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Table A1.1: Main characteristics of candidate hydro power projects

(Source – Master Plan for the Electricity Supply of Sri Lanka, Main Report, June 1989)

Project code	Avg. flow (m <sup>3</sup> /s)	Rated head (m)	Installed Cap. (MW)	Annual energy (GWh)	Avg. Gen. Cost (USC/kWh)
MADU003***	15.2	285	72	298	3.1
KOTM025	20.4	189	64	268	3.5
GING074	16.4	172	49	211	4.3
NALA005*	2.8	172	8	27	5.0
UMAO008***	16.8	117	35	143	5.1
UMAO034	10.3	245	42	173	5.4
KELA085	36.2	64	39	170	5.6
BELI009	2.2	274	10	43	5.6
BELI014	3.2	251	13	53	5.8
MAHW263	26.1	62	27	11	6.0
BELI015	0.9	1106	17	73	6.1
HASS006	1.8	320	10	35	6.3
UMAO021***	12.1	156	31	129	6.6
KELA071	49.2	32	26	114	6.8
NALA004*	2.8	94	5	18	7.1
KOTM033	15.7	340	93	390	7.3
MAHW235	67.0	18	21	83	7.3
KUKU022	29.6	225	116	512	7.5
MAHW288**	3.2	339	18	75	7.5
UMAO042	8.6	281	42	172	7.7
UMAO063	11.4	388	14	58	7.7
SUDU017	39.4	34	25	113	7.9
MAGA029	15.7	72	19	78	8.5
SITA014	27.4	60	30	123	8.8
BAMB010	6.6	82	10	40	8.9
KALU075	30.7	65	36	149	9.7
SUDU009	44.9	20	18	79	9.9
MAHW287**	3.6	173	10	42	11.1
GING052****	37.8	57	38	159	12.0
AGRA003	5.1	69	7	28	12.1
BADU029	8.8	85	13	47	13.0
DIYA008	0.5	305	3	11	15.8
GING053****	48.5	56	50	210	16.4
MAHA007	2.6	291	13	50	16.5
BADU013	10.3	161	28	106	17.6
HEEN009	7.8	36	5	20	17.7
MAHA096	10.4	43	8	34	18.4
LOGG011	7.4	16	2	8	24.8
MAGU043	10.7	55	8	38	36.7
HULU015	4.0	48	4	13	37.9
NILA059	19.8	40	15	65	38.5

Notation: Mutually exclusive projects: \*, \*\*, \*\*\*, \*\*\*\*

Table A1.2: Details of candidate hydro power projects  
(Source – Master Plan for the Electricity Supply of Sri Lanka, June 1989)

Project code	River/Tributary	Kilometer	Remarks
MADU003	Madu Oya	3	Madu Oya
KOTM025	Kotmale Oya	25	Pallegammedde
GING074	Gin Ganga	74	Watugala
NALA005	Nalanda Reservoir	5	Multipurpose Project, diversion into Deduru Oya
UMAO008	Uma Oya	8	Lower Uma Oya
UMAO034	Uma Oya	34	Diyakola
KELA085	Kelani Ganga	85	Broadlands
BELI009	Belihul Oya	9	
BELI014	Belihul Oya	14	
MAHW263	Mahaweli Ganga	263	Moragolla
BELI015	Belihul Oya	15	Over 1100 m head
HASS006	Hassalaka Oya	6	
UMAO021	Uma Oya	21	Dematapelessa Multipurpose Project
KELA071	Kelani Ganga	71	Nawata-Parussella
NALA004	Nalanda Oya	4	Mutually exclusive with NALA005
KOTM033	Kotmale Oya	33	Talawakelle
MAHW235	Mahaweli Ganga	235	Haloluwa
KUKU022	Kukule Ganga	22	Multipurpose project
MAHW288	Mahaweli Ganga	288	"Trafalgar", Long version mutually exclusive with MAHW287
UMAO042	Uma Oya	42	Puhulpola
UMAO063	Uma Oya	63	Bomuraella Multipurpose Project
SUDU017	Sudu Ganga	17	
MAGA029	Magal Oya	29	
SITA014	Sitawaka Ganga	14	Yogama
BAMB010	Bambarabotuwa Oya	10	
KALU075	Kulu Ganga	75	Ratnapura
SUDU009	Sudu Ganga	9	
MAHW287	Mahaweli Ganga	287	Carolina, mutually exclusive with long version of MAHW288
GING052	Gin Ganga	52	
AGRA003	Agra Oya	3	Upstream of township of Caledonia
BADU029	Badulu Oya	29	
DIYA008	Diyawini Oya	8	Samanalawewa Stage 11
GING053	Gin Ganga	53	Mutually exclusive with GING052

Project code	River/Tributary	Kilometer	Remarks
MAHO007	Maha Oya	7	
BADU013	Badulu Oya	13	Multipurpose Project, diversion into Loggal Oya
HEEN009	Heen Ganga	9	
MAHA096	Maha Oya	96	
LOGG011	Loggal Oya	11	
MAGU043	Maguru Oya	43	
HULU015	Hulu Ganga	15	
NILA059	Nilwala Ganga	59	



