500	50	125,0	320	10500,0	KAPLAN	1968	VERT.,U Type		
27	SLOVENIA	SREDNJA DRAVA II	2	74000	10500	50	125,0	320	11600,0	KAPLAN	1977/78	VERT.,U Type		
28	NEW ZEALAND	OHAU	4	73300	13200	50	166,6	345	5500,0	FRANCIS	1975/77	VERT.,S-U Type		
29	COLOMBIA	PLAYAS	3	71900	13800	60	360,0	670	1200,0	FRANCIS	1986	VERT.,S Type		
30	FINLAND	PETAJASKOSKI	1	70000	12250	50	100,0	297	16200,0	KAPLAN	2006	VERT.,S Type	60000	Upgrading, new stator
31	BIH	TREBINJE II	1	70000	14400	50	214,0	405	3400,0	FRANCIS	1972	VERT.,S Type		
32	SWEDEN	TUGGEN	1	70000	10000	50	125,0	328	8759,0	KAPLAN	*	VERT.	63000	Revitalization and upgrading
33	TURKEY	ASLANCIK	2	66660	13800	50	333,0	654	1600,0	FRANCIS	2012	VERT.,S Type		
34	BIH	BOČAC "A"	2	65000	10500	50	150,0	322	7080,0	KAPLAN	1981	VERT.,U Type		
35	MONTENEGRO	PERUČICA	2	65000	10500	50	428,0	790	800,0	2 PELTON	1977	HORIZ. Type		
36	BIH	GRABOVICA	2	64000	10500	50	150,0	390	5200,0	KAPLAN	1981	VERT.,U Type		
37	SWEDEN	MOFORSEN	1	64000	18000	50	125,0	263	6700,0	KAPLAN	2018	VERT.,S-U Type	50000	Upgrading, new stator and new rotor poles
38	TANZANIA	KIDATU	2	60000	10500	50	375,0	660	1150,0	FRANCIS	1974	VERT.,S Type		
39	TANZANIA	KIDATU II	2	60000	10500	50	375,0	660	1150,0	FRANCIS	1980	VERT.,S Type		
40	FINLAND	PYHÄKOSKI	2	58000	10500	50	150,0	385	245,0	KAPLAN	2011/13	VERT.,S Type	40000	Upgrading, new stators
41	IRAN	KHODA AFARIN	2	56000	10500	50	166,7	487	4200,0	KAPLAN	*	VERT.,S Type		on hold
42	SERBIA	BISTRICA	1	54000	10500	50	600,0	1070	380,0	FRANCIS	1959	VERT.,S Type		
43	COSTA RICA	CARIBLANCO	2	51730	13800	60	720,0	1225	300,0	FRANCIS	2006	VERT.,S Type		
44	SWEDEN	BERGEFORSEN	2	50000	9600	50	115,4	295	8400,0	KAPLAN	2016/2018	VERT.,S-U Type	45000	Upgrading, new stator and re-insulation of rotor poles
45	SLOVENIA	DOBLAR II	1	50000	10500	50	214,3	550	2600,0	KAPLAN	2001	VERT.S Type		
46	SERBIA	SRBOBRAN	1	50000	10500	50	1000,0	1250	-	-	1968	HORIZ.		Compensator
47	CROATIA	VARAŽDIN	2	50000	10500	50	125,0	305	7000,0	KAPLAN	1974	VERT.,U Type		
48	SWEDEN	KRANGEDE	2	46000	8500	50	167,0	-	-	FRANCIS	2019/*	VERT.S Type		Disassembly, checking, cleaning, reassembly of 2 generators
49	FINLAND	IMATRA	1	45000	10500	50	150,0	375	3000,0	KAPLAN	2005	VERT.S Type	34000	Upgrading, new stator and rotor poles
50	FINLAND	MELO	2	45000	10500	50	136,4	300	3800,0	KAPLAN	2015	VERT.,U Type	40000	Upgrading, new stators
51	SERBIA	PIROT	2	44500	10500	50	500,0	930	520,0	FRANCIS	1988	VERT.,S Type		
52	INDIA	KODOYAR II	1	44444	11000	50	500,0	915	390,0	FRANCIS	1968	VERT.,S Type		
53	FRANCE	MAREGES	1	42500	12000	50	150,0	-	-	KAPLAN	*	VERT.,S Type		New stator core, new stator winding, refurbishment of poles
54	CROATIA	ČAKOVEC	2	42000	6300	50	125,00	360	1150,0	-	1981	BULB TYPE		
55	CROATIA	DUBRAVA	2	42000	6300	50	125,00	360	1150,0	-	1991	BULB TYPE		
56	NORTH MACEDONIA	VRUTOK-MAVROVO	4	42000	12000	50	500,0	900	375,0	PELTON	1956/71	VERT.,S-U Type		
57	PHILIPPINES	BINGA	4	41200	13800	60	327,3	580	548,0	FRANCIS	2010/2012	VERT.,S Type	2 steps - 27800 kVA	Upgrading, new stators and rotor poles
58	INDIA	PERIYAR	1	41200	11000	50	750,0	1300	152,0	FRANCIS	1964	VERT.,S Type		
59	INDIA	SHOLAYAR-MADRAS I	2	41200	11000	50	750,0	1300	152,0	FRANCIS	1965/66	VERT.,S Type		
60	SWEDEN	STORFINNFORSEN	1	40000	18500	50	150,0	290	5200,0	FRANCIS	2018	VERT.		Voltage upgrading, new stator and refurbishment of poles
61	ARGENTINA	CABRA CORRAL	3	40000	13200	50	250,0	475	1680,0	FRANCIS	1976	VERT.,S Type		
62	MONTENEGRO	PERUČICA	5	40000	10500	50	375,0	675	675,0	2 PELTON	1958/61	HORIZ.		
63	SERBIA	UVAC	1	40000	10500	50	300,0	600	1300,0	FRANCIS	1978	VERT.,S Type		
64	KENYA	KAMBURU	3	37000	11000	50	273,0	540	1000,0	FRANCIS	2018/2019/2020	VERT.,S-U Type		Revitalization, new stator winding and new rotor winding
65	KENYA	KAMBURU	3	37000	11000	50	273,0	540	1000,0	FRANCIS	1973/75	VERT.,S-U Type		

