

Grouped Hydropower Plants in Chongqing, Yunnan, Sichuan and Guizhou Provinces, P.R. China



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1 PROJECT DETAILS

1.1 Summary Description of the Project

Grouped Hydropower Plants in Chongqing, Yunnan, Sichuan and Guizhou Provinces, P.R. China (herein after the project activity is also referred to as the Grouped Project).

The Grouped Project consists of 88¹ individual hydropower plants. All projects are run-of-river hydropower stations, spread widely across the less developed rural areas of south-western China, consisting of four provinces. Out of 88 hydropower plants, 9 projects are located in Yunnan, 60 in Chongqing, 13 in Sichuan and 6 in Guizhou Province. The entire Grouped Project complies with the VCS.

The total installed capacity of all the hydropower stations of the Grouped Project is 210.25 MW. The maximum installed capacity of an individual power station is 14MW. The Grouped Project Activity is expected to export around 740,884.3MWh² of electricity to the grid on an annual basis in the whole crediting period. By exporting electricity from a renewable energy source to the Southern China Power Grid (CSPG) and to the Central China Power Grid (CCPG), the project activity achieves greenhouse gas (GHG) emissions reductions by displacing electricity from fossil fuel based power plants connected to the grid. The average annual emission reduction of the project is 369,699tCO₂. The total estimated emission reductions during the second crediting period is 3,696,995tCO₂.

In the baseline scenario, the main GHG sources are the emissions from the electricity produced by the fossil fuel based power plants connected to CSPG and CCPG, which will be displaced by the electricity generated by the proposed Grouped Project activity.

1.2 Sectoral Scope and Project Type

The Grouped Project generates electricity from several micro and small-scale hydropower projects, which are all connected to the regional electricity grid. Each individual project activity within the Grouped Project has a total installed capacity of less than 15 MW, which is the limit for small-scale projects as per UNFCCC definition.

¹ Previously there were 98 hydropower plants included in the grouped project, now three hydropower plants (17_Luotian, 19_Baidongyan and 89_Dashi Stage I) have been withdrawn from the grouped project according to the agreement between DOE and the project proponents during the validation of the first crediting period.

² Seven hydropower plants (8_Mayuexi, 14_Lianmeng, 16_Gaodongzi, 20_Dibao, 26_Xiangyang Stage II, 43_Leyuan, 64_Banqiao Stage II) have excluded from the grouped project according to the 4th verification review response to VCS on Oct. 16th, 2015. The annual electricity in the PDD is updated accordingly.

Based on the “Grouped Project” approach under the VCS, which uses the UNFCCC definitions for small scale CDM projects for the individual project activities, the project belongs to following UNFCCC sectoral scope and project type:

Sectoral Scope 1: Energy industries (renewable - / non-renewable sources)

Project Type (i): Renewable energy projects

The project is a grouped project.

1.3 Project Proponent

Project developer/project proponent:

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Contact person	Fang Qun
Title	Project Manager
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Email	q.fang@southpolecarbon.com

Project owner/project proponent:

The Grouped Project has an individual project owner for each or a small number of hydropower plants. The comparison table for the individual project plant and its project owner name can be seen in Appendix 2. Here please see the contact information for the project owners.

Organization name	1 Chongqing Fuling Zengfuyoujiang Hydroelectric Plant 2 Chongqing Fuling Huanglong Hydroelectric Plant 3 Pengshui Runxi Jinxing Hydroelectric Plant of Fuling Chuandong Hydropower Co., Ltd. 4 Pengshui Shengda Hydropower Co., Ltd. 22&31 Wulong Chepanchengmendong Hydroelectric Plant 23 Wulong Yajiang Longbao Hydroelectric Plant 24&40&48 Wulong Runlong Maintenance Company 25 Wulong Guanqiao Hydroelectric Plant 27 Wulong Qingtongxi Hydroelectric Plant 28 Wulong Heping Hydroelectric Plant 29 Wulong Guanziya Hydroelectric Plant 30 Wulong Hongchao Hydropower Development Co., Ltd. 32 Wulong Tukan Shuanglong Hydroelectric Plant
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³ Swiss Carbon Value Ltd. is a fully owned subsidiary of South Pole Carbon Asset Management Ltd. and acts as carbon asset developer and buyer.

	33 Wulong Chushuitang Hydroelectric Plant 34 Wulong Shuangqiao Hydroelectric Plant 35 Wulong Longyuan Science & Technology Development Co., Ltd. 36&37&38&71 Wulong Boneng Electric Power Co., Ltd. 39 Wulong Luchi Hydroelectric Plant 41 Wulong Xiangyun Hydroelectric Plant 42 Wulong Houping Hongshan Hydroelectric Plant 44 Wulong Haiheng Agriculture Co., Ltd. 45 Wulong Suokousi Hydroelectric Plant 46 Wulong Canggou Xinli Hydropower Plant 47 Chongqing Wulong Jiangliu Hydroelectric Plant 49 Wulong Yuanquan Hydropower Co., Ltd. 50 Wulong Lianghekou Hydroelectric Plant 51 Wulong Wuhe Hydroelectric Plant 52 Wulong Sihe Hydroelectric Plant 53 Wulong Pingqiaoshilingyan Hydroelectric Plant 54 Wulong Nanmu Hydroelectric Plant 55 Wulong Canglong Hydropower Co., Ltd. 56 Wulong Dexin Hydropower Development Co., Ltd. 57&59 Wulong Landi Hydropower Co., Ltd. 58 Wulong Longfeng Hydropower Co., Ltd. 60 Wulong Jiayuan Hydropower Development Co., Ltd. 61 Wulong Haolong Hydropower Plant 62 Wulong Shuangchahe Hydroelectric Plant 63 Wulong Tukan Songshigou Hydroelectric Plant 65 Wulong Zili Electric Power Co., Ltd. 66 Wulong Sanyuan Hydroelectric Power Development Co., Ltd. 67&69 Chongqing Wulong Yuxiang Water Resource Development Co., Ltd. 68 Wulong Yongxin Hydropower Development Co., Ltd. 70 Daozhenxianghe Hydropower Development Co., Ltd. 72 Chongqing Fengyuanjinhui Hydropower Development Co., Ltd. 73 Wulong Yuqian Comprehensive Development Co., Ltd.
Contact person	Mr. Hu Shihua
Title	Chairman of Chongqing Wulong County Small Hydropower Industry Association
Address	Wulong County, Chongqing City

Telephone	+86 62522468
Email	yu.deng@ecochain.cn

Organization name	5&6 Wanzhou Yongfa Water Conservancy Development Co., Ltd. 7 Wanzhou Huiyin Hydropower Development Co., Ltd. 9 Wanzhou Xiaolong Hydropower Development Co., Ltd. 10 Wanzhou Fengyu Hydropower Development Co., Ltd. 11 Chongqing Wanzhou Electric Development Co., Ltd. 12&18 Wanzhou Zhende Hydropower Development Co., Ltd. 13 Wanzhou Yanshan Hydropower Development Co., Ltd. 15 Wanzhou Wanlin Hydroelectric Plant 21 Chongqing Wanzhou Xianfeng Hydroelectric Plant
Contact person	Mr. He Zhigang
Title	Legal Representative of Chongqing Wanzhou Electric Development Co., Ltd.
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Telephone	+86 23 58123219
Email	yu.deng@ecochain.cn

Organization name	74&75 Xingyi City Puti Power Co. Ltd.
Contact person	Yang Xiulong
Title	Director
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Telephone	+86 859 3912799
Email	gz_chen@126.com

Organization name	76 Yingjing County Sanhe Township Wumaxi Stage I Hydroelectric Station
Contact person	Mr. Chen Xiankang
Title	Legal Representative

Address	No. 99, 3 rd Section of Yingxingdong Road, Yandao Township, Yingjing County, Ya'an City, Sichuan Province, P.R. China
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Organization name	77 Yingjing Sanhe Mozigou Hydroelectric Plant 85 Yingjing County Sanhe Daihuanggou Hydroelectric Plant
Contact person	Mr. Mao Jiong
Title	Legal Representative
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Organization name	78 Yingjing Mayihe Hydropower Station
Contact person	Mr. Mou Wei
Title	Legal Representative
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Telephone	+86 835 8625519
Email	yjmw1973@163.com

Organization name	79 Yingjing Jinyatan Hydroelectric Plant
Contact person	Mr. Zou Qin
Title	Legal Representative
Address	Banfanggou, An'jing Village, Yingjing County, Ya'an City, Sichuan Province, P.R. China
Telephone	+86 835 7730021
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Organization name	80 Yingjing County Toudaoshui Hydroelectric Station
Contact person	Mr. Dong Guozhong
Title	Legal Representative
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Telephone	+86 13908163614
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Organization name	81 Sichuan Yingjing Sanhui Electric Power Co., Ltd.
Contact person	Mr. Ren Ruxiang
Title	Legal Representative
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Email	yu.deng@ecochain.cn