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## APPENDIX 02

Table A2.1: Details of LOI obtained small hydro projects by 31.12.2010

Se. No	Name of Facility	Area	Present Status	Project Type	Capacity (MW)
1	Adavikanda MHP-II, Erathna	Rathnapura	LOI Valid	MHP	1.200
2	AGCO Black Pool MHP, Black Pool, N'Eliya	Nuwara Eliya	LOI Valid	MHP	0.500
3	Alugolla MHP, Gampola	Nawalapitiya	LOI Valid	MHP	1.050
4	Alupolagama MHP, Alupola	Ratnapura	LOI Valid	MHP	0.700
5	Alupotha MHP, Alupotha, Ratnapura	Rathnapura	LOI Valid	MHP	1.000
6	Ampanagala MHP, Pitabeddara (Stream-Siyambalagoda Oya)	Weligama	LOI Lapsed	MHP	1.400
7	Andaradeniya MHP, (Kolluwa Dola), Andaradeniya, Deniyaya	Matara	LOI Valid	MHP	0.800
8	Ankanda MHP, Matale	Matale	LOI Valid	MHP	6.500
9	Arattana MHP, Arattana, Kandy District	Kundasale	LOI Lapsed	MHP	2.200
10	Arawakumbura MHP, Stream: Gal Oya	Monaragala	LOI Valid	MHP	0.715
11	Asoka Estate MHP, Stream-Balawana oya	Ratnapura	LOI Lapsed	MHP	0.100
12	Attanagalla MHP,		LOI Valid	MHP	0.500
13	Bambaragaha Oya MHP, Haldummulla		LOI Valid	MHP	1.000
14	Bathmedilla Mini Hydro Power Project, Bathmedilla, Kandeketiya	Badulla	LOI Valid	MHP	1.300
15	Berennawa MHP, Matiyantota		LOI Valid	MHP	0.500
16	Bowhill MHP, Kadiyanlana, Nawalapitiya	Nawalapitiya	LOI Valid	MHP	0.750
17	Campion MHP, Campion Estate, Bogawanthalawa	Nuwara Eliya	LOI Valid	MHP	3.000
18	Coolstream MHP, Nuwara Eliya	Nuwara Eliya	LOI Valid	MHP	1.200
19	Dambulu Oya Reservoir MHP	Matale	LOI Valid	MHP	1.600
20	Daranagala MHP, Darangala, Pitabeddara, Matara (Stream-Ginanga)	Weligama	LOI Lapsed	MHP	0.400
21	Deegalahinna Cascade I MHP, Deegalahinna	Nuwara Eliya	LOI Valid	MHP	0.280
22	Deegalahinna Cascade II MHP, Deegalahinna	Nuwara Eliya	LOI Valid	MHP	0.560
23	Dehigaspe MHP, Dehigaspe, Pitabeddara	Weligama	LOI Lapsed	MHP	1.200
24	Demodara MHP, Demodara, Hapugastenna	Ratnapura	LOI Valid	MHP	1.600
25	Denawak Ganga MHP II, Lellopitiya	Ratnapura	SPPA to be signed	MHP	1.400
26	Devturu Oya MHP, Ramboda	Nuwara Eliya	SPPA to be signed	MHP	1.200
27	Diggala MHP, Matale	Matale	LOI Valid	MHP	4.400
28	Dimbula MHP, Dimbula, Nuwara Eliya	Nuwara Eliya	LOI Valid	MHP	0.600
29	Dolekanda MHP, Dolekanda, Rakwana	Ratnapura	LOI valid	MHP	0.250

Se. No	Name of Facility	Area	Present Status	Project Type	Capacity (MW)
30	Doloswala MHP, Doloswala	Ratnapura	LOI Valid	MHP	1.600
31	Downside MHP - Ihalagama, Deniyaya	Weligama	LOI Lapsed	MHP	1.000
32	Dunsinane Cottage MHP, Dunsinane Estate	Nuwara Eliya	LOI Valid	MHP	0.900
33	Ebbawala MHP, Wellampitiyawa Oya, Ebbawala. Stream-Wellampitiyawa Oya	Matale	LOI Valid	MHP	6.000
34	Edinburgh Estate MHP, Edinburgh Estate, Nanu Oya	Nuwara Eliya	LOI valid	MHP	0.700
35	Ehelagahawadiya MHP, Ehelagahawadiya	Badulla	LOI Valid	MHP	1.000
36	Elgin MHP, Elgin Estate, Nuwara Eliya, (Stream-Dambagastalawa Oya)	Nuwara Eliya	LOI Valid	MHP	3.450
37	Erathna MHP II, Adavikanda, Kuruwita	Rathnapura	LOI Valid	MHP	1.000
38	Ethamala Ella MHP, Pahurutota Kosnilgoda. Stream-Nilwala Ganga		LOI Valid	MHP	2.000
39	Fairlawn MHP, Upcot, Hatton	Ginigathena	LOI Valid	MHP	0.600
40	Falcon Valley MHP (Stream-Ritigahaoya)	Kandy City	LOI Valid	MHP	2.000
41	Galaha Oya MHP, Galaha	Peradeniya	LOI Valid	MHP	0.540
42	Galbodawatta MHP,		LOI Valid	MHP	2.700
43	Gallenkanda MHP, Waleboda, Balangoda	Ratnapura	LOI Valid	MHP	0.300
44	Gammaduwa MHP, Matale	Matale	LOI valid	MHP	0.900
45	Gampola MHP, Stream-Atabage Oya	Nawalapitiya	LOI Valid	MHP	1.000
46	Ganepalla MHP, Ekki Oya, Ganepalla	Ruwanwella	LOI Valid	MHP	1.000
47	Ganthuna MHP, Ganthuna, Aranyake. Stream-Gurugoda Oya	Kegalle	LOI lapsed	MHP	1.300
48	Gawaragiriya MHP, Ayagama, Gawaragiriya	Ratnapura	LOI Valid	MHP	0.990
49	Ginigathena-Thiniyagala MHP, Ginigathena	Ginigathena	LOI Valid	MHP	0.800
50	Goorook Oya MHP, Goorook Oya, Gampola		LOI Valid	MHP	1.500
51	Green Energy MHP, Kotapola	Weligama	LOI Valid	MHP	0.200
52	Gurugal Oya MHP, Hewaheta	Peradeniya	LOI Valid	MHP	0.550
53	Gurugoda Oya MHP - Phase II, Udagama, Kegalle	Kegalle	LOI Valid	MHP	2.400
54	Gurugoda Oya MHP, Kankiriya Stream-Gurugoda Oya	Kegalle	LOI Valid	MHP	1.400
55	Hagala MHP, Hagala, Wattedagama	Nuwara Eliya	LOI Valid	MHP	0.400
56	Halgran Oya I MHP, Hanguranketha	Nuwara Eliya	LOI Valid	MHP	5.000
57	Halgran Oya II MHP, Hanguranketha	Nuwara Eliya	LOI Valid	MHP	0.950
58	Handagiri MHP, Haputale	Ratnapura	LOI Valid	MHP	1.000
59	Hathmala Ella MHP, Kolawenigama, Deniyaya. Stream-Gin Ganga	Weligama	LOI Valid	MHP	2.000