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66	EL SALVADOR	CHAPARRAL	2	36000	13800	60	300,0	620	700,0	FRANCIS	2017/2018	VERT., S Type		
67	SWEDEN	RÄTAN	1	36000	11000	50	200,0	365	1970,0	FRANCIS	*	VERT.		New stator, re-insulation of rotor poles
68	BIH	MOSTARSKO BLATO	2	35300	10500	50	500,0	900	275,0	FRANCIS	2009	VERT., S Type		
69	GERMANY	ERING-FRAUENSTEIN	1	35000	10500	50	68,2	190	14000,0	KAPLAN	*	VERT., U Type	30000	Production and installation of new generator
70	NORWAY	DALE II	1	35000	12000	50	750,0	1368	80,0	FRANCIS	2006	VERT., S Type		
71	CROATIA	VINODOL	3	35000	10500	50	500,0	925	247,0	PELTON	2002/2003	HORIZ.		
72	FINLAND	IMATRA	2	34000	10500	50	125,0	250	3472,0	FRANCIS	2014	VERT., S Type	24000	Upgrading, new stators, new shafts, re-insulation of rotor poles
73	FINLAND	PAMILO	1	34000	10500	50	187,5	350	1400,0	FRANCIS	2013	VERT., S Type	32000	Upgrading, new stator, re-insulation of rotor poles
74	CROATIA	PERUĆA	2	34000	10500	50	187,5	365	2400,0	FRANCIS	2004/2005	VERT.,U Type	26000	New generators
75	TURKEY	MENZELET	4	33000	13800	50	333,3	665	640,0	FRANCIS	1988/89	VERT.,S-U Type		
76	SWEDEN	SVARTHÅLSFORSEN	2	33000	12800	50	107,0	330	5672,0	KAPLAN	2017/2018	VERT, S-U Type	29000	Upgrading, new stators, re-insulation of rotor poles
77	USA	LOWER BAKER 4	1	32000	13800	60	300,0	300	557,0	FRANCIS	2012	VERT., S-Type		
78	SWEDEN	ÅSEN	1	32000	11000	50	150,0	360	1956,0	FRANCIS	2018	VERT.		Revitalization, new stator, re-insulation of rotor poles
79	NORTH MACEDONIA	TIKVESH	2	31800	10500	50	300,0	540	800,0	FRANCIS	2003	VERT.	26000	Upgrading, new stators and rotor poles
80	SLOVENIA	HE OŽBALT	3	30000	10500	50	125,0	350	4100,0	KAPLAN	2002/2004	VERT.,U Type		
81	SLOVENIA	HE VUHRED	3	30000	10500	50	125,0	350	4100,0	KAPLAN	2001/2003	VERT.,U Type		
82	BIH	JABLANICA	6	30000	6300	50	300,0	594	650,0	FRANCIS	1954/57	VERT.,S Type		
83	BIH	MOSTAR	3	30000	10500	50	150,0	420	2100,0	KAPLAN	1987	VERT.,U Type		
84	SERBIA	ZVORNIK	4	30000	11000	50	150,0	340	4800,0	KAPLAN	1953/56	VERT.,S-U Type		
85	COSTA RICA	TORO 3	2	29700	13800	60	600,0	900	205,0	FRANCIS	2011	VERT., S Type		
86	IRAQ	HEMREN DAM	2	27800	11000	50	166,7	450	4125,0	KAPLAN	1981	VERT.,U Type		
87	INDIA	SHOLAYAR II	1	27778	11000	50	428,0	800	320,0	FRANCIS	1969	VERT.,S Type		
88	SERBIA	BERDAP II	4	27750	6300	50	62,5	147	4500,0	-	1986	BULB TYPE		
89	SWEDEN	BATFORS	2	27000	11000	50	125,0	300	4025,0	FRANCIS	2005/06	VERT.		Revitalization, stator core and winding
90	NORTH MACEDONIA	GLOBOČICA	2	26000	10500	50	375,0	695	400,0	FRANCIS	1963	VERT.,S Type		
91	CROATIA	PERUĆA	2	26000	10500	50	187,5	405	2400,0	FRANCIS	1959/60	VERT.,U Type		
92	NORTH MACEDONIA	ŠPILJE	3	26000	10500	50	300,0	540	800,0	FRANCIS	1968	VERT.,S Type		
93	NORTH MACEDONIA	TIKVEŠ	2	26000	10500	50	300,0	540	800,0	FRANCIS	1967/68	VERT.,S Type		
94	NORTH MACEDONIA	TIKVEŠ II	2	26000	10500	50	300,0	540	800,0	FRANCIS	1980	VERT.,S Type		
95	SLOVENIA	FALA 9-10	2	25000	10500	50	100,0	300	3800,0	KAPLAN	1989	VERT.,U Type		
96	CROATIA	LEŠČE	2	25000	10500	50	187,5	360	1300,0	FRANCIS	2009	VERT.,S-Type		