Organization name	82 Sichuan Yingjing Yunwushan Hydropower Co., Ltd.
Contact person	Mr. Zhong Jiabing
Title	Legal Representative
Address	No. 70, Heping Street, Yandao Township, Yingjing County, Ya'an City, Sichuan Province, P.R. China
Telephone	+86 13881622669
Email	yu.deng@ecochain.cn

Organization name	83 Shimian Zhongxin Electric Power Development Co., Ltd.
Contact person	Mr. Song Tao
Title	Legal Representative
Address	Gongjiagou Hydropower Station, Caoke Township, Shimian County, Ya'an City, Sichuan Province, P.R. China
Telephone	+86 835 8887016
Email	yu.deng@ecochain.cn

Organization name	84 Sichuan Yingjing Hengyuan Electric Power Co., Ltd.
Contact person	Mr. Wang Guoqing
Title	Board Chairman
Address	Coal Industry Bureau of Yingjing County, Ya'an City, Sichuan Province, P.R. China
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Organization name	86 Sichuan Yingjing Gaoqiaohe Electric Power Co., Ltd.
Contact person	Mr. Liao Wubin
Title	Legal Representative
Address	Gaoqiaohe Hydropower Station Office, No. 141, Yingxingdong Road, Yandao Township, Yingjing County, Ya'an City, Sichuan Province, P.R. China
Telephone	+86 835 7622798
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Organization name	87 Sichuan E'bian Heizhugou Hydropower Co., Ltd.
Contact person	Mr. Li Donghua
Title	General Manager
Address	No. 25, Buxing Street, Shaping Township, Ebian Yi Autonomous County, Leshan City, Sichuan Province, P.R. China
Telephone	+86 833 5226188
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Organization name	88 E'bian Longxin Electric Power Co., Ltd.
Contact person	Mr. Wei Yi
Title	General Manager
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Organization name	90&91&92 Lingcang Runda Hydropower Co., Ltd.
Contact person	Mr. Yang Weimin
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Organization name	93 Midu County Taishan Power Co., Ltd.
Contact person	Mr. Zhi Jianping
Title	Legal Representative
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Email	zhangqingxi@263.net

Organization name	94 Zhenyuan Yi, Hani and Lahu Autonomous County Xiaojiehe Hydropower Co., Ltd.
Contact person	Mr. Zhang Jizhong
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Telephone	+86 879 5861888
Email	zhangqingxi@263.net

Organization name	95 Xishuangbanna Chuangye Hydropower Development Co., Ltd.
Contact person	Mr. Wei Yulin

Title	Legal Person
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Organization name	96 Yingjiang County Tianchao Hydropower Co. Ltd.
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Organization name	97 Jinping Mengqiao Datan Electricity Co. Ltd.
Contact person	Mr. Zhu Tianchao
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Organization name	98 Yunnan Fugong Huatai Electricity Development Co. Ltd.
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Email	zengs11999@sina.com

1.4 Other Entities Involved in the Project

No any other entities are involved in the project.

1.5 Project Start Date

Project start date: March 2002 (date of the earliest start date of an individual project)

Operational lifetime of project activity: Please see Annex 2

1.6 Project Crediting Period

The first crediting period of the project activity is from 28 March 2006 to 27 March 2016. The total number of years: 10 years. It is a renewable crediting period and can be renewed twice.

The second crediting period of the project activity is from 28 March 2016 to 27 March 2026.

There are about 24 hydropower plants would be ended before the end date of the 2nd crediting period (27 March 2026). The detailed end dates of the second crediting period for these projects are summarized in the Appendix 2.

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	
Large project	√

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
28/03/2016-27/03/2017	403,101
28/03/2017-27/03/2018	403,101
28/03/2018-27/03/2019	403,101
28/03/2019-27/03/2020	403,101
28/03/2020-27/03/2021	403,101
28/03/2021-27/03/2022	403,101
28/03/2022-27/03/2023	402,271
28/03/2023-27/03/2024	361,965
28/03/2024-27/03/2025	291,634
28/03/2025-27/03/2026	222,519
Total estimated ERs	3,696,995
Total number of crediting years	10 years
Average annual ERs	369,699

1.8 Description of the Project Activity

The total installed capacity of all the hydropower stations of the Grouped Project is 210.25MW. The maximum installed capacity of an individual power station is 14MW.

In the Pre- project scenario the entire electricity, delivered to the grid by the project activity, would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources.

The project shall result in replacing anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 369,699tCO₂e per year in the whole crediting period, there on displacing 740,884.3MWh/year amount of electricity from the grid.

The following table provides the technical specifications of the main equipment (i.e. turbines and generators) installed at each project activity under the Grouped Project. All information shown in the following table is the on-site statistical data provided from the project owners of each hydropower plants.

Project No.	Project Title	Total Installed capacity (MW)	Turbine							Generator								
			Number	Model	Rated Water Head (m)	Rated flow rate (m3/s)	Rated power (MW)	Rated rotational speed (r/min)	Manufacturer	Number	Model	Rated Power(MW)	Rated Electrical Current (A)	Rated voltage (KV)	Rated rotational speed (r/min)	Rated frequency	Rated Power Factor	Manufacturer
1	Zengfuyoujiang Hydroelectric Plant	0.5	2	ZD-560-80	14	2.4	0.25	600 750	Sichuan Jintang Hydraulic Turbine Ltd.	2	SFL-250-10/750	0.25	370	0.4	600	50	0.8	Chongqing Electrical Machinery Plant
				ZD-560-80	14	2.4	0.25	600 750			SFL-250-10/750	0.25	370	0.4	600	50	0.8	
2	Jianshitan Hydroelectric Plant	0.7	6	ZD-760-80	6	2.5	0.1	750	Sichuan Jintang Hydraulic Turbine Ltd.	6	SFL-100-8/650	0.1	185	0.4	750	50	0.8	Chongqing Electrical Machinery Plant
				ZD-760-80	6	2.5	0.1	750			SFL-100-8/651	0.1	185	0.4	750	50	0.8	
				ZD-760-80	6	2.5	0.1	750			SFL-100-8/652	0.1	185	0.4	750	50	0.8	
				ZD-760-80	6	2.5	0.125	750			SFL-100-8/653	0.1	185	0.4	750	50	0.8	
				ZD-760-120	6	5.5	0.25	300	Sichuan Dayi Hydraulic Turbine Ltd.		SFL-150-20/750	0.15	370	0.4	300	50	0.8	
				ZD-760-120	6	5.5	0.25	300			SFL-150-20/750	0.15	370	0.4	300	50	0.8	

3	Jinxing Hydroelectric Plant	0.83	1	HLA15 3-WJ-60	39.5	3	0.83	750	Chongqing Zhong county Yinhe Hydraulic Turbine Plant	1	SFWE-830	0.83	860	0.4	750	50	0.8	Chongqing Sailimeng Electric Machine Co., Ltd
4	Huzhong Hydroelectric Plant	2.5	2	CJA23 7-W-110/B1×11	280	0.56	1.307	600	Chongqing Power Equipment Manufacturing Ltd.	2	SFW12 50-10/1430	1.25	143					Hunan Shanli hydro Equipment Manufacturing Ltd.
5	Chongqing Wanzhou Fengmu Hydroelectric Plant	0.1	1	HLA19 4-WJ-35	18-36	0.387 - 0.518	0.161	848-1200	Chongqing Sanxia electrical equipment Ltd	1	SFW10 0-8/590	0.1	180.5	0.4	1000	50	0.8	Sichuan Xinsheng electrical equipment factory
6	Chongqing Wanzhou Longdong Hydroelectric Plant	0.2	1	CJ22-W-55/1×7	100-200	0.104 - 0.243	0.132 - 0.426	750-1000	Chongqing wanzhou Wuqiao Turbine factory	1	SFW-W200-8/740	0.2	361	0.4	750	50	0.8	Sichuan Xinsheng electrical equipment factory
7	Chongqing Wanzhou Dengta Hydroelectric Plant	0.25	1	HL820-WJ-60	16.5	2.06	0.25	600	Chongqing wanzhou Wuqiao Turbine factory	1	SFW25 0-10/850	0.25	451	0.4	600	50	0.8	Chongqing wanzhou Wuqiao Turbine factory
9	Chongqing Wanzhou Xiaolong Hydroelectric Plant	0.32	1	CJ237-WJ-70/1×5.5	300	0.15-0.2	0.379	1000	Chongqing Electricity Generation Equipment Manufacturing Ltd	1	SFW-W-320-6/740	0.32	577	0.4	1000	50	0.8	Chongqingsaili meng electricity factory
10	Chongqing Wanzhou Yihe Hydroelectric Plant	0.32	1	CJ22-W-55/1×7	220.3	0.2	0.4253	1000	Chongqing Electricity Generation Equipment Manufacturing Ltd	1	SFW32 0-6/740	0.32	577	0.4	1000	50	0.8	Chongqing electrical factory
11	Chongqing Wanzhou Tiande Hydroelectric Plant	0.35	2	HL160-WJ-42	244-62.2	0.566 - 0.903	0.111 — 0.435	807—1286	Sichuan Zhongzhou turbine factory	2	TSW11 -8	0.175	181	0.4	750	50	0.8	Chongqing Yunhe entity Ltd