Se. No	Name of Facility	Area	Present Status	Project Type	Capacity (MW)
60	Heel Oya (Teldeniya) MHP-1.3MW, Kundasale	Kundasale	LOI Lapsed	MHP	1.300
61	Heenganga MHP,88/4, Watarantenna, Kandy. TP: 081 2223201, 0777 808246	Kandy	LOI Lapsed	MHP	5.000
62	Hulkiridola MHP, Kosgulana, Ratnapura	Ratnapura	LOI Valid	MHP	1.500
63	Illumbekanda MHP, Rakwana	Ratnapura	LOI Valid	MHP	1.500
64	Ilukpelessa MHP - Phase I, Hanguranketha	Nuwra Eliya	LOI Valid	MHP	2.000
65	Ilukpelessa MHP, Kalthota, Balangoda		LOI Valid	MHP	1.500
66	Indigolla MHP, Indigolla Village, Walapane	Nuwra Eliya	LOI Valid	MHP	2.500
67	Ingiriya MHP,	Ratnapura	LOI Valid	MHP	0.800
68	Jenney Valley MHP, Jenney Valley Estate, Atabage, Gampola. Stream-Atabage Oya	Nawalapitiya	LOI Valid	MHP	0.800
69	Kadurugaldola MHP, Diyabibbla. Stream-Kadurugaldola	Rathnapura	LOI Valid	MHP	1.200
70	Kalugala Pitawala MHP, Nuwara Eliya	Nuwara Eliya	LOI Valid	MHP	0.800
71	Kandadola MHP, Gorakawala, Pitabeddara	Weligama	LOI Valid	MHP	0.180
72	Kandegama MHP, Kandegama, Gampola	Nawalapitiya	LOI Valid	MHP	0.850
73	Karapalagama MHP, Karapalagama, Haguranketha	Nuwara Eliya	LOI Valid	MHP	2.000
74	Kiriwaneliya MHP	Nuwara Eliya	LOI Valid	MHP	4.650
75	Kiriweldola MHP (Stream-Mahadola)	Weligama	LOI Lapsed	MHP	0.960
76	Kithulgala MHP, Kithulgala	Ginigathena	LOI Valid	MHP	1.000
77	Kitulgala MHP, Kithulgala	Ginigathena	LOI Valid	MHP	7.300
78	Kiula MHP, Matale	Matale	LOI Valid	MHP	2.800
79	Kokawita MHP - 2.0MW (Phase I & Phase 2 each 1MW)	Rathnapura	LOI Valid	MHP	2.000
80	Koladeniya MHP, Koladeniya		LOI Valid	MHP	2.000
81	Kosgama MHP, Kosgama, Kandy	Kundasale	LOI Valid	MHP	1.000
82	Kosgolla MHP at Kosgolla, Passara Stream- Kosgolla Oya	Badulla	LOI Valid	MHP	3.000
83	Kosgulana MHP, Mathugama. Stream-Kukule Ganga	Kalutara	LOI Valid	MHP	1.500
84	Koskulana MHP, Rakwana. (Stream-Koskulana Ganga)		LOI Valid	MHP	0.600
85	Koswathu Ganga MHP Stream- Koswathu Ganga	Ratnapura	LOI Valid	MHP	3.000
86	Kotulanda MHP, Kitulgala	Nawalapitiya	SPPA to be signed	MHP	0.200
87	Kudawa MHP, Kudawa, Balangoda	Ratnapura	LOI Valid	MHP	2.000
88	Kukul Oya MHP, Pawila. Stream-Kukul Oya	kandy	LOI Valid	MHP	1.450
89	Kumbukewela MHP, Hanguranketha	Nuwara Eliya	LOI Valid	MHP	1.600
90	Livefield MHP, Ramboda, Kotmale		LOI Valid	MHP	4.000
91	Loggal Oya MHP-I	Badulla	LOI Valid	MHP	1.600



