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Hydrogenerators with Francis turbines with output large than 300 MW with indirect air cooling of stator and rotor windings

Table № 1

№	HPP	Country	Quantity	Output, MW max/rated	Rotation speed, RPM	Year of first aggregate exploitation
1	Piedra del Aguila	Argentina	4	408,5/370,5	125	1989
2	Aguamilpa	Mexico	3	363,2/323,9	150	1991
3	Burejskaja	Russia	6	335	125	2004
4	El Cajon	Mexico	2	416,7/375	150	2006
5	Boguchanskaja	Russia	9	333,3	90,9	manufacture
6	La Yeska	Mexico	2	416,7/375	150	project

Hydrogenerators with Francis turbines with output large than 300 MW with water cooling of stator winding and forced air cooling of rotor winding

Table № 2

№	HPP	Country	Quantity	Output, MW max/rated	Rotation speed, RPM	Year of first aggregate exploitation
1	Krasnoyarskaya	Russia	12	500	93,75	1964, reconstruction
2	Sayano-Shushenskaya	Russia	10	720/640	142,8	1977
3	Evenkiyskaya	Russia	8	1000	107,1	project

Hydrogenerators with Kaplan turbines with output larger 100 MW

Table № 3

№	HPP	Country	Quantity	Output, MW max/rated	Rotation speed, RPM	Year of first aggregate exploitation
1	Jerdap I	Serbia	6	190	71,5	1969, reconstruction
2	Iron Gates I	Romania	6	190	71,5	1969, reconstruction
3	Salto Grande	Argentina	7	135.	75	1977
4	Salto Grande	Uruguay	7	135.	75	1977
5	Sobradinho	Brasilia	6	175	75	1978
6	Volzhskaya	Russia	42	120	68,2	1953 reconstruction
7	Shulbinskaya	Russia	5	117	75	1986

Hydrogenerators with bulb turbines output larger than 50 MW

Table №4

№	HPP	Country	Quantity	Output, MW max/rated	Rotation Speed, RPM	Year of first aggregate exploitation
1	Saratovskaya	Russia	2	54	75	manufacture
2				75	81,82	project

Hydrogenerators with nominal speed over 300 RPM output about 100 MW

Table № 5

№	HPP	Country	Quantity	Output, MW max/rated	Rotation speed, RPM	Year of first aggregate exploitation
1	Lower Sileru	India	2	115	300	1971
2	Shambskaya	Armenia	2	85,5	500	1974
3	Balimela	India	2	82,5/75	375	2006
4	La Higuera	Chili	2	80/77,35	600	erection

The powerful hydrogenerators with stator bore diameter more than 11 m since 1960

Table № 6

№	HPP	Country	Quantity	Output, MW max/rated	Rota-tion speed, RPM	Dia. stator bore, mm	Stator core height mm	Year of first aggregate exploitation
1	Bratskaya	Russia	14	225	125	11000	2500	1960
2	Votkinskaya	Russia	10	100	62,5	14300	1700	1961
3	Dneprodzer-zhinskaya	Ukraine	8	44	51,7	14500	1070	1963
4	Krasnoyarsk	Russia	12	500	93,8	16100	1850	1964 reconctr
5	Aswan	Egypt	12	200	100	11900	2350	1966 reconstruction
6	Jerdap I	Serbia	6	190	71,5	14190	1750	1969 recon.
7	Iron Gates I	Romania	6	190	71,5	14190	1750	1969 r reconstruction
8	Rizhskaya	Latvia	6	64	55,6	14560	1200	1972
9	Capivara	Brazil	4	160	100	13500	1750	1972
10	Zeiskaya	Russia	6	215	136,4	10400	2200	1975
11	Salto-Grande	Argentina	7	135	75	13500	1900	1977
12	Salto-Grande	Uruguay	7	135	75	13500	1900	1977
13	Ust-Ilimskaya	Russia	8	240	125	11000	2150	1976

Table № 6 (continue)

14	Sayano-Shushenskaya	Russia	10	720/640	142,8	11850	2750	1977
15	Sobradinho	Brazil	6	175	75	14190	2200	1978
16	Kegumskaya	Latvia	3	64	55,6	14560	1200	1978
17	Cheboksarska	Russia	14	78	57,7	14120	1490	1981
18	Mainskaya	Russia	3	107	62,5	14300	1700	1983
19	Khoa-Bin	Vietnam	8	240	125	11000	2150	1986
20	Shulbinskaya	Kazakhstan	5	117	75	13500	2000	1986
21	Piedra-del-Aguila	Argentina	4	408,5/ 370,5	125	12000	2800	1989
22	Aguamilpa	Mexico	3	363,2/ 323,95	150	11200	2800	1991
23	Bureiskaya	Russia	6	335	125	12000	2650	2001
24	Srednekansk	Russia	3	142,5	100	11900	1530	2003
25	El Cajon	Mexico	2	416,7/375	150	10840	3000	2006
26	Sangtudinska	Tadjik	4	167,5	100	11900	1820	2007
27	Boguchanska	Russia	9	333,3	90,91	14550	2030	manufacture
28	La Yeska	Mexico	2	416,7/ 375	150	10840	3000	project
29	Evenkijskaya	Russia	8	1000	107,1	16000	3,1	project

Sayano-Shushenskaya HPP, Russia – 6400 MW, 10 x 640 MW, 142 RPM

Sayano-Shushenskaya HPP, Russia – 6400 MW, 10 x 640 MW, 142 RPM

Krasnojarskaja HPP, Russia – 6000 MW, 12 x 500 MW, 94 RPM

Bureiskaya HPP, Russia –2010 MW, 6 x335 MW, 125 RPM

El Cajon HPP, Mexico –750 MW, 2x375 MW, 150 RPM

Aswan HPP, Egypt –2400 MW, 12 x 200 MW, 100 RPM

Jerdap HPP, Serbia- 1140 MW, 6 x 190 MW, 71,5 RPM

Jerdap HPP, Serbia- 1140 MW, 6 x 190 MW, 71,5 RPM