12	Chongqing Wanzhou Puziling Hydroelectric Plant	0.48	2	HZ240-W-50	15.0—36.5	1.201—1.870	0.144—0.5464	600—1000	Zhong County Boxuan Turbine factory	2	TSWN8 5/61-8	0.32	452	0.4	750	50	0.8	Chongqing Sailimeng Electricity Factory
				HL820-WJ-65	19	2.16	0.32	488-827			SFWE1 60-8/650	0.16	289	0.4	750	50	0.8	
13	Chongqing Wanzhou Yanshan Hydroelectric Plant	0.5	4	CJ22-W-55/1×7	238.43	0.3	0.4253	1000	Chongqing Three Gorge hydro electrical equipmet Manufacture Ltd	2	SFW25 0-6/740	0.25	451	0.4	1000	50	0.8	Chongqing Three Gorge hydro electrical equipment Manufacture Ltd
15	Chongqing Wanzhou Wanlin Hydroelectric Plant	0.52	2	HLA55 0-WJ-50	55.6	0.8	0.32	1000	Chongqing Zhongzhou Turbine factory	2	SFW-W260-6/650	0.26	361	0.4	1000	50	0.8	Chongqing Sailimeng electrical equipment Ltd.
18	Chongqing Wanzhou Yanjingxi Hydroelectric Plant	0.6	2	HL820-WJ-50	20	1.35	0.2	654-822	Zhong county Boxuan Turbine factory	1	SFW20 0-8/740	0.2	361	0.4	750	50	0.8	Chongqing Salimeng Electrical Equipment Ltd
				HL820-WJ-65	19	2.16	0.32	488-827	Zhong county Boxuan Turbine Factory	1	SFW40 0-10/99	0.4	722	0.4	600	50	0.8	Chongqing Salimeng Electrical Equipment Ltd
21	Chongqing Wanzhou Xianfeng Hydroelectric Plant	2×1.8	2	HLA54 2-WJ-60	197	1.06	1.895	1500	Chongqing Zhongzhou Turbine factory	2	SFW-J1800-4/1480	1.8	206.2	6.3	1000	50		Chongqing Yun River Hydroelctrical Equipment Ltd
22	Heba Hydroelectric Plant	0.32	2	HL110—WJ--42	40	1.5	0.16	1000	Chongqing Electrical Machinery Plant	2	SFW16 0—6/590	0.16	289	0.4	1000	50	0.8	Chongqing Gongzhou Hydraulic Turbine Ltd.
23	Sandaoguai Hydroelectric Plant	0.1	1	HZA-W-40	53	0.26	0.1	800	Chongqing Zhong County Hydraulic Turbine Plant	1		0.1	180.5	0.38	750	50	0.8	Sichuan Xinsheng Electrical Machinery Plant

24	Beiya Hydroelectric Plant	0.125	2	HL194-WJ-35	34	0.46	0.25	1000	Chongqing Wanzhou Electrical Machinery Plant	1	SFW12 5-6/650	0.125	190	0.4	1000	50	80	Chongqing Electrical Machinery Plant
25	Wulong Guanqiao Hydroelectric Plant	0.125	1	HL194—WJ—35	40	0.35	0.125	1000	Chongqing Hydraulic Turbine Plant	1	TYPEF W—125-6/560	0.125	125	0.38	1000	50	0.8	Chongqing Electrical Machinery Plant
27	Qingtongxi Hydroelectric Plant	0.2	1	FL110—Wy—50	48	0.5	0.21	750	Chongqing Electrical Machinery Plant	1	TYTES FW—W200	0.2	CURRENT 36.1	0.4	750	50	0.8	Chongqing Electrical Machinery Plant
28	Heping Hydroelectric Plant	0.25	1	XJA—W—40/1×11	108	0.33	0.25	1000	Sichuan Hydraulic Turbine Plant	1	SFW—W250-6/740	0.25	451	0.4	1000	50	0.8	Chongqing Shilijian Electrical Machinery Plant
29	Guanziya Hydroelectric Plant	0.32	1	XJA—W—40/1×10	18	2.1	0.32	600	Chongqing Electrical Machinery Plant	1	SFW—W320-10/850	0.32	577	0.4	600	50	0.8	Chongqing Electrical Machinery Plant
30	Baiyangping Hydroelectric Plant	0.32	1	XLAW1*1.25	75-150	0.487 - 0.689	294-851	750-1000	Chongqing Power Equipment Manufacturing Ltd	1	SFW-320-850	0.32	577	0.4	750	50	0.8	Chongqing Sailimeng Electric Machine Co., Ltd
31	Chengmending Hydroelectric Plant	0.32	2	HL110—WJ--42	40	1.5	0.96	1000	Chongqing Electrical Machinery Plant	2	SFW160—6/590	0.16	289	0.4	1000	50	0.8	Chongqing Zhongzhou Hydraulic Turbine Plant
32	Shuanglong Hydroelectric Plant	0.35	2	WL160-42	42	1.2	0.1	700	Chongqing Wanzhou Hydraulic Turbine Plant	2	SFW-W250-61/740	0.25	450	0.4	700	50	0.8	Chongqing Electrical Machinery Plant
				HLD54-WJ-60	42	1.25	0.25	700			SFW100-6/560	0.1	450	0.4	700	50	0.8	
33	Chushuitang Hydroelectric Plant	0.375	2	HLA551-WJ-50	24	1.85	0.25	1000	Sichuan Zhong County	2	SFW-250-8/740	0.25	451	0.4	750	50	0.8	Chongqing Sailimeng Electric

				HL260-WJ-35	24	0.8	0.125	944	Hydraulic Turbine Plant		SFW-125-12/740	0.125	451	0.4	1000	50	0.8	Machine Co., Ltd
34	Shuangqiao Hydroelectric Plant	0.4	1	CJ237—W—Y	256	0.2	0.4	1000	Chengdu Jintang County Jinyuan Hydraulic Machine Manufacturing Ltd.	1	SFW-400-6/850	0.4	721.7	0.4	1000	50	0.8	Sichuan Xinsheng Electrical Machinery Plant
35	Shiqiao Hydroelectric Plant	0.4	1	XJA—W—50/1×12.5	120	0.47	0.459	750	Sichuan Jianhua Hydraulic Turbine Plant	1	SFW—W400-8/850	0.4	721.7	0.4	750	50	0.8	Sichuan Xinsheng Electrical Machinery Plant
36	Shuanglian Hydroelectric Plant	0.4	1	HL110-WJ-50	90	0.55	0.44	1000	Chongqing Power Equipment Manufacturing Ltd	1	SFW400—6/850	0.4	721.73	0.4	1000	50	0.8	Sichuan Xinsheng Electrical Machinery Plant
37	Baijia Hydroelectric Plant	0.4	1	HL200-WJ-35	76	0.76	0.4	1000	Chongqing Power Equipment Manufacturing Ltd	1	SFW-W-W400-6/850	0.4		0.4	1000	50	0.8	Chongqing Power Equipment Manufacturing Ltd
38	Xinqiao Hydroelectric Plant	0.4	1	XJA—W50/1×12.5	102	0.5	0.4	1000	Chongqing Power Equipment Manufacturing Ltd	1	SFW400—6/850	0.4		0.4	1000	50	0.8	Chongqing Power Equipment Manufacturing Ltd
39	Luchi Hydroelectric Plant	0.445	2	SJXJA-W-32/1×9	80	1	0.32	750	Chongqing Zhong County Hydraulic Turbine Plant	2	JXBES EE-W-320—885	0.32		0.4	750	50	0.8	Chongqing Power Equipment Manufacturing Ltd
				SJXJA-W-50/1×12.5	80	1	0.125	750			JXBES EE-W-125—656	0.125		0.4	750	50	0.8	
40	Xiangyang Stage III Hydroelectric Plant	0.5	2	CJ22-W-70/1×7	235	0.42	0.25	1000	Chongqing Wanzhou Electrical Machinery Plant	2	SFW250/89	0.25	400	0.4	1000	50	0.8	Chongqing Electrical Machinery Plant