Se. No	Name of Facility	Area	Present Status	Project Type	Capacity (MW)
92	Loggal Oya MHP-III (Steam-Loggal Oya)	Badulla	LOI Lapsed	MHP	1.400
93	Lower Atabage MHP-II, Devita, Atabage. Stream-Atabage Oya	Nawalapitiya	LOI Valid	MHP	1.250
94	Lower Kalupahana Oya MHP, Silathena, Haldummulla. (Stream-Kalupahana Oya)		LOI Valid	MHP	2.500
95	Lower Korawakka Oya (Gorook Oya) MHP, Ketaboola, Nawalapitiya. Stream-Korawakka Oya	Ginigathhena	LOI Valid	MHP	3.000
96	Lower Naya Ganga MHP, Uda Maliboda, Deraniyagala, Kegalle District	Ruwanwella	SPPA to be signed	MHP	1.000
97	Ma Oya - Uda Dumbara MHP, Uda Dumbara	Kundasale	LOI Valid	MHP	4.000
98	Madugeta MHP, Madugeta, Matugama	Galle	LOI Valid	MHP	2.500
99	Maha Oya MHP, Palle Ma Oya, Hanguranketha	Nuwara Eliya	LOI Valid	MHP	1.250
100	Makelidola MHP-0.45MW, Stream-Kukule Ganaga, Makelidola, Kalutara District	Kalutara	LOI Lapsed	MHP	0.450
101	Maliboda MHP, Maliboda	Nuwara Eliya	LOI Valid	MHP	1.000
102	Maliyadda MHP, Hangurankrtha	Badulla	LOI Valid	MHP	2.000
103	Manella MHP, Weragala, Attanagalla	Ruwanwella	LOI Valid	MHP	0.500
104	Mareli Oya Dumbara Manana MHP, Dumbara, Kiriella. (stream-Mareli Oya)	Ratnapura	LOI Valid	MHP	0.500
105	Marukanda MHP, Marukanda, Kuruwita	Ratnapura	LOI Valid	MHP	2.000
106	Mawanana MHP, Mawanana, Galle District	Weligama	LOI Lapsed	MHP	6.000
107	Menik Ganga (Parapawa Oya) MHP, Badalkumbura. Stream-Parapawa Oya	Badulla	LOI Valid	MHP	0.960
108	Menik Ganga MHP - I, Badalkumbura, Buttala. Stream-Parapawa Oya	Badulla	LOI Valid	MHP	2.825
109	Milla Oya MHP, Maduwatta, Passara, Badulla (Stream-Milla Oya)	Badulla	LOI Lapsed	MHP	1.200
110	Monaraela MHP, Yatiyanthota		LOI Valid	MHP	1.200
111	Morapitiya MHP, Athwelthota, Mathugama. Stream-Pelen Ganga	Kalutara	LOI Valid	MHP	0.700
112	Mosville MHP, Mosville Estate, Dolosbage		LOI Valid	MHP	0.900
113	Mul Oya MHP, Wegama, Uda Hewaheta (Stream-Mul Oya)		LOI Valid	MHP	5.000
114	Nalanda Oya MHP, Matale (Stream-Nalanda Oya)	Matale	LOI Valid	MHP	1.600
115	Naya Ganga MHP, Deraniyagala	Kegalle	LOI Valid	MHP	3.000