97	SLOVENIA	MAVČIČE	2	25000	10500	50	150,0	375	2300,0	KAPLAN	1986	VERT.,S-U Type		
98	MOROCCO	MECHRA KLILA	1	25000	10500	50	187,5	390	2400,0	KAPLAN	1966	VERT.,U Type		
99	CROATIA	SKLOPE	1	25000	10500	50	250,0	560	850,0	FRANCIS	1969	VERT.,S Type		
100	FINLAND	UTANEN	1	25000	10500	50	125,0	325	2600,0	KAPLAN	2005	VERT.,S-U Type		
101	CROATIA	GOJAK	3	25000	10500	50	428,6	775	355,0	FRANCIS	2017/2018/2019	VERT.,S Type		
102	CROATIA	ĐALE	2	24000	10500	50	166,6	440	2000,0	KAPLAN	1988	VERT.,S Type		
103	SLOVENIA	FALA	1	24000	10500	50	125,0	315	3800,0	KAPLAN	1963	VERT.,U Type		
104	FINLAND	HAAPAKOSKI	2	24000	10500	50	150,0	450	1470,0	KAPLAN	2008	VERT, S-U Type	17500	Upgrading, new stators and overhaul
105	ICELAND	LAGARFOSS	1	24000	10500	50	136,4	315	1755,0	KAPLAN	2006	VERT.,S-Type		
106	FINLAND	MAALISMA	2	24000	10500	50	166,7	457	1050,0	KAPLAN	2009/2010	VERT, S-U Type	20000	Upgrading, new stators and overhaul
107	SLOVENIA	MARIBORSKI OTOK	3	24000	10000	50	125,0	315	3800,0	KAPLAN	1947-60	VERT.,U Type		
108	FINLAND	PAHKAKOSKI	2	24000	10500	50	166,7	490	1310,0	KAPLAN	2011/2012	VERT, S-U Type	21000	Upgrading, new stators and overhaul
109	SLOVENIA	VUZENICA	2	24000	10000	50	125,0	315	3800,0	KAPLAN	1951-54	VERT.,U-Type		
110	SLOVENIA	PLAVE II	1	23000	10500	50	166,7	490	2900,0	KAPLAN	2000	VERT,U Type		
111	CROATIA	RIJEKA	2	23000	10500	50	600,0	1060	150,0	FRANCIS	1967	VERT.,S Type		
112	SLOVENIA	OŽBALT	3	22000	10500	50	125,0	335	3000,0	KAPLAN	1959-61	VERT.,U Type		
113	INDIA	SHOLAYAR-KERALA	3	22000	11000	50	750,0	1360	95,0	FRANCIS	1965-66	VERT.,S Type		
114	SLOVENIA	VUHRED	3	22000	10500	50	125,0	335	3000,0	KAPLAN	1955-57	VERT.,U Type		
115	SLOVENIA	VUZENICA-III	1	22000	10500	50	125,0	335	3000,0	KAPLAN	1957	VERT.,U Type		
116	SLOVENIA	BREŽICE	3	21500	10500	50	107,1	320	2800,0	KAPLAN	2018	VERT.,U Type		
117	AUSTRIA	WÖLLA	1	20000	6300	50	1000,0	1975		FRANCIS	*	VERT., S Type		New stator, re-insulation of rotors poles
118	CROATIA	GOJAK	3	20000	10500	50	428,0	775	355,0	FRANCIS	1957-58	VERT.,S Type		
119	SERBIA	POTPEČ	3	20000	8800	50	187,5	365	1300,0	KAPLAN	1966-69	VERT.,S-U Type		
120	SWEDEN	BORGFORSEN	1	19000	6600	50	150,0	420	-	KAPLAN	2014	VERT., S Type	17000	Upgrading, new stator, re-insulation of rotor poles
121	SWEDEN	BORGFORSEN	1	19000	6600	50	150,0	420	-	KAPLAN	2019*	VERT., S Type	17000	Upgrading, new stator, re-insulation of rotor poles
122	INDIA	YAMUNA II	3	19000	11000	50	150,0	305	2200,0	FRANCIS	1964-66	VERT.,U Type		
123	BIH	PEĆ MLINI	2	18000	10500	50	600,0	1080	90,0	FRANCIS	2003	VERT.,S Type		
124	INDIA	BHAVANI KATTALAI I	2	16666	6600	50	71,4	214	2900,0	-	2003	BULB TYPE		
125	INDIA	BHAVANI KATTALAI II	2	16666	6600	50	71,4	214	2900,0	-	2009	BULB TYPE		
126	INDIA	BHAVANI KATTALAI III	2	16666	6600	50	71,4	214	2900,0	-	2010	BULB TYPE		
127	NEW GUINEA	RAMU	3	16666	11000	50	750,0	1300	68,0	FRANCIS	1975	VERT.,S Type		
128	SLOVENIA	BLANCA	3	16500	6300	50	100,0	295	2800,0	KAPLAN	2008-2009	VERT., U Type		
129	SLOVENIA	DOBLAR I	3	16000	10500	50	300,0	574	320,0	FRANCIS	2010/2013	VERT.,S Type		
130	SERBIA	VRLA I-"A"	2	16000	6000	50	600,0	1120	120,0	PELTON	1954-55	VERT.,S Type		