41	Xiangyun Hydroelectric Plant	0.5	2	CJA23 7-W-40/1×11	105	0.65	0.25	1000	Chongqing Zhong County Sanxia Hydraulic Equipment Manufacturing Ltd.	2	SFW-W250-6/740	0.25	451	0.4	1000	50	0.8	Chongqing Sailimeng Electric Machine Co., Ltd
42	Hongshan Hydroelectric Plant	0.5	2	CD237-Y-1X7/55	260	0.125	0.274	1000	Chongqing Power Equipment Manufacturing Ltd.	2	VFW-V250-6/740	0.25	451	0.4	1000	50	0.8	Chengdu Xinsheng Electrical Machinery Plant
44	Yong'an Hydroelectric Plant	0.63	1	CJ237-W-70/1×7	330	0.24	0.63	1000	Chongqing Wanzhou Electrical Machinery Plant	1	SFW-W630-6/990	0.63	1136.7	0.4	1000	50	0.8	Chongqing Xinsheng Electrical Machinery Plant
45	Suokousi Hydroelectric Plant	0.65	2	110W-42	69	0.524	0.25	1000	Chongqing Power Equipment Manufacturing Ltd	2	50-6/140	0.25	451	0.4	1000	50	0.8	Chongqing Xinsheng Electrical Machinery Plant
				110W-50	69	0.524	0.4	1000			400-6/850	0.4	121.7	0.4	1000	50	0.8	
46	Xinli Hydroelectric Plant	0.7	2	HL240-WJ-60	295	3.33	0.5	750	Wanzhou Hydraulic Turbine Plant	2	SFW500-10/990	0.5	400	0.4	750		0.8	Chongqing Xinsheng Electrical Machinery Plant
				HL260-WJ-42	295	3.33	0.2	750			SFW200-6/740	0.2		0.4	750		0.8	
47	Caijiagou Stage III Hydroelectric Plant	0.72	2	XGA-W-1X15.5	85	0.617	0.427	600	Chongqing Power Equipment Manufacturing Ltd	2	SFW-400-10/990	0.4	721.7	0.4	600	50	0.8	Chengdu Xinsheng Electrical Machinery Plant
				XGA-W-1X14	85	0.488	0.338	750			SFW-W320-8/850	0.32	571.4	400	750		0.8	
48	Xiangyang Stage I Hydroelectric Plant	0.8	2	CJ22-W-70/1×7	225	0.42	0.4	1000	Chongqing Wanzhou Power Equipment Manufacturing Ltd.	2	SFW400/69	0.4	650	0.4	1000	50	0.8	Chongqing Wanzhou Power Equipment Manufacturing Ltd.
49	Cheqingyan Hydroelectric Plant	0.8	2	CJ22-W-70/1×9	185	0.25	0.4	750	Chongqing Hydraulic Turbine Plant	2	SFW-W400-8/850	0.4	722	0.4	750	50	0.8	Chongqing Electrical

																		Machinery Plant
50	Lianghekou Hydroelectric Plant	0.8	2	HLD260—50	29	1.8	0.4147	750	Chongqing Power Equipment Manufacturing Ltd.	2	SFW—400-8/850	0.4	721.7		750	50	0.8	Chongqing Electrical Machinery Plant
51	Wuhe Hydroelectric Plant	0.8	2	CJ22—W—70/1×9	230	0.25	0.4	750	Chongqing Wanzhou Hydraulic Turbine Plant	2	SFW—W400-8/850	0.4	722	0.4	750	50	0.8	Chongqing Power Equipment Manufacturing Ltd.
				CJ22—W—70/1×9	230	0.25	0.4	750			SFW—W400-8/850	0.4	722	0.4	750	50	0.8	
52	Sihe Hydroelectric Plant	0.8	2	CJ22—W—70/1×9	200	0.3825	0.6116	750	Chongqing Power Equipment Manufacturing Ltd.	2	SFW—W400—8/850	0.4	620	0.4	750	50	0.85	Sichuan Xinsheng Electrical Machinery Plant
53	Shilingyan Hydroelectric Plant	0.82	2	HL110-WJ-50	81	0.4	0.5	1095	Sichuan Hydraulic Turbine Plant	2	SFW-500-6/850	0.5		0.4	1000	50	0.8	Chongqing Electrical Machinery Plant
				XJA-W-40/1×11	81	0.4	0.32	1095			SFW-320-6/41	0.32		0.4	1000	50	0.8	
54	Nanmu Hydroelectric Plant	0.82	2	CD22—W—70/1×9	180	0.2727	0.5	767	Chongqing Power Equipment Manufacturing Ltd.	2	SFW—W500-8/990	0.5	902	0.4	1500	50	0.8	Chongqing Sailimeng electrical equipment Ltd.
				CD22—W—10/1×7.8	180	0.2727	0.32	767			SFW—W320-8/850	0.32	577	0.4	750	50	0.8	
55	Canglong Hydroelectric Plant	0.88	2	SFW-W630-6/990 HLA-WJ-50	69	1.4	0.688	1050	Chongqing Power Equipment Manufacturing Ltd	2	SFW—W630-6/990	0.63	1136.7	0.4	2000	50	0.8	SichuanXinshe ng Electrical Machinery Plant
				SFW-W250-6/740 HL110-WJ-42	75	0.382	0.222	1000			SFW—W250-6/740	0.25	451	0.4	2400	50	0.8	

56	Daheba Hydroelectric Plant	1	2	CJA23-W—90/1×4	610	0.11	0.5	1000	Chongqing Power Equipment Manufacturing Ltd/Sichuan Hydraulic Turbine Plant	2	SFW—W500-6/850	0.5	902.1	0.4	1000	50	0.8	SichuanXinshe ng Electrical Machinery Plant
57	Heixigou Hydroelectric Plant	1	1	CJA23 7-W-115/1×13	175	0.72	1	500	Ling Ling Generating Equipment Co., Ltd. P. R. China	1	SFW10 00-12/143 0	1	115	6.3	500	50	0.8	Ling Ling Generating Equipment Co., Ltd. P. R. China
58	Yanchanghe Stage III Hydroelectric Plant	1.02	3	HL5510 -WJ-50	36.5	3.78	0.5	1000	Chongqing Power Equipment Manufacturing Ltd	3	SEW-W500-6/850	0.5	903	0.4	1000	50	0.8	Chongqing Power Equipment Manufacturing Ltd
				HL240-WJ-42	36.5	3.78	0.32	1000			SFW-W320-6/740	0.3 2	577.4	0.4	1000	50	0.8	
				HL240-WJ-35	36.5	3.78	0.2	1000			SFW-W200-6/740	0.2	361	0.4	1000	50	0.8	
59	Muzonghe Stage IV Hydroelectric Plant	3×0.3 6	3	HCD46 -WJ-84	116	2.942	0.393	500	Chongqing Generating Equipment Manufacture Co., Ltd.	3	SFW36 0-14/180	0.3 6		0.4	500	50	0.8	
60	Dengta Hydroelectric Plant	1.09	4	CG237 W55-1*5.5	170-296	0.13-0.172	183-396	1000	Sichuan Emeishan Longjian Hydraulic Machine Manufacturing Ltd.		SFW-W320-6/740	0.3 2	577.4 A	0.4	1000	50	0.8	Sichuan Xinsheng Electrical Machinery Plant
				CG237 W55-1*5.5	290	0.166	401	1000			SFW-W320-6/740	0.3 2	577.4 A	0.4	1000	50	0.8	
				CG237-W-55/1*5	290	0.142	343	1000			SFW-W250-740	0.2 5	361A	0.4	1000	50	0.8	
				CG237-W55/1*4.5	170-290	0.088 - 0.115	120-260	1000			SFW-W200-740	0.2	361A	0.4	1000	50	0.8	
61	Banqiao Stage II Hydroelectric Plant	1.4	3	HLD54-WJ-60	85	0.77	0.5	1000	Chongqing Power Equipment Manufacturing Ltd	3	SFW-W500-6/850	0.5	903	0.4	1000	50	0.8	Chongqing Sailimeng Electric Machine Co., Ltd