Se. No	Name of Facility	Area	Present Status	Project Type	Capacity (MW)
116	Nilambe Oya MHP, Rajamallewatta, Nilambe. (Stream- Nilambe Oya)	Nawalapitiya	LOI Lapsed	MHP	0.510
117	Owala MHP, Matale	Matale	LOI Valid	MHP	2.800
118	Padiyapelella MHP I & II, Walapone Phase-I - 3.5MW, Phase-II - 3.0MW	Nuwara Eliya	SPPA to be signed	MHP	6.500
119	Panangala MHP (Stream-Kanneliya Ela)	Galle	LOI Valid	MHP	0.700
120	Panilkanda MHP, Rakwana	Ratnapura	LOI Valid	MHP	1.000
121	Parambe MHP, Madopitiya, Kegalle	Kegalle	LOI Valid	MHP	2.000
122	Penrhos MHP, Penrhos, Nawalapitiya		LOI Valid	MHP	1.500
123	Pita Kele-Kudawa MHP	Kalutara	LOI Lapsed	MHP	0.650
124	Polgaswatta MHP, Polgaswatta.	Ginigathena	LOI Valid	MHP	1.000
125	Pothupitiya MHP, Ilumbakanda, Potupitiya. (Stream-Maha Oya)	Ratnapura	LOI Lapsed	MHP	2.500
126	Punugala MHP, Yatiyanthota	Ruwanwella	LOI Valid	MHP	2.500
127	Pupulaketiya MHP, Pupulaketiya, Rakwana	Ratnapura	LOI Valid	MHP	1.400
128	Rambukkan Oya (Dedunupitiya) MHP, Hathbawa, Thumpane	Kegalle	LOI Valid	MHP	1.325
129	Ranmudu Oya MHP I, Meneri Kumbura, Balangoda. Stream-Ranmudu Oya & Kini Oya	Ratnapura	LOI Lapsed	MHP	0.770
130	Ranwala Oya MHP, Maliboda, Deraniyagala	Ratnapura	SPPA to be signed	MHP	0.700
131	Rassagala MHP Ph. I, Egoda Weleboda	Kahawatta	LOI Lapsed	MHP	2.400
132	Rassagala MHP Ph. II, Egoda Weleboda	Kahawatta	LOI Lapsed	MHP	2.200
133	Rattota MHP, Rattota, Matale	Matale	LOI Valid	MHP	2.000
134	Ritigaha Oya MHP-I, Ritigaha Oya, Dedugala		LOI Valid	MHP	0.500
135	Ross Estate MHP, Ross Estate, Matale	Matale	LOI valid	MHP	3.800
136	Ruhunu MHP,	Ratnapura	LOI Valid	MHP	0.350
137	Sirimalgama MHP, Sirimalgama, Badulla	Badulla	LOI Valid	MHP	1.700
138	Siyambalagastenna MHP, Yatiyantota. Stream-Wee Oya	Ruwanwella	LOI Lapsed	MHP	0.950
139	St. Haliens MHP, St. Haliens Estate, Watawala	Nawalapitiya	LOI Valid	MHP	0.750
140	Stellenberg MHP		LOI Valid	MHP	1.000
141	Tawalantenna MHP, Madawela, Matale	Peradeniya	LOI Valid	MHP	1.000
142	Theberton MHP, Theberton Estate, Maussakelle		LOI Valid	MHP	1.000
143	Thebuwana MHP, Thebuwana		LOI Valid	MHP	1.000
144	Tumpelawaka MHP, Gampola	Nawalapitiya	LOI Valid	MHP	1.500
145	Uda Hapuwida MHP, Matale, Kandy	Matale	LOI Valid	MHP	1.500
146	Udawela MHP, Udawela, Soranathota	Badulla	LOI Valid	MHP	1.800
147	Udugalakanda MHP, Karaldekma, Udagalakanda, Horana	Horana	LOI Valid	MHP	0.350

Se. No	Name of Facility	Area	Present Status	Project Type	Capacity (MW)
148	Udugam Oya MHP Stream-Udugama Oya at Gallandala	Galle	LOI Lapsed	MHP	2.000
149	Uduwankanda MHP, Uduwankanda, Agalawatta	Kaluthara	LOI Valid	MHP	0.300
150	Upper Aberdeen MHP, Kalaweldeniya. Stream-Kehelgamuwa Oya	Ginigathhena	LOI Valid	MHP	0.600
151	Upper Dunsinane MHP, Dunsinane Estate	Nuwara Eliya	LOI Valid	MHP	0.600
152	Upper Galagama MHP, Belihul Oya	Kahawatta	LOI Lapsed	MHP	4.000
153	Upper Gurugal Oya MHP, Hewaheta	Peradeniya	LOI Valid	MHP	0.500
154	Upper Hal Oya MHP, Uvaparanagama	Badulla	LOI Valid	MHP	0.800
155	Upper Labuwawa MHP, Labuwawa,	Ratnapura	LOI Valid	MHP	3.800
156	Upper Lemastota MHP, Lemastota, Koslanda	Diyatalawa	LOI Valid	MHP	1.000
157	Upper Magalganga MHP(Upper Section)	Ratnapura	SPPA to be signed	MHP	2.400
158	Upper Menik Ganga (parapawa Oya) MHP, Ranugalla, Badalkumbura	Badulla	LOI Valid	MHP	1.000
159	Upper Sheen MHP, Sheen Estate	Nuwara Eliya	LOI Valid	MHP	0.400
160	Urubokka MHP, Deniyaya	Weligama	LOI Valid	MHP	1.000
161	Wahugalthalawa MHP, Wahugalthalawa, Walapane.	Nuwara Eliya	LOI Valid	MHP	1.000
162	Wallawaya MHP, Buduruwagala, Wellawaya (Stream-Kuda Oya)	Badulla	LOI Valid	MHP	2.000
163	Waltrim MHP, Waltrim Estate, Agra Oya, Nuwara Eliya	Nuwara Eliya	LOI Valid	MHP	2.000
164	Watawala B Estate MHP, Rozella, Watawala	Nuwara Eliya	LOI Valid	MHP	0.300
165	Waverly MHP, Agarapathana. Stream-Agara Oya	Nuwara Eliya	SPPA to be signed	MHP	1.200
166	Wee Oya Estate MHP, Yatiyantota		LOI Valid	MHP	0.700
167	Welikandurawa MHP, Kosgulana, Kalutara. ( Stream-Welikandurawa Dola)	Kalutara	LOI Valid	MHP	0.600
168	Wembiyagoda MHP, Wembiyagoda, Rakwana		LOI Valid	MHP	1.300
169	Wijeriya MHP - at Eraporuwa, Wijeriya, Kolonna	Kahawatta	SPPA to be signed	MHP	0.600
170	Wilagama MHP, Wilagama, Nuwara Eliya		LOI Valid	MHP	1.000
171	Yapamma MHP, Yapamma, Passara	Badulla	LOI Valid	MHP	0.227
	Total				271.392