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131	SERBIA	VRLA III	1	16000	6000	50	600,0	1120	120,0	PELTON	1957	VERT.,S Type		
132	RUANDA	RUZIJII II	1	15000	6600	50	187,5	400	800,0	FRANCIS	2000	VERT.,S-U Type		
133	ALBANIA	SHKOPETI	2	15000	6300	50	300,0	760	80,0	-	2004	VERT	12500	Upgrading, new stators and rotor poles
134	SLOVENIA	BOŠTANJ	3	14500	6300	50	107,0	380	690,0	-	2005	BULB TYPE		
135	CANADA	RAPIDES DES COEURS	6	14500	13800	60	225,0	538	294,0	SAXO	2008	VERT.		
136	SLOVENIA	VRHOVO	3	14300	6300	50	107,0	412	667,0	-	1991-92	BULB TYPE		
137	CANADA	MAGPIE	3	14000	13800	60	225,0	523	294,0	SAXO	2007	VERT., S-U Type		
138	FINLAND	KUURNA	2	14000	10500	50	93,8	264	2000,0	KAPLAN	2020	VERT.	11000	Upgrading, new stators, new rotor / new rotor poles
139	SERBIA	VRLA II	1	14000	6000	50	500,0	965	180,0	FRANCIS	1953	VERT.,S Type		
140	SERBIA	VRLA IV	1	14000	6000	50	500,0	965	180,0	FRANCIS	1957	VERT.,S Type		
141	MOROCCO	EL BORJ	2	13000	10000	50	600,0	1225	25,2	FRANCIS	2008	HORIZ.		
142	SLOVENIA	SOLKAN	3	13000	6300	50	214,3	525	850,0	KAPLAN	1984	VERT.,U Type		
143	SWEDEN	TURINGE	1	12780	10000	50	214,3	570	380,0	KAPLAN	2018	VERT.		Revitalization, new stator, re-insulation of rotor poles
144	BIH	JAJCE II	3	12500	6000	50	250,0	500	400,0	FRANCIS	1953-56	VERT.,S Type		
145	SERBIA	KOKIN BROD	2	12500	6300	50	375,0	745	170,0	FRANCIS	1961	VERT.,S Type		
146	NEW ZEALAND	RUAHIIHI	2	12500	11000	50	500,0	945	92,0	FRANCIS	1981	VERT.,S Type		
147	INDIA	YAMUNA I / DHAKRANI	3	12500	11000	50	187,5	460	950,0	KAPLAN	1963-66	VERT.,U Type		
148	SLOVENIA	MEDVODE	2	12000	6300	50	214,0	499	620,0	KAPLAN	1952-54	VERT.,S Type		
149	SWEDEN	GRADA	1	11500	11000	50	115,4	340	1860,0	KAPLAN	2012	VERT.,S Type		New stator
150	SLOVENIA	PLAVE I	2	11425	10500	50	300,0	670	260,0	KAPLAN	2016/2017	VERT.,S Type		
151	SLOVENIA	MOSTE	1	11000	6300	50	750,0	1200	28,0	FRANCIS	1978	VERT.,R.,S Type		
152	MOROCCO	TANAFNIT	2	11000	10000	50	500,0	1045	34,4	FRANCIS	2008	HORIZ		
153	SWEDEN	UNTRA	1	11000	7500	50	125,0	250	1150,0	FRANCIS	*	HORIZ		
154	INDIA	JALDHAKA	2	10600	11000	50	600,0	1100	65,0	FRANCIS	1963	VERT.,S Type		
155	DOMIN. REPUBLIC	JIMENO A	1	10500	12500	60	720,0	1080	29,0	FRANCIS	2002	VERT.,S Type		
156	FINLAND	LIEKSANKOSKI 1	1	10500	10500	50	150,0	445	930,0	KAPLAN	2012	VERT., U Type	9500	Upgrading, new stator, re-insulation of rotor poles
157	FINLAND	LIEKSANKOSKI 2	1	10500	10500	50	150,0	445	930,0	KAPLAN	2018	VERT., U Type	9500	Upgrading, new stator, re-insulation of rotor poles
158	FINLAND	PANKAKOSKI 1	1	10500	10500	50	150,0	445	930,0	KAPLAN	2013	VERT., U Type	9500	Upgrading, new stator, re-insulation of rotor poles
159	FINLAND	PANKAKOSKI 2	1	10500	10500	50	150,0	445	930,0	KAPLAN	2018	VERT., U Type	9500	Upgrading, new stator, re-insulation of rotor poles
160	NORWAY	TORSNES	1	10400	6600	50	600,0	1080	-	PELTON	2013	6SBV6 1120M1-10		
161	NORWAY	STEINVIK	1	10380	6600	50	1000,0	1860	-	PELTON	2006	6SBV6 1000M-6		
162	SWEDEN	VÄSSINKOSKI	1	10000	6300	50	333,3	650	56,0	FRANCIS	2018	VERT.,S Type		Refurbishment, re-insulation of rotor poles
163	COSTA RICA	BIRRI	2	10000	4160	60	600,0	1080	120,0	PELTON	1989	HORIZ.		
164	SWEDEN	ELDFORSEN	1	10000	6600	50	125,0	293	94,8	KAPLAN	2009	VERT.S-U Type		
165	NORTH MACEDONIA	VRBEN	1	9500	6300	50	750,0	1350	26,0	FRANCIS	2003	HORIZ.	8000	Upgrading, new winding, re-insulation of rotor poles
166	AUSTRIA	WEINZÖDL	2	9500	5300	50	150,0	462	220,0	-	2013/2014	BULB TYPE		
167	COLOMBIA	DOLORES	1	9000	6600	60	600,0	1180	64,0	FRANCIS	1996	HORIZ.		
168	NEW ZEALAND	MANGAPAPA	2	9000	11000	50	750,0	1250	30,0	FRANCIS	1971	VERT.,S Type		
169	SLOVENIA	MOSTE	1	9000	6300	50	500,0	1050	82,0	FRANCIS	2009	VERT.,S Type	7500	
170	SLOVENIA	MOSTE	1	9000	6300	50	500,0	1050	82,0	FRANCIS	2003	VERT.,S Type	7500	
171	BURKINA FASO	BAGRE	2	9000	6600	50	272,7	720	250,0	FRANCIS	1991	VERT.,S-U Type		
172	GUINEA	DONKEA	2	8500	6300	50	500,0	950	80,0	FRANCIS	1969	VERT.,S Type		
173	INDIA	KARIKKAYAM	2	8340	11000	50	176,5	476	520,0	KAPLAN	1999	VERT.,S-U Type		
174	CROATIA	MANOJLOVAC I	3	8000	6300	50	500,0	1010	50,0	FRANCIS	1954-55	HORIZ.		
175	NORTH MACEDONIA	RAVEN	3	8000	6300	50	500,0	935	70,0	FRANCIS	1959-70	VERT.,S Type		
176	NORTH MACEDONIA	VRBEN	2	8000	6300	50	750,0	1350	26,0	FRANCIS	1959	HORIZ.		
177	FINLAND	PUNTARIKOSKI	1	8000	6300	50	150,0	420	785,0	KAPLAN	2017	VERT., S Type		Revitaization, new stator, re-insulation of rotor poles
178	FINLAND	MYLLYKOSKI	1	7900	10500	50	94,0	280	1100,0	KAPLAN	2012	VERT., S Type	5700	Upgrading, new stator and rotor poles
179	NORWAY	KLOSTERFOSS	2	7800	6000	50	100,0	255	400,0	-	2014/2015	BULB TYPE	5670	Upgrading and revitalization, existing upstream cover and access shaft
180	NORTH MACEDONIA	KALIMANCI	2	7500	6300	50	500,0	905	80,0	FRANCIS	1970	VERT.,S Type		
181	ITALY	MOSSO IN PASSIRIA	2	7500	6300	50	750,0	1350	-	PELTON	2006	6SBV6 900M2-8		
182	ICELAND	MJOLKA-II	2	7125	6300	50	750,0	1420	36,0	PELTON	1975	HORIZ.		
183	NORWAY	REKVATN	1	7100	6600	50	750,0	1200	-	FRANCIS	2011	6SBV6 900M2-8		
184	CROATIA	FUŽINE	1	6700	6300	50	375,0	675	85,0	FRANCIS	2017	VERT. S Type		
185	INDONESIA	AMPELGADING	2	6540	6600	50	1000,0	1710	-	FRANCIS	2009	6SBO6 800S2-6		
186	TURKEY	QILDIR	3	6400	10600	50	750,0	1350	18,5	FRANCIS	1973	VERT.,S Type		
187	NORWAY	STAMPOLVA	1	6400	6600	50	1000	1800	-	PELTON	*	6SBV6 800M1-6		
188	NORWAY	KVAESANI	1	6325	6600	50	1000,0	1830	-	PELTON	2010	6SBV6 800S2-6		
189	GUINEA	GRANDES CHUTES	2	6300	3200	50	750,0	1300	21,4	PELTON	1963	HORIZ.		
190	GUINEA	GRANDES CHUTES	2	6300	3200	50	600,0	1050	-	FRANCIS	2020	6SBV3 900S2-10		
191	IRAN	DOROODZAN DAM	2	6200	4160	50	300,0	655	110,0	FRANCIS	1986	VERT.,S-U Type		
192	SWEDEN	IGGESUND	1	6200	6600	50	333,3	834	37,0	-	2009	6SBV6 1250-18		
193	FINLAND	KORKEAKOSKI	2	6100	10500	50	214,3	643	100,0	KAPLAN	2017	VERT. S Type	4400	
194	PHILIPPINES	TAFT	3	5900	6300	50	400,0	800	-	FRANCIS	*	6SBO6 1000M-18		
195	BIH	DUB	2	5800	6300	50	600,0	1100	-	FRANCIS	2017	6SBO6 900M2-10		