				HLD54-WJ-60	85	0.77	0.5	1000	Sichuan Emeishan Longjian Hydraulic Machine Manufacturing Ltd.		SFW-W500-6/850	0.5	903	0.4	1000	50	0.8	Chongqing Electrical Machinery Plant
				HL160-WJ-55	85	0.77	0.4	1000			SFW-W400-6/850	0.4	721.7	0.4	1000	50	0.8	Sichuan Xinsheng Electrical Machinery Plant
62	Shuangchahe Hydroelectric Plant	1.43	2	CJA23 7—W--90/1×5.5	630	0.163 1	0.857	1000	Chongqing Power Equipment Manufacturing Ltd	2	SFW—800-6/990	0.8	1443	0.4	1000	50	0.8	Guangdong Chaozhou Huineng Electric Equipment Ltd.
				CJA23 7—W--90/1×5	630	0.163 1	0.685	1000			SFW—630-6/990	0.6 3	1370	0.4	1000	50	0.8	
63	Songshigou Hydroelectric Plant	3×0.5	3	GJ22-W-70/1X9	100-250	0.27-0.428	0.216 - 0.849	600-750	Emei Mountain City Longjian Hydropower Equipment Manufacture Co., Ltd.	3	SFW—W500-8/990	0.5	902.1	0.4	750	50	0.8	Sichuan Xinsheng Electrical Machinery Plant
65	Shujiuhe Hydroelectric Plant	2.5	2	HLD54—WJ—71	153	1.3	1.5	1000	Chongqing Power Equipment Manufacturing Ltd	2	SFWE—K1250-6/1430	1.2 5	85.9	10.5	1000	50	0.8	Chongqing Electrical Machinery Plant
66	Yangyan Hydroelectric Plant	2.5	2	ZDT03-LH-225	39	12.6	1	279	Chongqing Power Equipment Manufacturing Ltd	2	SF1000 - 32/260 0	1	114.6	6.3	187.5	50	0.8	Guangdong Xingning County Electrical Machinery Co.,Ltd.
			2	IG103-6H-225	39	12.6	0.25	192	Sichuan Dayi County Hydraulic Turbine Plant	2	SF250-32/250	0.2 5	41	450	187	50	0.8	
67	Baiguo Hydroelectric Plant	2×1.6	2	CJA23 7-W-110/2×11B	192	1.05	1.6	500	Dongfeng Electric Machinery Plant P. R. China	2	SFW16 00-12/173 0		183.3	6.3		50	0.8	Dongfeng Electric Machinery Plant P. R. China
68	Longqiao Hydroelectric Plant	2×2	2	HLD54-WJ-78	159	1.82	2.11	1000 0	Lingling Power Equipment Plant	2	SFW20 00-6/1430	2	230	6.3	1000	50	0.8	Lingling Power Equipment Plant

69	Baiyang Hydroelectric Plant	2×2.5	2	CJA23 7-W-100/1×11	435	0.72	2.5	750	Sichuan Dongfeng Electric Machinery Plant Co., Ltd. P. R. China	2	SFW25 00-8/1730 0	2.5	286.4	6.3		50	0.8	Sichuan Dongfeng Electric Machinery Plant Co., Ltd. P. R. China
70	Xinmin Tailwater Stage II Hydroelectric Plant	1.26	2	HLA15 3-WJ-500	46.5	1.8	0.63	1000	Zhongzhou Hydraulic Turbine Plant	2	SFW—W630 —6/990	0.6 3	1136. 7	0.4	1000	50	0.8	Chengdu Xinmin Electrical Machinery Plant
71	Dongliuhe Hydroelectric Plant	1.86	1	HL110-50	64	0.6	0.32	1000	Wanzhou Hydraulic Turbine Plant	1	SFW32 0—6/850	0.3 2	577.4	0.4	1000	50	0.8	Sichuan Xinsheng Electrical Machinery Plant
			2	XJA-W-50/1×9	145	0.5	0.64	1000	Wanzhou Hydraulic Turbine Plant	2	SFW32 0—6/740	0.3 2		0.4	1000	50	0.8	Sichuan Xinsheng Electrical Machinery Plant
			1	HL110-50	85	0.5	0.4	1000	Wanzhou Hydraulic Turbine Plant	1	SFW40 0-6/850	0.4		0.4	1000	50	0.8	
			1	XJA-W-50/1×1 2.5	125	0.5	0.5	1000	Wanzhou Hydraulic Turbine Plant	1	SFW50 0—8/990	0.5		0.4	750	50	0.8	Sichuan Xinsheng Electrical Machinery Plant
72	Dahegou Hydroelectric Plant	5×0.6 3	5	CJ237-9/1×5 (2) CJ237-9/1×6(3)	503	0.165	0.63	1000	Emei Mountain City Juneng Hydropower Equipment Manufacture Co., Ltd.	5	SFW63 0-6/990	0.6 3	1137	0.4	1000	50	0.8	Chongqing Electric Machine Federation Ltd. PRC.
73	Xinmin Stage II Hydroelectric Plant	5.5	3	HLD54-WJ-78(2)	150	5	2	1000	Hunan Yongzhou Lingling Hydraulic Turbine Plant	3	SFW—2000—6/1430(2)	2	230	6.3	1000	50	0.8	Hunan Yongzhou Lingling Hydraulic Turbine Plant
				HLD54-WJ-75(1)	150	5	1.5	1000	Chongqing Wanzhou Hydraulic Turbine Plant		TYPE WEK15 00-	1.5	230	6.3	1000	50	0.8	Chongqing Wanzhou Hydraulic Turbine Plant

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74	Guizhou Province Xingyi City Puti Hydropower Plant Technical Reform Project	6	2	H4045-LJ-160	22.4	17.3	3	250	Sichuan Dongfeng Electrical Equipment Factory	2	SF3000-24/3250	3	343.7	6.3	250	50	0.8	Sichuan Dongfeng Electrical Equipment Factory
75	Guizhou Province Xingyi City Puti 2nd Stage (Xiniutang) Hydropower Plant Technical Reform Project	9.5	2	HLUF3 913-LJ-160	24.5	17.42	3.684	250	Naning Electrical Equipment Factory of P.R.China	2	SF3500 24/3250	3.5	401	6.3	250	50	0.8	Naning Electrical Equipment Factory of P.R.China
			1	HLA55 1-LJ-140	24.5	11.84	2.63	300		1	SF2500 - 20/2800	2.5	236.38	6.3	300	50	0.8	
76	Wumaxi Stage II Hydroelectric Plant	0.8	2	CJ22-w-70/1×9	190	0.3	0.4	750	Sichuan Hongya Turbine Ltd.	2	SFW-W400-8/850	0.4	721.7	0.4	750	50	0.8	Sichuan Xinsheng Electric Machine Ltd.
77	Mozigou Hydroelectric Plant	1.26	2	CJ475-W-85/1*8	256	0.62	0.63	750	Sichuan Hongya Turbine Ltd.	2	SFW-W630-8/990	0.63	1137	0.4	750	50	0.8	Chongqing Electric Machine Federation Ltd.PRC
78	Mayihe Hydroelectric Plant	1.26	2	DL54—WJ—60	115	0.4-1	150-630	750-1000	Sichuan Jiannan Electricity Machine Ltd.	2	SFW-W630-6/990	0.63	1137	0.4	1000	50	0.8	Chongqing Electric Machine Federation Ltd.PRC
79	Jinyatan Hydroelectric Plant	3.2	4	CJ22-W70/1×9B	280	0.4	0.8	1000	Zhongzhou Turbine Ltd.	4	SFW-W800-6/990	0.8	1442	0.4	1000	50	0.8	Chongqing Electric Machine Federation Ltd.PRC
80	Toudaoshui Hydroelectric Station	3.2	2	XJE-W-60B/2×11.5	160—215	1.118—1.296	1.485—2.338	843—978	Zhejiang Leqing Machine Ltd.	2	SFW1600-6/1430	1.6	183.3	6.3	1000	50	0.8	Zhejiang Linhai Electric Machine Ltd.

81	Sanhui Hydroelectric Plant	4.8	3+3	Sanhui : HL550-WJ-60 ; Sanhui wei HLD46-WJ-55	Sanhui : 81 ; Sanhui wei : 71	Sanhui : 1.26 ; Sanhuiwei 1.5	0.8	1000	Yibin Fuyuan Electricity generation Equipment Ltd.	3+3	SFW-W800-6/990	0.8	1442	0.4	1000	50	0.8	Chongqing Electric Machine Federation Ltd.PRC
82	Qingshuihe Stage I Hydroelectric Plant	5	2	CJA23 7—W—110/2×10.2	268	1.12	2.5	600	Lisong Hydraulic-electricity Technology Co.Ltd. Chongqing	2	SFW2500-8/2160	2.5	343	10.5	750	50	0.8	Chongqing Turbine Ltd.
83	Gongjiagou Hydroelectric Plant	10	2	CJA23 7-w-140/2×7.5	673.2	0.92	5.6	750	Chongqing Turbine Ltd.	2	SFW5000-8/2160	5	343	10.5	750	50	0.8	Chongqing Turbine Ltd.
84	Chahe Stage III Hydroelectric Plant	5.8	3	HLD54-WJ-84 (2) ; XJA-W-50/1*12 (1)	180 ; 150-180	1.9 ; 0.594 -0.65	2.5 (2) ; 0.699 — 0.918 (1)	1000	Yibin Fuyuan Electricity generation Equipment Ltd. (2) Sichuan Xinjinneijiang Turbine Production Ltd. (1)	3	SFW-K2500-6/1430 (two) ; SFW800-W-6/990 (one)	2.5 (2) ; 0.8 (1)	286.4 (2) ; 1442 (1)	6.3 (2) ; 0.4 (1)	1000	50	0.8	Chongqing Electric Machine Federation Ltd.PRC
85	Daihuanggou Hydroelectric Plant	8	2	CJA23 7-W-110/2×9	440	1.1	4.17	750	Lisong Hydraulic-electricity Technology Co.Ltd. Chongqing	2	SFWE-K4000-8/1730	4	458.2	6.3	750	50	0.8	Chongqing Electric Machine Federation Ltd.PRC
86	Gaoqiaohe Hydroelectric Plant	9.6	3	HL110—WJ—92 (two) HLD9-92	130(two) ; 130(one)	2.997 (two) ;	3.351 (two) ;	750(two) ; 750(one)	Kunming Electric machine Ltd.(two) Sichuan	3	SFW3200-8/1730 (three)	3.2	366.6	6.3	750	50	0.8	Kunming Electric machine Ltd. (two) Sichuan Dongfeng