Table A2.2: Details of SPPA signed small hydro projects by 31.12.2010

Se. No	Name of Facility	Area	Present Status	Project Type	Capacity (MW)
1	Agra Oya MHP II, Norton Bridge	Nawalapitiya	SPPA SIGNED	MHP	1.50
2	Badulu Oya MHP, Dunhinda, Badulla	Badulla	SPPA SIGNED	MHP	2.00
3	Bambarabotuwa Oya MHP-I, Wewelwatta, Seetha Eliya, Nuwara Eliya (BAMB 010)	Kahawatta	SPPA SIGNED	MHP	1.10
4	Bambarabotuwa Oya MHP-II, Wewelwatta, Seetha Eliya, Nuwara Eliya (BAMB 010)	Kahawatta	SPPA SIGNED	MHP	3.00
5	Bambarabotuwa Oya MHP-III, Wewelwatta, Seetha Eliya, Nuwara Eliya (BAMB 010)	Kahawatta	SPPA SIGNED	MHP	4.00
6	Bambarabotuwa Oya MHP-IV, Wewelwatta, Seetha Eliya, Nuwara Eliya (BAMB 010)	Kahawatta	SPPA SIGNED	MHP	0.95
7	Barcaple MHP Ph II, Barcaple Estate, Galaboda. Stream-Inguru Oya	Ginigathhena	SPPA SIGNED	MHP	4.00
8	Bomuruella MHP, Perawella, Nuwara Eliya	Nuwara Eliya	SPPA SIGNED	MHP	9.52
9	Denawak Ganga MHP II, Lellopitiya	Ratnapura	SPPA SIGNED	MHP	1.40
10	Denawak Ganga MHP, Gonakumbura, Ratnapura	Ratnapura	SPPA SIGNED	MHP	7.20
11	Ellamulla MHP, Belinul Oya, Padiyapellella	Nuwara Eliya	SPPA SIGNED	MHP	1.50
12	Ganthuna Udagama MHP (Stream-Gurugoda Oya)	Kegalle	SPPA SIGNED	MHP	1.20
13	Gonagamuwa MHP, Kithulgala	Nawalapitiya	SPPA SIGNED	MHP	0.75
14	Hulu Ganga MHP, Watekelle, Kandy	Kandy	SPPA SIGNED	MHP	1.00
15	Indurana MHP, Indurana, Attanagalla	Gampaha	SPPA SIGNED	MHP	0.06
16	Kadiyanlena MHP, Bowhill, Gorok Oya, Korawakka Oya	Nawalapitiya	SPPA SIGNED	MHP	1.00
17	Kehelgamu Oya MHP-Stage II, Polpitiya, Nuwara Eliya District	Nawalapitiya	SPPA SIGNED	MHP	2.00
18	Kiriwaneliya MHP, Kiriwaneliya, Norton Bridge.	Nawalapitiya	SPPA SIGNED	MHP	3.80
19	Kirkoswald MHP, Kirkoswald Estate, Norwood. Stream-Hambantota Oya	Nuwara Eliya	SPPA SIGNED	MHP	4.00
20	Lemastota MHP Stream- Lemastota Oya at Koslanda	Badulla	SPPA SIGNED	MHP	1.30
21	Lower Kalupahana Oya MHP	Babulla	SPPA SIGNED	MHP	2.50
22	Magal Ganga MHP, Deraniyagala	Ruwanwella	SPPA SIGNED	MHP	2.80

Se. No	Name of Facility	Area	Present Status	Project Type	Capacity (MW)
23	Manakola MHP, Belihul Oya, Padiyapelella	Nuwara Eliya	SPPA SIGNED	MHP	2.50
24	Mount Vernon MHP	Nuwara Eliya	SPPA SIGNED	MHP	1.00
25	Mulgama MHP, Balangoda	Kahawatta	SPPA SIGNED	MHP	2.80
26	Nadurana Oya MHP - Nadurana, Eheliyagoda(Nadurana Oya)	Ratnapura	SPPA SIGNED	MHP	0.35
27	Rakwana Ganga MHP-II, Nivitigala	Kahawatta	SPPA SIGNED	MHP	1.00
28	Thundola Ganga MHP, Lankaberiya, Kolonna	Galle	SPPA SIGNED	MHP	0.75
29	Upper Neluwa MHP, Neluwa	Galle	SPPA SIGNED	MHP	2.00
30	Upper Rakwana Ganga MHP, Kabaragala, Ratnapura. Feasibility Report submitted for 900kW	Ratnapura	SPPA SIGNED	MHP	0.60
31	Upper Ritigaha Oya MHP, Dedugala	Ruwanwella	SPPA SIGNED	MHP	0.45
32	Werapitiya MHP, Strem Kota Ganga, Galkotuwa, Werapitiya	Kundasale	SPPA SIGNED	MHP	1.70
	Total				69.73



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**A3. Efficiency test of Model Turbine**

Efficiency test of the model turbine have been carried out at the Fuji Hydraulic Lab in Japan with other model tests. Tests have been performed in a range of guide vane openings from 5.4 mm to 29.7 mm at the increment of 2.7 mm and a range of unit speeds from 55 to 82 rpm.