## HYDROGENERATORS REFERENCE LIST

ITEM	SUPPLIED TO	POWER STATION	PCS	CAPACITY (kVA)	VOLTAGE (V)	FREQ (Hz)	RATED SPEED (rpm)	RUNAWAY SPEED (rpm)	mD <sup>2</sup> (m <sup>2</sup> )	TURBINE TYPE	YEAR OF MANUFACTURE	TYPE OF CONSTRUCTION	UPGRADING FROM (kVA)	REMARKS
196	PAKISTAN	GUJRUNWALLA	3	5750	3300	50	107,0	276	890,0	KAPLAN	1957	VERT.,U Type		
197	CAMBODIA	KIROROM	2	5600	6300	50	600,0	1100	14,5	PELTON	1966	HORIZ.		
198	SERBIA	MEDUVRŠJE-II	1	5600	6300	50	300,0	852	110,0	KAPLAN	1956	VERT.,S Type		
199	SERBIA	OVČAR BANJA	1	5600	6300	50	300,0	852	110,0	KAPLAN	1956	VERT.,S Type		
200	C. AFR. REP.	BOALI 2	2	5500	5500	50	600,0	1150	33,4	KAPLAN	2013	VERT.,S Type		New stators
201	C. AFR. REP.	BOALI 2	2	5500	5500	50	600,0	1150	33,4	KAPLAN	1974	VERT.,S Type		
202	NORWAY	RASDALEN	1	5490	6600	50	750,0	1150	-	PELTON	2009	6SBV6 900-8		
203	BULGARIA	VACHA	1	5400	6300	50	500,0	880	-	FRANCIS	*	6SCO6 1000S1-12		
204	COLOMBIA	PAJARITO	1	5400	6600	60	720,0	1140	32,0	FRANCIS	1996	HORIZ.		
205	CROATIA	KRALJEVAC	1	5300	10500	50	1000,0	1700	13,0	PELTON	1989	HORIZ.		
206	MALAYSIA	SUNGAI SELAMA	2	5300	6300	50	429	771		PELTON	*	6SBO6 900M2-14		
207	NORWAY	N. GROSLANDELV	1	5230	6600	50	600,0	1052		PELTON	2018	6SBV6 900S1-10		
208	IRAN	SHAHID RAJAE	3	5200	6300	50	750,0	1380	5,6	FRANCIS	2007	6SBV6 900-8		
209	SWITZERLAND	AUGAND	2	5200							*	6SBV6 1000M1-14		
210	KOSOVO	KOZHNER	2	5050	6300	50	500,0	915	19,0	PELTON	2005	HORIZ.		
211	CROATIA	FUŽINE	1	5000	6300	50	375,0	695	86,0	FRANCIS	1956	VERT.,R.,S Type		
212	MONTENEGRO	LIVEROVIĆI	2	5000	6300	50	500,0	900	80,0	FRANCIS	1955	HORIZ.		
213	USA	VERNON	4	5000	13800	60	144,0	345	140,0	KAPLAN	2007	VERT.,S Type		
214	SLOVENIA	ZADLAŠČICA	2	5000	6300	50	750,0	1350	15,0	PELTON	1989	HORIZ.		
215	SWITZERLAND	RASOIRA	1	5000	6300	50	375,0	1050		KAPLAN	*	6SBV6 1000S2-16		
216	NORWAY	LANGDALSELVA	1	4900	6600	50	600,0	1135	-	PELTON	2012	6SBV6 900S2-10		
217	ETHIOPIA	TISS ABBAY	2	4800	6000	50	375,0	745	48,0	FRANCIS	1962	VERT.,S Type		
218	ETHIOPIA	TISS ABBAY-II	1	4800	6000	50	375,0	745	48,0	FRANCIS	1983	VERT.,S Type		
219	NORWAY	VANNOLA	1	4750	6600	50	1000,0	1860	-	PELTON	2008	6SBV6 710M2-6		
220	CANADA	JONQUIERE	1	4500	4160	60	276,9	700	46,0	KAPLAN-S	1996	HORIZ.		
221	BIH	USTIPRAČA	2	4400	6300	50	500,0	900	-	FRANCIS	2015	6SBO6 900M1-12		Horizontal
222	NORWAY	REINAGA	1	4350	6600	50	1000,0	1870	-	PELTON	2014	6SBV6 800S1-6		
223	NORWAY	BRUVOLLELVA	1	4335	6600	50	750,0	1500	-	FRANCIS	2009	6SBV6 710M2-8		
224	NORWAY	TVEITASKAR	1	4312	6600	50	750,0	1400	-	PELTON	2009	6SBV6 800S1-8		
225	SLOVENIA	AJBA PLAVE	1	4300	3150	50	187,5	420	75,0	-	1974	HORIZ		
226	BIH	NOVAKOVIĆI 1	1	4200	6300	50	750,0	1265	-	FRANCIS	2011	6SBO6 710M2-8		
227	NORWAY	PALMAFOSSEN	1	4200	6600	50	231,0	646		KAPLAN	*	6SBV6 1120M2-26		
228	USA	MADISON DAM	4	4100	4000	60	300,0	586	5,5	FRANCIS	2020	6SBO4 1120S2-24		
229	NORWAY	BOEN FOSS	1	4100	6300	50	231	644		KAPLAN	2020	6SBV6 1120M2-26		
230	BULGARIA	BANITE	1	4000	6300	50	750,0	1480	-	FRANCIS	2009	6SBV6 710M2-8		
231	SERBIA	RAŠKA	2	4000	6300	50	1000,0	1800	7,2	PELTON	1952	VERT.,S-U Type		
232	INDONESIA	TANGKA	2	4000	6300	50	1000,0	1800		FRANCIS	2020	6SBO6 710S2-6		
233	NORWAY	MANNBERG	1	3940	6600	50	1000,0	1720		PELTON	2016	6SBV6 710S2-6		
234	ICELAND	BJOLFSVIRKJUN	2	3900	6600	50	750,0	1350	-	FRANCIS	2007	6SBO6 710M2-8		
235	ICELAND	FJARDARA 2	2	3900	6600	50	750,0	1350	-	FRANCIS	2007	HORIZ.		
236	NORWAY	MIDTLEGRE	1	3855	6600	50	1000,0	1800		PELTON	2015	6SBV6 710S2-6		
237	CROATIA	GOLUBIĆ	2	3850	6000	50	500,0	925	30,0	FRANCIS	1981	HORIZ.		
238	PHILIPPINES	MATUNO	3	3800	6300	60	400,0	880		KAPLAN	2020	6SBO6 900M1-18		
239	ALBANIA	RAPUNI 3&4	3	3780	6300	50	428,6	800		FRANCIS	2015	6SBO6 900M1-14		
240	NEPAL	TRISHULLI	3	3750	6600	50	500,0	925	41,0	FRANCIS	1963	HORIZ.		
241	SWEDEN	SEMLA	1	3750	3300	50	250,0	641		KAPLAN	2017	SB 2507-24		BULB TYPE
242	IRAN	MAHABAD	2	3700	6300	50	375,0	755	57,0	FRANCIS	1969	VERT.,S Type		
243	NORWAY	BYRO	1	3550	6600	50	1000,0	1850		PELTON	2015	6SBV6 710M1-6		
244	AUSTRIA	BREITENBACH	1	3500	10500	50	200,0	460	42,0	KAPLAN	2005	VERT., S-U Type		
245	NEW ZEALAND	DEEP STREAM	2	3500	690	50	1000,0	1930	-	FRANCIS	2007	6SBO1 630M2-6		
246	SLOVENIA	DUBRAVA	1	3500	10500	50	750,0	1300	-	PELTON	2007	6SBO0 710M3-8B		
247	TURKEY	GENERAL	2	3500	6300	50	1000,0	2000	-	FRANCIS	2012	6SBO6 710M1-6		
248	NORWAY	STUBLIELVA	1	3300	6600	50	750,0	1520	-	PELTON	2014	6SBO6 710M2-8		
249	PHILIPPINES	TIBAG	2	3300	6300	60	900,0	1719		FRANCIS	*	6SBO6 710S1-8		
250	MONTENEGRO	GLAVA ZETE	2	3200	6300	50	375,0	1020	48,0	KAPLAN	1952/53	VERT.,S Type		
251	BIH	LUKAČ	1	3200	6300	50	600,0	1160	-	FRANCIS	2007	6SBO6 710M2-10		
252	SERBIA	MEDUVRŠJE	1	3200	6300	50	375,0	1020	48,0	KAPLAN	1953	VERT.,		
253	SERBIA	OVČAR BANJA	1	3200	6300	50	375,0	1020	48,0	KAPLAN	1952	VERT.,S Type		
254	BIH	UNA	4	3170	6300	50	300,0	750	25,0	KAPLAN	2000	VERT.,S Type		
255	NORWAY	KALDSANI	1	3120	6600	50	750,0	1320	-	PELTON	2014	6SBO6 710M2-8		
256	NORWAY	VASSVIKELVA	1	3100	6600	50	1000,0	1750	-	PELTON	2014	6SBO6 710S2-6		
257	PHILIPPINES	DAVAO	1	3030	2400	60	900,0	1910		FRANCIS	*	6SBO2 710S1-8		
258	GERMANY	ROTHENFELS	1	3020	6300	50	130,4	395		KAPLAN	2017	SB 3159-46		BULB TYPE
259	AUSTRIA	OVELLA	1	3000	3300	50	272,7	780	16,2	KAPLAN	2018	SB 1809-22		
260	NORWAY	SORDALSELVA	1	3000	6600	50	600,0	1050		PELTON	2016	6SBO6 800S2-10		