				WJ-G2 (one)		2.98(one)	3.2(o ne)		Dongfeng Electric machine Ltd. (one)									Electric machine Ltd. (one)
87	Zhuyeshan Hydroelectric Plant	5	2	HLD26 1-WJ- 75	185	3.5	2.5	1000	Yibin Fuyuan Electricity generation Equipment Ltd.	2	SFWE- K2500- 6/1430	2.5	286.4	6.3	1000	50	0.8	Chongqing Sailimeng Electric Machine Co., Ltd
88	Lianghekou Hydroelectric Plant	10M W(2× 4+1× 2MW)	2	CJA23 7-W- 130/2× 13.6	285	1.81	4.21	500	Kunming Electric Machine Company	2	SFW40 00- 12/215 0	4	458.2	6.3	500	50	0.8	Kunming Electric Machine Company
			1	CJA23 7-W- 105/1× 11	419	0.632	2.15	750		1	SFW20 00- 8/1430	2	229.1	6.3	750	50	0.8	
90	Dabaishu Hydroelectric Plant	3.2	2	HL120- WJ-61	185	0.913	1.6	750/1 000	Yunnan Lancangjiang Electric Machine Co.	2	HPWE- K1600- 6/1180 SFWE- K1600- 6/1430	1.6	115		1000/ 1000	50/5 0	0.8/0. 8	Yunnan Lancangjiang Electric Machine Co.
91	Dashi Stage III Hydroelectric Plant	3.2	2	HL120- WJ-61	300	1.19	1.6	1000/ 1000	Yunnan Lancangjiang Electric Machine Co.	2	HPWE- K1600- 6/1180 SFWE- K1600- 6/1430	1.6	212.3		1000	50/5 0	0.8/0. 8	Yunnan Lancangjiang Electric Machine Co.
92	Dashi Stage II Hydroelectric Plant	4.2	2+ 1	HL100- WJ-65 HLA55 0-WJ- 71	300	1.21	4.2 (1×2+ 2.2)	750/1 000	Yunnan Lancangjiang Electric Machine Co.	2+ 1	LNP- K1000- 6 (2)SF WE- K2200- 610(1)	4.2 (1× 2+2 .2)	121.6 /201		1000/ 1000	50/5 0	0.8/0. 8	Yunnan Lancangjiang Electric Machine Co.
93	Yunnan Midu County Taishanhe Hydropower Station	5	1× 1+ 2× 2	HL100- WJ-65 HLA55 0-WJ- 71	120/12 0	1.06/ 2.06	1.086 /2.17	750/1 000	Chongqing Sailimeng Electric Machine Co., Ltd	1× 1+ 2× 2	SFWE- K1000- 6/1180 SFWE- K2000- 6/1430	5	114.6 /229	6.3/ 6.3	1000/ 1000	50/5 0	0.8/0. 8	Chongqing Sailimeng Electric Machine Co., Ltd

94	Zhenyuan County Xiaojiehe Hydropower Station	5	004/005	HL110-WJ-78	95-170	1.8-2.6	1.72-3.4	750-1000	Zhejiang Jinhua Turbine Manufactory Company	2	SFW2500-6/1430	2.5	286.3	6.3	1000	50	0.8	Chaozhou Huineng Generator Manufactory Company
95	Jinghong City Chuangye Hydropower Station	8	2	CJA237-W-115/2×12	302-319	1.06	4.02	600	Zhejiang Jinhua Turbine Manufactory Company	2	SFW4000-10/2150	4MW	N/A	6.3	1000	50Hz	0.8	Zhejiang Jinhua Turbine Manufactory Company
96	Yingjiang Husa River 5th Stage Hydropower Plant	8	2	HLD46-WJ-76	126.6	3.84	4.167	1000	Kuming Electrical Equipment Factory	2	SFW4000-6/1730	4	458.2	6.3	1000	50	0.8	Kuming Electrical Equipment Ltd.Co.
97	Yunnan Province Jinping County Mengqiao Village Datan Hydropower Station	10	2	HLC437-WJ-93	128	4.744	2.041	750	Chongqing Turbine Factory Company Ltd.	2	SFW5000—8/2160	5	572.8	6.3	750	50	0.8	Chongqing Turbine Factory Company Ltd.
98	Fugong County Lishadi Hydropower Plant Project	14	2	HLA1794-WJ-100	285-300	2.7-3.0	6.794	1000	Yuxi Hydroelectric Equipment Factory Yunnan China	2	SFW7000-6/2150	7	802	6.3	1000	50	0.8	Yunnan Yuxi Hydroelectric Equipment Factory The People's Republic of China

The individual projects are connected to the local grid (known as “electricity system” in the “Tool to calculate the emission factor for an electricity system” approved by the CDM Executive Board of UNFCCC).

Prior to the individual projects’ commissioning, most of project owners have organized a series of training together with the supplier of equipments. The training conducted covered mainly the following topics: management of hydropower generation, operation and maintenance of hydropower plant, operation and maintenance of turbine, generator, and other equipments. The purpose of the training is to enable the local staff to perform regular operation and maintenance.

1.9 Project Location

Based on the geographical distribution situation of the hydropower plants under the proposed VCS Grouped project, the hydropower plants are separated into four subgroups: subgroup separately in Chongqing City, Sichuan Province, Yunnan Province and Guizhou Province. Maps of the four provinces Chongqing, Sichuan, Yunnan, and Guizhou indicating the individual project locations are provided below. The exact geographic location of each hydropower plants under the Grouped project are all provided in the Table 1-2, and all these geographic coordinates data are from the real measurement data by the intermediaries with GPS measuring tools.

As can be seen in Figure 1.1, and Figure 1.2 for Chongqing Province, 11 hydropower stations are located in Wanzhou County along the Northeast direction from Chongqing city (project numbers included: 5~7,9~13,15 18, 21), whereas 49 hydropower stations are located in Wulong County to the Southeast of Chongqing (project numbers included: 1~4, 22~25,27~42,44~63,65~69).



Figure 1-1 Chongqing Municipality City in China

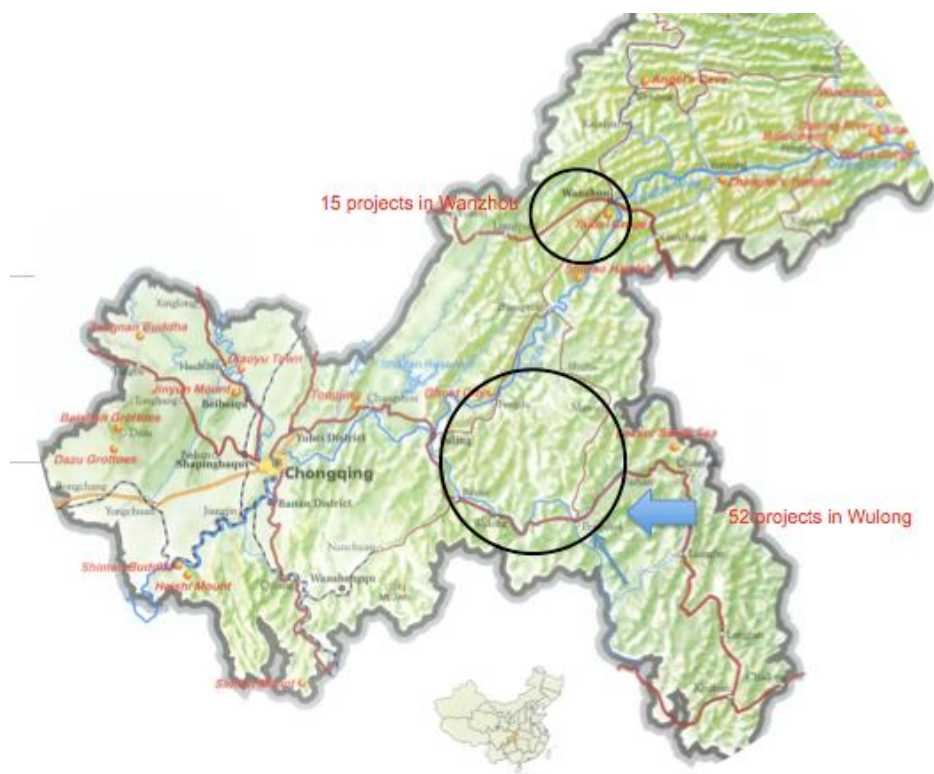


Figure 1-2 Hydropower Plants in Chongqing City

As shown in figure 1.3 and figure 1.4, 2 hydropower stations are located in Ebian County (project numbers included: 87, 88) and 11 in Ya'an County within Sichuan province, southwest of Sichuan's capital city Chengdu (project numbers included: 76~86).