**A3.1 Physical constants have been used [21]**

*(i) Acceleration due to gravity (g) :*

The acceleration due to gravity (g) during the model test (latitude = 35.5°, sea level) has been used as 9.79788 m/s<sup>2</sup>.

*(ii) Specific weight of water (γ Aq) :*

The values of specific weight of water γ Aq in kgf/m<sup>3</sup> corresponding to latitude of 35.5°, sea level have been referred to the following table according to the IEC model test code PUB.193:



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Table A3.1: Variation of specific weight of water with temperature corresponding to the latitude of 35.5°, sea level

Water Temp. (C°)	0	4	10	20	30	40
γ Aq (kgf / m <sup>3</sup> )	997.7	997.8	997.6	996.1	993.6	990.2

*(iii) Specific weight of Mercury (γ Hg) :*

The values of specific weight of mercury γ Hg in kgf/m<sup>3</sup> have been referred to the following table.

Table A3.2: Variation of specific weight of mercury with temperature

Temp. (C°)	0	5	10	15	20	25	30	35
γ Hg (kgf / m <sup>3</sup> )	13,584	13,572	13,559	13,547	13,534	13,522	13,510	13,497

### A3.2 Calculation of efficiency test [21]

(i) Following values have been measured and recorded

- a) Guide vane opening,  $A_{gm}$  (mm)
- b) Room temperature,  $t_r$ , (C°)
- c) Water temperature,  $t_w$ , (C°)
- d) Reading of speed,  $nE$  (rpm)
- e) Reading of electromagnetic flow meter,  $Q_E$  (l/s)
- f) Reading of mercury-column manometer at spiral case inlet,  $H_u$  (mm Hg)
- g) Reading of mercury-column manometer at draft tube outlet,  $H_l$  (mm Hg)
- h) Reading of torquemeter,  $W_{T1}$  (Kg f)

(ii) Discharge ( $Q$ )

The discharge has been determined by the algebraic equation given below.

$$Q = Q_E + \Delta Q \quad (A3.1)$$

$Q$  : Discharge (l/s)

$Q_E$  : Reading of the electromagnetic flow meter (l/s)

$\Delta Q$  : Corrected value based on the calibration results (l/s)



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(iii) Net head ( $H$ )

The Net Head has been determined by the algebraic equation given below.

$$H = H_h + H_s + \left( \frac{v_1^2}{2g} - \frac{v_2^2}{2g} \right) \quad (A3.2)$$

$H_h$  : Static pressure head at casing inlet (m)

$H_s$  : Suction head (m)

(iv) Static pressure head at casing inlet ( $H_h$ )

The Static pressure head at Casing Inlet has been determined by the algebraic equation given below.

$$H_h = \frac{H_u \times \gamma_{Hg} \times 10^{-3} + E_{lu} \times \gamma_r \times 10^{-3} + H_{u0} \times 10^4 \times g / g_0}{\gamma_w} \quad (A3.3)$$

$H_u$  : Reading of Mercury-column manometer at spiral case inlet (mm)

$H_{u0}$  : Standard pressure head ( $\gamma = 1,000 \text{ kgf/m}^3$ )

$E_{lu}$	Height of Mercury-column manometer above the standard level (mm)
$\gamma_{Hg}$	Specific weight of Mercury at room temperature (13,534 kgf/m <sup>3</sup> )
$\gamma_w$	Specific weight of water at water temperature (995.9 kgf/m <sup>3</sup> )
$\gamma_r$	Specific weight of water at room temperature (996.1 kgf/m <sup>3</sup> )
$g$	Acceleration due to gravity at the laboratory (Latitude 35.5° and sea level) (9.79788 m/s <sup>2</sup> )
$g_0$	International standard value of “g” (9.8065 m/s <sup>2</sup> )

(v) *Suction head ( $H_s$ )*

The Suction head has been determined by the algebraic equation given below.

$$H_s = \frac{-(H_l \times \gamma_{Hg} \times 10^{-3} + E_{ll} \times \gamma_r)}{\gamma_w} \quad (\text{A3.4})$$

$H_l$  Reading of Mercury-column manometer (mm Hg)

$E_{ll}$  Height of Mercury-column manometer above the standard level (mm)

(vi) *Dynamic velocity head difference*

The dynamic velocity head difference has been determined by the algebraic equation given below.

$$\left( \frac{v_1^2}{2g} - \frac{v_2^2}{2g} \right) - \frac{1}{2g} \times \left( \frac{1}{A_1^2} - \frac{1}{A_2^2} \right) \times \left( \frac{Q}{1,000} \right)^2 \quad (\text{A3.5})$$

$\left( \frac{v_1^2}{2g} - \frac{v_2^2}{2g} \right)$  : Dynamic velocity head difference

$A_1$  : Cross sectional area at measuring position of  $H_u$  (0.1071 m<sup>2</sup>)

$A_2$  : Cross sectional area at draft tube outlet (0.5299 m<sup>2</sup>)

$Q$  : Turbine discharge (l/s)

(vii) *Rotating speed ( $N$ )*

$$N = nE \quad (\text{A3.6})$$

$N$  : Rotating speed (rpm)