## HYDROGENERATORS REFERENCE LIST

ITEM	SUPPLIED TO	POWER STATION	PCS	CAPACITY (kVA)	VOLTAGE (V)	FREQ (Hz)	RATED SPEED (rpm)	RUNAWAY SPEED (rpm)	mD <sup>2</sup> (m <sup>2</sup> )	TURBINE TYPE	YEAR OF MANUFACTURE	TYPE OF CONSTRUCTION	UPGRADING FROM (kVA)	REMARKS
261	BIH	MAJDAN	1	3000	6300	50	1000,0	1300	1,0	PELTON	2004	6SBO6 630 M2-6		
262	GEORGIJA	AKHALKALAKI 1	3	3000	6300	50	600,0	1260		FRANCIS	*	6SBO6 710M2-10		
263	ITALY	CASTIGLIONE	2	2800	6300	50	750,0	1275	0,4	FRANCIS	2005	6SBO6 710M1-8		
264	GUINEA	BANEAH	2	2780	3150	50	375,0	1100	50,0	KAPLAN	1988	VERT.,S Type		
265	NORTH MACEDONIA	GLAŽNJA	1	2500	6300	50	1000,0	1740	1,7	PELTON	1986	HORIZ.		
266	ITALY	MONTALTO DORA	1	2500	6300	50	300,0	709	14,0	KAPLAN	2004	VERT		
267	ITALY	MONTALTO DORA 2	1	2500	6300	50	300,0	709	-	KAPLAN	2006	6SBO6 1000M-20		
268	SLOVENIA	LOMŠČICA	1	2400	3150	50	1000,0	1700	3,5	FRANCIS	1989	HORIZ.		
269	ITALY	BESSE 2	1	2300	6000	50	500,0	1075	-	FRANCIS	2007	6SBV6 710M2-12		
270	SLOVENIA	MELJE	1	2250	400	50	250,0	585	-	KAPLAN	2008	6SBO1 1250M1-24		
271	ICELAND	BJOLFSEVIRKJUN	2	2200	6600	50	500,0	900	-	PELTON	2007	6SBO6 710M1-12		
272	NORTH MACEDONIA	DOŠNICA	3	2200	6300	50	600,0	1140	8,0	PELTON	1952	HORIZ.		
273	BIH	MESIČI	2	2200	3150	50	600,0	1320	8,0	FRANCIS	1949/50	VERT.,		
274	SLOVENIA	SAVICA	2	2200	6300	50	600,0	1140	8,0	PELTON	1949/50	HORIZ.		
275	ITALY	SEDA	1	2200	6300	50	500,0	800	0,6	PELTON	2004	6SBO6 710 M2-12		
276	BIH	SLAPOVI NA UNI	4	2200	3150	50	300,0	780	25,0	KAPLAN	1950/53	VERT.,S Type		
277	SERBIA	SOKOLOVICA	2	2200	3150	50	300,0	780	25,0	KAPLAN	1950/55	VERT.,S Type		
278	SYRIA	YARMOUK	2	2200	6300	50	1500,0	2700	1,5	PELTON	1952	HORIZ.		
279	CROATIA	ZAVRELJE	1	2200	6300	50	600,0	1140	4,0	PELTON	1952	HORIZ.		
280	ICELAND	FJARDARA 1	2	2200	6600	50	500,0	900	-	PELTON	2007	6SBO6 710M1-12		Horizontal
281	NORWAY	SOLIA	1	2177	6600	50	600,0	1095	-	FRANCIS	2015	6SBO6 710S1-10		
282	BIH	NOVAKOVIĆI 2	1	2150	6300	50	1000,0	1670	-	FRANCIS	2011	6SBO6 630M1-6		
283	NORWAY	BORDALSBEKKEN	1	2050	690	50	750,0	1322	-	PELTON	2012	6SBO1 630S2-8		
284	NORWAY	HOMMSANI	1	2020	690	50	750,0	1350	-	PELTON	2013	6SBO1 630S2-8		
285	ROMANIA	SAFRA	1	2000	6300	50	1000,0	1998	-	PELTON	2013	6SBV6 630M1-6		
286	GEORGIJA	AKHALKALAKI 2	1	2000	6300	50	750,0	1525		FRANCIS	*	6SBO6 630M1-8		
287	SLOVAKIA	ZELIEZOVCE	2	1990	690	50	230,8	655	-	KAPLAN	2015	6SBO1 1250S1-26		BULB TYPE
288	FINLAND	KISSAKOSKI	1	1890	690	50	187,5	550	-	-	2012	6SBO1 1120-32		BULB TYPE
289	SWEDEN	BANGBRO	1	1800	690	50	600,0	1200	1,5	FRANCIS	2005	6SBO1 630M1-10		
290	SLOVENIA	MEŽICA	2	1800	3300	50	1000,0	1630	2,9	PELTON	1965	HORIZ.		
291	BIH	MUJADA	1	1800	400	50	750,0	1300	-	PELTON	2005	6SBO1 560L-8		
292	BIH	MUJAKOVIĆI	1	1800	400	50	750,0	1300	0,5	PELTON	2004	6SBO1 560L-8		
293	CROATIA	OZALJ	2	1800	6300	50	300,0	780	25,0	KAPLAN	1951	VERT.,S Type		
294	NORTH MACEDONIA	PESOČANI	2	1800	6300	50	600,0	1140	6,8	PELTON	1951	HORIZ.		
295	BIH	POLJANICA 1	2	1800	400	50	750,0	1300	-	PELTON	2005	6SBO1 560L-8		
296	NORTH MACEDONIA	SAPUNČICA	2	1800	6300	50	1000,0	1850	2,8	PELTON	1951/52	HORIZ.		
297	SLOVENIA	SAVA	2	1800	6300	50	600,0	1600	-	KAPLAN	2008	6SBV6 630M2-10		
298	TURKEY	AYRANPINAR	1	1800	6300	50	600,0	1194		FRANCIS	*	6SBO6 630S2-10		
299	BIH	TREŠANICA	1	1750	400	50	600,0	1080	-	KAPLAN	2007	6SBO1 630M1-10		
300	GERMANY	LANDSBERG	1	1710	6300	50	214,3	460	49,0	STRAFLO	*			Revitalization, new stator winding and core, re-insulation of rotor poles
301	GERMANY	SPERBER	1	1710	6300	50	214,3	460	49,0	STRAFLO	*			Revitalization, new stator winding and core, re-insulation of rotor poles
302	CROATIA	OZALJ	3	1700	5000	50	107,4	193	-	KAPLAN	2017/2018/2019	VERT.,S Type		Revitalization, new stators and rotors
303	ITALY	SILEA	2	1700	6000	50	107,1	270	-	KAPLAN	2007	6SBO6 1250-56		
304	ROMANIA	GOZNA	2	1600	6300	50	750,0	1405	-	FRANCIS	2013	6SBV6 630S2-8		
305	SLOVENIA	MEŽICA	1	1600	3300	50	750,0	1315	3,0	FRANCIS	1998	HORIZ.		
306	CROATIA	PRANČEVIĆI	1	1600	6300	50	428,6	943	-	FRANCIS	2014	6SBO6 710M1-14		
307	NORWAY	TYTTEBERELVA	1	1600	690	50	428,6	790	-	PELTON	2013	6SBO1 710S2-14		
308	CROATIA	LEPENICA	1	1560	6300	50	600,0	1560	5,8	KAPLAN	1988	VERT.,R.,S Type		
309	BIH	BOTUN	1	1500	400	50	1000,0	1700	0,4	PELTON	2004	6SBO1 560M2-6		
310	BIH	JEZERNICA	1	1500	400	50	1000,0	1700	0,4	PELTON	2004	6SBO1 560M1-6		
311	NORWAY	KVINESDAL	1	1500	660	50	1000,0	2000	-	PELTON	2006	6SBO1 560S1-6		
312	BIH	VITEZ	1	1500	6300	50	300,0	700	-	KAPLAN	2006	6SBO6 800M2-20		
313	CROATIA	ZAKUČAC	2	1500	400	50	750,0	1350	1,0	PELTON	2003	S 1253-8		Horizontal
314	SWEDEN	ADOLFSFORS	1	1500	690	50	250,0	580	0,5	FRANCIS	2005	6SBO1 900M-24		
315	SWITZERLAND	RÜCHLIG	1	1425	6300	50	750,0	2548	-	KAPLAN	2014	SB 1127-8		
316	CROATIA	DUBRAVA-"B"	1	1400	400	50	428,0	1350	8,0	KAPLAN	1989	HORIZ.		
317	SLOVENIA	JAVORNIK	1	1400	5250	50	750,0	1450	0,9	PELTON	1986	HORIZ.		
318	CROATIA	LEŠČE	1	1320	400	50	750,0	1365	-	-	2009	6SBO1 630M-8		
319	ITALY	BESSE 1	1	1300	6000	50	600,0	1200	-	FRANCIS	2007	6SBV6 630S2-10		
320	CROATIA	DUBROVNIK	2	1300	400	50	1000,0	1800		PELTON	2017	6SC01 560S1-6		
321	CROATIA	ČAKOVEC	1	1300	400	50	432,0	1200	2,0		1981	BULB TYPE		
322	UNITED KINGDOM	CLAERWEN	1	1300	690	50	600,0	1500		FRANCIS	*	6SBO1 560M1-10		
323	SWITZERLAND	ETTISBÜHL	1	1240	400	50	230,8	696	-	KAPLAN	2010	6SBO1 900S-26		
324	SLOVENIA	FUŽINE-VEVČE	1	1200	6300	50	1000,0	3000	0,8	FRANCIS	1986	VERT.,S Type		
325	MONTENEGRO	LIPKOVO	1	1200	400	50	750,0	1680	1,2	PELTON	1962	HORIZ.		