Figure 1-3 Sichuan Province in China

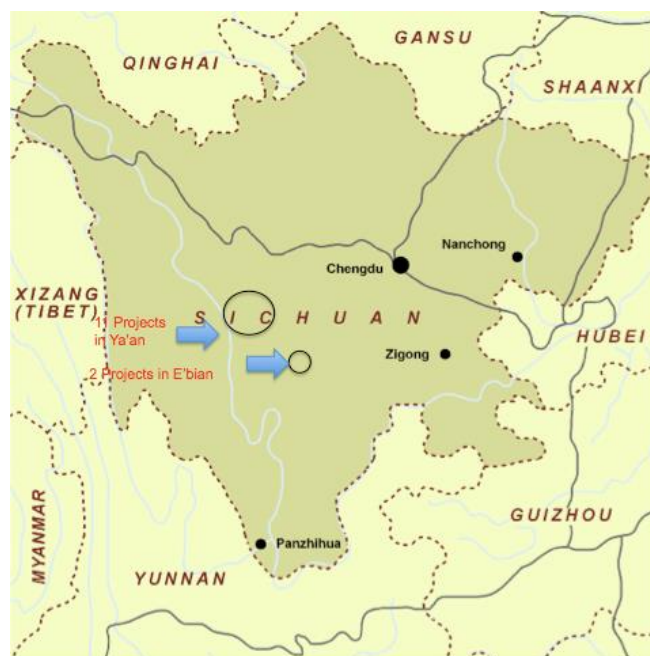


Figure 1-4 Hydropower Plants in Sichuan Province

Figure 1.5 and 1.6 shows 9 power stations in Yunnan Province (project numbers included: 90~98), sparsely distributed throughout the entire province with borders to Myanmar, Laos and Vietnam.



Figure 1-5 Yunnan Province in China



Figure 1-6 Hydropower Plants in Yunnan Province

Figure 1.7 and figure 1.8 indicates 6 project locations in Guizhou province(project numbers included: 70~75).



Figure 1-7 Guizhou Province in China



Figure 1-8 Hydropower Plants in Guizhou Province

Table 1-2 The location of the Grouped Project

Project No.	Project Title	Geographical Coordinates
1	Zengfuyoujiang Hydroelectric Plant	N 29°32'23.12", E 107° 0'17.29"
2	Jianshitan Hydroelectric Plant	N 29°17'14.67", E 107° 8'18.20"
3	Jinxing Hydroelectric Plant	N 29°39'24.68", E 108°12'19.73"
4	Huzhong Hydroelectric Plant	N 29°25'1.30", E 108° 5'15.67"
5	Chongqing Wanzhou Fengmu Hydroelectric Plant	E 108°48'45" N 30°32'19"
6	Chongqing Wanzhou Longdong Hydroelectric Plant	E 108°50'15" N 30°36'37"
7	Chongqing Wanzhou Dengta Hydroelectric Plant	E 108°39'30" N 30°38'11"
9	Chongqing Wanzhou Xiaolong Hydroelectric Plant	E 108°47'49" N 30°34'59"
10	Chongqing Wanzhou Yihe Hydroelectric Plant	E 108°44'04" N 30°41'42"
11	Chongqing Wanzhou Tiande Hydroelectric Plant	E 108°24'18" N 30°38'5"
12	Chongqing Wanzhou Puziling Hydroelectric Plant	E 108°49'30" N 30°36'08"
13	Chongqing Wanzhou Yanshan Hydroelectric Plant	E 108°19'38" N 30°33'57"
15	Chongqing Wanzhou Wanlin Hydroelectric Plant	E 107°59'41" N 30°46'62"
18	Chongqing Wanzhou Yanjingxi Hydroelectric Plant	E 108°51'08" N 30°38'11"
21	Chongqing Wanzhou Xianfeng Hydroelectric Plant	E 108°41'15" N 30°33'15"
22	Heba Hydroelectric Plant	N 29°19'10.40", E 107°37'32.49"
23	Sandaoguai Hydroelectric Plant	N 29°27'58.76", E 107°22'42.11"
24	Beiya Hydroelectric Plant	N 29°21'32.47", E 107°38'30.24"

25	Wulong Guanqiao Hydroelectric Plant	N 29°24'34.60", E 107°49'54.15"
27	Qingtongxi Hydroelectric Plant	N 29°28'14.97", E 108°00'48.54"
28	Heping Hydroelectric Plant	N 29°21'10.84", E 107°39'10.98"
29	Guanziya Hydroelectric Plant	N 29°22'16.92", E 107°45'14.34"
30	Baiyangping Hydroelectric Plant	N 29°26'7.04", E 107°39'41.32"
31	Chengmending Hydroelectric Plant	N 29°18'46.28", E 107°37'32.28"
32	Shuanglong Hydroelectric Plant	N 29°25'32.33", E 107°40'6.82"
33	Chushuitang Hydroelectric Plant	N 29°32'17.48", E 107°56'34.68"
34	Shuangqiao Hydroelectric Plant	N 29°32'12.41", E 107°57'10.41"
35	Shiqiao Hydroelectric Plant	N 29°10'35.75", E 107°48'48.45"
36	Shuanglian Hydroelectric Plant	N 29°25'29.10", E 108° 02'6.13"
37	Baijia Hydroelectric Plant	N 29°33'56.74", E 108°01'40.13"
38	Xinqiao Hydroelectric Plant	N 29°31'43.50", E 108° 1'16.73"
39	Luchi Hydroelectric Plant	N 29°23'25.72", E 107°38'10.45"
40	Xiangyang Stage III Hydroelectric Plant	N 29°24'6.59", E 107°53'7.37"
41	Xiangyun Hydroelectric Plant	N 29°22'25.91", E 107°38'37.84"
42	Hongshan Hydroelectric Plant	N 29°35'55.57", E 108° 2'25.20"
44	Yong'an Hydroelectric Plant	N 29°20'32.46", E 107°38'33.45"
45	Suokousi Hydroelectric Plant	N 29°24'55.81", E 107°41'19.75"
46	Xinli Hydroelectric Plant	N 29°26'35.99", E 107°58'15.50"
47	Caijiagou Stage III Hydroelectric Plant	N 29°13'27.65", E 107°39'16.46"

48	Xiangyang Stage I Hydroelectric Plant	N 29°25'22.02", E 107°53'27.70"
49	Cheqingyan Hydroelectric Plant	N 29°16'1.31", E 107°28'25.89"
50	Lianghekou Hydroelectric Plant	N 29°15'41.20", E 107°41'39.47"
51	Wuhe Hydroelectric Plant	N 29°31'46.40", E 107°51'53.96"
52	Sihe Hydroelectric Plant	N 29°31'52.23", E 107°52'13.95"
53	Shilingyan Hydroelectric Plant	N 29°20'52.64", E 107°22'41.42"
54	Nanmu Hydroelectric Plant	N 29°33'09.43", E 108°01'28.06"
55	Canglong Hydroelectric Plant	N 29°15'0.97", E 107°40'50.22"
56	Daheba Hydroelectric Plant	N 29°11'18.40", E 107°41'23.72"
57	Heixigou Hydroelectric Plant	N 29°27'19.93", E 108° 0'33.33"
58	Yanchanghe Stage III Hydroelectric Plant	N 29°30'02.34", E 107°55'27.63"
59	Muzonghe Stage IV Hydroelectric Plant	N 29°27'22.13", E 108° 0'37.04"
60	Dengta Hydroelectric Plant	N 29°15'45.45", E 107°38'33.03"
61	Banqiao Stage II Hydroelectric Plant	N 29°14'18.52", E 107°39'1.97"
62	Shuangchahe Hydroelectric Plant	N 29°18'16.75", E 107°43'02.48"
63	Songshigou Hydroelectric Plant	N 29°23'41.02", E 107°40'40.05"
65	Shujiahe Hydroelectric Plant	N 29°20'0.27", E 107°45'39.81"
66	Yangyan Hydroelectric Plant	N 29°27'46.67", E 107°22'55.58"
67	Baiguo Hydroelectric Plant	N 29°23'40.76", E 107°47'15.62"
68	Longqiao Hydroelectric Plant	N 29° 1'33.00", E 107°44'33.27"
69	Baiyang Hydroelectric Plant	N 29°19'20.81", E 107°47'37.19"