$nE$  : Reading of electronic digital speed meter (rpm)

(viii) *Turbine output*

Turbine output has been determined by the algebraic equation given below.



$$P = \frac{2\pi}{60} \times N \times (W_{T1} - W_{T0}) \times L \times \frac{1}{102} \quad (\text{A3.7})$$

$W_{T1}$  : Reading of torque meter (kgf)

$W_{T0}$  : Zero point of torque meter (kgf)

$L$  : Arm length of torque meter (m)

(ix) *Water input power ( $P_w$ )*

Water input power has been determined by the algebraic equation given below.

$$P_w = \frac{\gamma_w \times Q \times H}{102.0 \times 1,000} \quad (\text{A3.8})$$

(x) *Turbine efficiency ( $\eta_m$ )*

Turbine efficiency has been determined by the algebraic equation given below.

$$\eta_m = \frac{P}{P_w} \times 100 \quad (\text{A3.9})$$

(xi) *Unit speed ( $n_{11}$ )*

The Unit speed is determined by the algebraic equation given below.

$$n_{11} = \frac{n}{\sqrt{H}} \times D_1 \quad (\text{A3.10})$$

$D_1$  : Nominal runner diameter (m)

(xii) *Unit discharge ( $Q_{11}$ )*

The Unit discharge is determined by the algebraic equation given below.

$$Q_{11} = \frac{Q}{\sqrt{H}} \times \left(\frac{1}{D_1}\right)^2 \quad (\text{A3.11})$$

(xiii) *Unit output power ( $P_{11}$ )*

The Unit output power is determined by the algebraic equation given below.

$$P_{11} = \frac{P}{H^{3/2}} \times \left(\frac{1}{D_1}\right)^2 \times \frac{\gamma_0}{\gamma_w} \quad (\text{A3.12})$$

$\gamma_0$  : Standard specific weight of water ( $\gamma_0 = 1000 \text{ kgf} / \text{m}^3$ )

### A3.3 Converted prototype turbine efficiency

The prototype efficiencies have been calculated from the model test results by the following conversion method [21]. It is to be noted that the subscript p denotes the prototype and m denotes the model turbine.

#### (i) Guide Vane opening conversion ( $A_g$ )

The conversion formula used has been given below.

$$A_{gp} = \left( \frac{r_{gp}}{D_{gm}} \right) \times \left( \frac{D_p}{D_m} \right) \times A_{gm} \quad (\text{A3.13})$$

$D_p$  : Runner inlet diameter (m)

$D_{gp}$  : Guide Vane pitch circle diameter of prototype (m)

$D_{gm}$  : Guide Vane pitch circle diameter of scaled model (m)

#### (ii) Net head ( $H_p$ )

Net head has been converted as follows.

$$H_p = U.R.L - T.W.L - \Delta H_p - \Delta H_i$$

$$H_p = U.R.L - (958 + 0.21260 \times Q^{2/3}) - 0.0374 \times Q^2 \quad (\text{Case 1}) \quad (\text{A3.14})$$

$$H_p = U.R.L - (958 + 0.21260 \times (2 \times Q)^{2/3}) - 0.0894 \times Q^2 \quad (\text{Case 2}) \quad (\text{A3.15})$$

Case 1 : Single unit operation

Case 2 : Two units in operation

$U.R.L$  : Upper reservoir level elevation (m)

$T.W.L$  : Tail water level elevation (m)

$\Delta H_p$  : Penstock loss (m)

$\Delta H_i$  : Inlet valve loss (negligibly small)

$Q$  : Discharge ( $\text{m}^3/\text{s}$ )

#### (iii) Turbine efficiency conversion ( $\eta_p$ )

Full up of Moody's 1/5 power formula has been adopted for the maximum efficiency.

$$\eta_{p \max} = \left[ (100 - \eta_{m \max}) \times \left\{ 1 - \left( \frac{D_m}{D_p} \right)^{1/5} \right\} \right] + \eta_{m \max} \quad (\text{A3.16})$$

$\eta_{m \max}$  : Maximum efficiency of the model

$\eta_{p \max}$  : Maximum efficiency of the prototype

$D_m$  : Runner inlet diameter of model (m)

$D_p$  : Runner inlet diameter of prototype (m)

The efficiency of the prototype turbine at other points has to be obtained by adding the difference value of maximum efficiency between prototype and model to the model efficiency of each point as given below.

$$\eta_p = \eta_m + (\eta_{p \max} - \eta_{m \max}) \quad (\text{A3.17})$$

(iv) *Discharge conversion (Q)*

Discharge has been converted as follows

$$Q_p = (D_{1m} \times S)^2 \times \sqrt{H_p} \times (Q_{11}/1000) \quad (\text{A3.18})$$

$D_{1m}$  : Nominal runner diameter of model (m)

$H$  : Net head (m)

$Q_{11}$  : Unit discharge (l/s)

$S$  : Ratio of linear dimension of prototype to model

(v) *Turbine output conversion (P)*

Turbine output has been converted as follows

$$P_p = (D_{1m} \times S)^2 \times (\gamma_p/\gamma_0) \times H_p^{3/2} \times P_{11} \times (\eta_p/\eta_m) \quad (\text{A3.19})$$

$\gamma_p$  : Specific weight of water at site (992 g / m<sup>3</sup>)