## HYDROGENERATORS REFERENCE LIST

ITEM	SUPPLIED TO	POWER STATION	PCS	CAPACITY (kVA)	VOLTAGE (V)	FREQ (Hz)	RATED SPEED (rpm)	RUNAWAY SPEED (rpm)	mD <sup>2</sup> (m <sup>2</sup> )	TURBINE TYPE	YEAR OF MANUFACTURE	TYPE OF CONSTRUCTION	UPGRADING FROM (kVA)	REMARKS
326	MONTENEGRO	SLAP ZETE	2	1200	3150	50	250,0	400	29,0	KAPLAN	1951	VERT.,S Type		
327	NORTH MACEDONIA	TURIJA-STRUMICA	2	1170	400	50	1000,0	2100	0,5	PELTON	1986	HORIZ.		
328	UNITED KINGDOM	YSTRADFFIN	1	1170	690	50	750,0	1450		FRANCIS	2020	6SBO1 500M2-8		
329	TURKEY	DINC 1	1	1150	400	50	750,0	1350	-	PELTON	2011	6SBO1 560S1-8		
330	BIH	DO	2	1100	400	50	500,0	1000	-	KAPLAN	2015	6SBO1 630S1-12		
331	ITALY	CRESPI 3	1	1100	400	50	375,0	975	-	KAPLAN	2007	6SBO1 630M2-16		
332	ITALY	CRESPI 5	1	1100	400	50	375,0	825	-	KAPLAN	2007	6SBO1 630M1-16		
333	TURKEY	DINC 2	1	1100	400	50	428,6	775	-	PELTON	2011	6SBO1 630M1-14		
334	SLOVENIA	KNEŠKE RAVNE	1	1100	400	0	600,0	1100	1,0	PELTON	1992	HORIZ.		
335	TURKEY	AYRANPINAR	1	1100	6300	50	750,0	1493		FRANCIS	*	6SBO6 500M1-8		
336	TOGO	KPIMÉ	2	1000	5000	50	750,0	1350	1,1	PELTON	1962	HORIZ.		
337	CROATIA	ORLOVAC-"B"	1	1000	400	50	1000,0	1800	1,7	PELTON	1972	HORIZ.		
338	MONTENEGRO	PERUĆICA-"B"	2	1000	400	50	1000,0	1800	0,9	PELTON	1957-64	HORIZ.		
339	CROATIA	SPLIT-"B"	2	1000	400	50	750,0	1350	4,0	FRANCIS	1961	HORIZ.		
340	CROATIA	ZELENI VIR	1	1000	5000	50	750,0	1350	1,1	FRANCIS	1961	HORIZ.		
341	SERBIA	BISTRICA-"B"	1	950	400	50	1000,0	1800	0,8	PELTON	1959	HORIZ.		
342	SERBIA	DIKANCE	1	950	400	50	1000,0	1800	0,8	PELTON	1975	HORIZ.		
343	SERBIA	DIKANCE	1	950	400	50	1000,0	1800	0,8	PELTON	1957	HORIZ.		AS.GEN.
344	ITALY	BRUGNETO 2	1	900	400	50	757,0	1400	-	FRANCIS	2006	6AGO1 500S3-8		
345	NORTH MACEDONIA	ZRNOVCI	2	900	3150	50	600,0	1080	2,0	PELTON	1949	HORIZ.		
346	AUSTRIA	HAUNOLDMÜHLE	2	900	400	50	214,0	555	1,1	KAPLAN	2019	6SBO1 900S1-28		
347	BIH	PODKOZICA	1	863	400	50	1000,0	1550	-	PELTON	2005	6SBO1 450M2-6		
348	BIH	POLANICA 2	2	850	400	50	1000,0	1800	-	FRANCIS	2005	6SBO1 450-6		
349	FINLAND	PUHOS	1	850	400	50	150,0	300		KAPLAN	2020	6SBO1 1000S1-40		
350	ITALY	LAVOREIT	1	845	400	50	750,0	1350	-	FRANCIS	2019	6SBO1 500S1-8		
351	UNITED KINGDOM	YSTRADFINN	1	820	690	50	750,0	1650		FRANCIS	2020	6SBO1 500S2-8		
352	ITALY	CRESPI 1	1	800	400	50	300,0	760	-	KAPLAN	2007	6SBO1 630M1-20		
353	SLOVENIA	KOREN	2	800	400	50	750,0	1350	-	PELTON	1992	HORIZ.		
354	CROATIA	SENJ-"B"	1	800	400	50	1500,0	2700	0,4	PELTON	1965	HORIZ.		
355	ITALY	VAL MAIRA	2	800	400	50	1000,0	1800	-	FRANCIS	2004	6SBO1 500M-6		
356	SWEDEN	ARJEPLÖG	1	800	690	50	150,0	424	-	-	2013	6SBO1 1120S1-40		
357	AUSTRIA	OFFNER LAVANT	1	750	400	50	375,0	938	-	KAPLAN	2015	6SBO1 560M2-16		
358	BIH	JABLANICA-"B"	2	750	400	50	750,0	1350	1,3	FRANCIS	1952/58	HORIZ.		
359	NORTH MACEDONIA	LUKAR	1	750	400	50	750,0	1275	-		2000	40SB S904-8		
360	BIH	RAMA-"B"	1	750	400	50	750,0	1570	1,3	PELTON	1968	HORIZ.		
361	AUSTRIA	SCHALLDORF	2	750	690	50	200,0	530	-	KAPLAN	2012	6SBO1 800S1-30		
362	SERBIA	SOKOLJA	1	750	3150	50	750,0	1350	1,3	FRANCIS	1950	HORIZ.		
363	SERBIA	VRLA I-"B"	1	750	400	50	750,0	1350	1,3	PELTON	1952	HORIZ.		
364	GREECE	SARANTOBRIS I	1	700	400	50	750,0	1275	-	PELTON	1999	HORIZ.		
365	SLOVENIA	ORMOŽ-VARAŽDIN	1	670	380	50	385,0	1000	0,8		1974	BULB TYPE		
366	MONTENEGRO	SAVO MAŠKOVIĆ	3	650	3150	50	500,0	900	2,0	PELTON	1951	HORIZ.		
367	SERBIA	SELJAŠNICA	2	650	3150	50	500,0	900	2,0	PELTON	1951	HORIZ.		
368	BIH	VLAŠENICA	2	650	3150	50	500,0	900	2,0	PELTON	1950	HORIZ.		
369	SERBIA	ZVORNIK-"A"	1	650	400	50	500,0	900	2,0	FRANCIS	1954	HORIZ.		
370	BIH	DUŠČICA	1	640	400	50	750,0	1350	-	FRANCIS	2012	6SBO1 450M2-8		
371	ETHIOPIA	ADOLA	3	630	400	50	600,0	1080	2,8	PELTON	1963	HORIZ.		
372	SLOVENIA	STRUGE	1	620	400	50	333,0	550	-	KAPLAN	2005	6SBO1 630M2-18		
373	KENYA	KIANTHUMBI	1	600	400	50	600,0	1200		FRANCIS	2020	6SBO1 500S1-10		
374	CROATIA	VARAŽDIN	1	580	400	50	757,0		-	KAPLAN	2014	6AGO1 500S1-8		AS.GEN.
375	NORTH MACEDONIA	VRUTOK-"B"	1	560	400	50	1500,0	2850	0,3	PELTON	1956	HORIZ.		
376	ITALY	CONSUVERO	2	550	3000	50	275,0	930	0,9	PELTON	2005	6SBO3 500M-16		
377	BULGARIA	DRAGOVISHTICA	1	550	6300	50	508,0	980	-	FRANCIS	2009	6AGO6a 500M1-12		AS.GEN.
378	SLOVENIA	MOŽNICA	1	550	5500	50	600,0	1220	0,9	PELTON	1961	HORIZ.		
379	SLOVENIA	ŽINGARICA	1	540	400	50	1000,0	1800	-	PELTON	1993	HORIZ.		
380	SLOVENIA	SAVA KRANJ	1	505	3150	50	510,0	1500	0,5		1967	BULB TYPE		
381	ITALY	BALANGERO	1	500	400	50	508,0	1200	-	KAPLAN	2007	6AGO1 500S1-12		AS.GEN.
382	ITALY	CERETTO	1	500	400	50	221,0	625	-	KAPLAN	2006	6AGO1 710M2-28		AS.GEN.
383	ITALY	CHIUSA DI PESIO	1	500	400	50	429,0	840	-		2002	HORIZ.		AS.GEN.
384	ITALY	CRESPI 2	1	500	400	50	250,0	700	-	KAPLAN	2006	6SBO1 630M2-24		
385	SLOVENIA	OPLONICA	1	450	400	50	600,0	1080	0,4		1994	HORIZ.		
386	ITALY	PICEGLIE 1	1	450	400	50	758,0	1250	-	KAPLAN	2004	6AOG 407-08		AS.GEN.
387	BIH	POSUŠJE	1	430	400	50	600,0	1080		PELTON	2019	6SBO1 450M2-10		
388	BULGARIA	VODEV CHARK	1	420	6300	50	1010,0	1950	-	PELTON	2013	9AOG 407-06		AS.GEN.
389	ITALY	SALTO BRUNENGA	1	400	400	50	434,0	1100	-	KAPLAN	2006	5AGO1 500S2-14		AS.GEN.
390	ITALY	VILLANOETTA	1	400	400	50	600,0	1300	0,3	KAPLAN	2004	6SBO1 450M2-12		

## HYDROGENERATORS REFERENCE LIST

ITEM	SUPPLIED TO	POWER STATION	PCS	CAPACITY (kVA)	VOLTAGE (V)	FREQ (Hz)	RATED SPEED (rpm)	RUNAWAY SPEED (rpm)	mD <sup>2</sup> (m <sup>2</sup> )	TURBINE TYPE	YEAR OF MANUFACTURE	TYPE OF CONSTRUCTION	UPGRADING FROM (kVA)	REMARKS
391	SLOVENIA	KRANJ-OLJARICA	1	390	400	50	500,0	1500	-	PELTON	1991	HORIZ.		AS.GEN.
392	ITALY	SUSSA 2	1	350	400	50	308,0	600	-	KAPLAN	2006	6AGO1 560S2-20		AS.GEN.
393	ITALY	DOMPE 1	1	320	400	50	382,0	790	-	KAPLAN	2004	6AGO1 500S2-16		AS.GEN.
394	ITALY	SANTA ANNA	1	300	400	50	235,0	510	-	KAPLAN	2007	6AGO1 630S2-26		AS.GEN.
395	ITALY	BERSANA	1	270	500	50	610,0	1350	-	PELTON	2004	6AOG 404-10		AS.GEN.
396	ITALY	DOMPE 2	1	250	400	50	508,0	1400	-	PELTON	2005	6AOG 407-12		AS.GEN.
397	SLOVENIA	VODOSIL	1	250	400	50	333,0	667	-		2003	HORIZ.		AS.GEN.
398	ITALY	AGISTROU 3	1	250	400	50	1011,0	1700	-		2004	6AOG 319-06		AS.GEN.
399	CROATIA	PLETERNICA	1	230	400	50	250,0	450	-	KAPLAN	2012	6SBO1 560S1-24		
400	ITALY	MATHIE	1	200	400	50	1010,0	1800	-	FRANCIS	2005	6AOG 318-06		AS.GEN.
401	CROATIA	VELIKA VRANOVINA	1	200	400	50	1500,0	2350	-	PELTON	2013	6AZG 318-04		AS.GEN.
402	SLOVENIA	GRMOV VRH	1	170	400	50	1009,0		-	PELTON	2013	6AOG 318-06		AS.GEN.
403	ITALY	PIEVE DI TECO	1	150	400	50	435,0	1100	-	KAPLAN	2013	6AOG 404-14		AS.GEN.
404	ITALY	ECOLUBE	1	140	400	50	339,0	750	-	KAPLAN	2005	6AOG 407-18		AS.GEN.
405	SLOVENIA	RAZTEŽILNIK	1	132	380	50	1012,0		-		2011	6AOG 314-06		AS.GEN.
406	ITALY	SEDESANE	1	110	400	50	1015,0	1700		PELTON	2015	6AOG 311-06		AS.GEN.
407	AUSTRIA	SCHMIDLEITHNER	1	100	400	50	750,0	1400	-		2013	6AOG 314-08		AS.GEN.
408	CROATIA	VELIKA ŠUMA	1	90	400	50	750,0	900		PELTON	2016	6AZG 317-08		AS.GEN.

HORIZ. - horizontal unit

R - reversible unit

VERT. - vertical unit

S-U - semi-umbrella type

S - suspended type

U - umbrella type

\* - under manufacturing

AS.GEN. - Asynchronous generator