70	Xinmin Tailwater Stage II Hydroelectric Plant	N 29° 0'19.33", E 107°46'1.32"
71	Dongliuhe Hydroelectric Plant	Stage 1 : N 29° 8'14.40", E 107°43'46.80" Stage 2 : N 29° 6'45.46", E 107°44'22.46" Stage 3 : N 29° 5'42.15", E 107°44'33.75" Stage 4 : N 29° 4'52.89", E 107°43'34.06"
72	Dahegou Hydroelectric Plant	N 28°49'14.23", E 107° 8'46.24"
73	Xinmin Stage II Hydroelectric Plant	N 28°59'50.15", E 107°46'50.89"
74	Guizhou Province Xingyi City Puti Hydropower Plant Technical Reform Project	N 25°10'21" E 104°43'55"
75	Guizhou Province Xingyi City Puti 2nd Stage (Xiniutang) Hydropower Plant Technical Reform Project	N 25°07'45" E 104°41'56"
76	Wumaxi Stage I Hydroelectric Plant	N 29°40'18", E 102°32'30"
77	Mozigou Hydroelectric Plant	N 29°45'25.84", E 102°27'13.95"
78	Mayihe Hydroelectric Plant	N 29°42'58", E 102°33'12"
79	Jinyatan Hydroelectric Plant	N 29°40'4.94", E 102°43'29.55"
80	Toudaoshui Hydroelectric Station	N 29°42'41", E 102°33'31"
81	Sanhui Hydroelectric Plant	N 29°43'28", E 102°36'10"
82	Qingshuihe Stage I Hydroelectric Plant	N 29°36'21", E 102°45'43"
83	Gongjiagou Hydroelectric Plant	N 29°22'19.82", E 102° 2'25.10"
84	Chahe Stage III Hydroelectric Plant	N 29°48'09", E 102°28'46'
85	Daihuanggou Hydroelectric Plant	N 29°44'38.82", E 102°25'56.62"
86	Gaoqiaohe Hydroelectric Plant	N 29°36'13"

		E 102°44'4"
87	Zhuyeshan Hydroelectric Plant	N: 29°02'22.71", E: 103°01'36.51"
88	Lianghekou Hydroelectric Plant	N: 29°09'46.2 " E: 103°05'35.7 "
90	Dabaishu Hydroelectric Plant	N: 24°23'23.15 " E: 100°08'42.08 "
91	Dashi Stage III Hydroelectric Plant	N: 24°21'11.25 " E: 100°06'25.21 "
92	Dashi Stage II Hydroelectric Plant	N: 24°24'11.31 " E: 100°08'55.01 "
93	Yunnan Midu County Taishanhe Hydropower Station	N 24°56'24", E 100°42'20"
94	Zhenyuan County Xiaojiehe Hydropower Station	N 24°00'18", E 101°16'57"
95	Jinghong City Chuangye Hydropower Station	N 22°04'38", E 100°42'31"
96	Yingjiang Husa River 5th Stage Hydropower Plant	N 24°31'11" E 97°44'25"
97	Yunnan Province Jinping County Mengqiao Village Datan Hydropower Station	N 22°55'31" E 103°4'31"
98	Fugong County Lishadi Hydropower Plant Project	N 27°16'20" E 98°53'50"

1.10 Conditions Prior to Project Initiation

Prior to the start of implementation of the proposed project activity, electricity delivered to the grid by the project activity would have otherwise been generated by the operation of power grid-connected power plants and by the addition of new generation sources. The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity.

The project is a Greenfield hydro power project and does not involve generation of GHG emissions for the purpose of their subsequent reduction, removal or destruction

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

All of the project activity instances comply with all Chinese relevant laws and regulations. It has obtained the approval letters from governmental authorities: Development and Reform Commission (DRC), as well as Environment Protection Agency (EPA). The two approvals well demonstrate that local government permits the

construction of the project. Consequently, the project is compliance with laws, status and other regulatory frameworks.

1.12 Ownership and Other Programs

1.12.1 Project Ownership

The Grouping Entities of the grouped project hold the Right of Use of the Project Activity as evidenced in accordance with item (3) of Section 3.11.1 of the VCS Standard v3.6: The project owners have full ownership of the plant, equipment and process that generates the GHG emission reductions and have not divested of such ownership.

1.12.2 Emissions Trading Programs and Other Binding Limits

In October 2011, China government planned to establish 7 pilot regional emissions trading systems (ETs), including municipalities of Beijing, Shanghai, Tianjin, Shenzhen and Chongqing, Guangdong province and Hubei province. Besides, China National ETS is expected to be launched at the end of year 2017.

However, the grouped project and any of its project activity instances do not reduce GHG emissions from activities that are included in an emission trading program or any other mechanism that includes GHG allowance trading, because:

1. VCS has already confirmed the exclusion of 7 hydropower plants included in Chongqing ETS since the 4th Verification of the Grouped Project.

Actually 7 hydropower plants (8_Mayuexi, 14_Lianmeng, 16_Gaodongzi, 20_Dibao, 26_Xiangyang Stage II, 43_Leyuan, and 64_Banqiao Stage III) included in Chongqing ETS have already been excluded from the Grouped Project since the 4th Verification during the first crediting period of the project.

Based on the final VCS Project Review Report of the project's 4th verification on 11 July 2016 (covering monitoring period from 26 June 2013 to 25 May 2015), at that time:

- i) Chongqing ETS has already established the compliance period from 1 January 2013 to 31 December 2015. As per the Chongqing ETS regulations, emission data from year 2008 to 2012 of fossil fuel power generation plants covering by the ETS have been used for setting the baseline and cap.

- ii) For the Grouped Project, originally there were in total 67 hydropower plants out of all 95 plants in Chongqing Province. Most of the 67 hydro plants had started operation before 2008 except the 7 plants mentioned above. The 60 hydro plants (60 = 67 - 7) with operation start date before 2008 had already made their impacts on the fossil fuel power generation plants before the year 2008, so no extra allowances would be earned by the fossil fuel power generation plants between 2013 and 2015 due to the operation of those hydropower plants, thus no double counting should be expected.

- iii) To be conservative, the 7 plants have already been excluded from emission

reduction calculation since the 4th verification of the project. VCS has already confirmed the exclusion.

Moreover, CCSC has already considered this situation, in the current renewed PDD and the corresponding validation report, those 7 hydropower plants have also been excluded from the project, as the total number of hydropower plants have already been changed from 95 to 88 and the total installed capacity have already been changed from 215.71 MW to 210.25 MW.

2. Project hydropower plants in Yunnan, Sichuan and Guizhou Provinces are not included in any emission trading programs or any other mechanisms that include GHG allowance trading.

Since June 2013 China has launched 7 pilot ETs (Shenzhen, Guangdong, Beijing, Shanghai, Tianjin, Hubei, and Chongqing). Until now, in total 8 ETs have been in operation, including the just mentioned 7 pilot ones and one non-pilot ET in Fujian Province.

For the rest 28 hydropower plants in Yunnan, Sichuan and Guizhou Provinces, there has been neither emission trading programs nor other mechanisms that include GHG allowance trading existing.

3. In the upcoming China National ETs, no double counting should be expected from all remaining 88 project hydropower plants.

The China National ETs will be launched at the end of year 2017. As one of the qualified third party carbon auditing entities in the China National ETs, CCSC has confirmed that for power generation industry, emission data of year 2013-2015 have been used by the government bureau to set the cap for allocating the allowances.

As all 88 hydropower plants started operation before 2013, they had already made the fossil fuel power generation plants reduce output before the year 2013. Their impacts on fossil fuel power generation plants happened before the year (2013) that the government bureau used for baseline selection. The baseline value, which is used by the government bureau to set the cap, is an already reduced value that takes into account of emission reductions by those hydro plants, so it the cap for the fossil fuel power plants. Therefore, no extra allowances would be earned by the fossil fuel power generation plants during the upcoming China Nation ETs due to the operation of those hydropower plants, thus no double counting shall be expected.

Since the 4th Verification of the Grouped Project in 2015, 7 hydropower plants out of 67 plants located in Chongqing have been excluded from claiming emission reductions. It was due to the concern that for Chongqing pilot ETs, Chongqing Development and Reform Commission (DRC) used emission value from year 2008 to 2012 for setting the cap and those 7 plants have a start date after the ETs baseline year (2008).

Now the Chongqing pilot ETS (2013 to 2015) is over. As the China National ETS will be launched at the end of year 2017, several industries including power generation industry would be taken out of Chongqing and included in China National ETS. The allowances for those industries for year 2016 and onwards will be allocated via National ETS instead of Chongqing ETS. For National ETS, the emission data of year 2013 to 2015 have been used by national DRC (NDRC) as the baseline value for allocating allowances instead of 2008 to 2012 for Chongqing pilot ETS. It makes all the 67 projects located in Chongqing having start date prior to the ETS baseline year (2013), and their emissions reductions would inherently be taken into account when the volume of allowances to be allocated is determined.

However, to be on the conservative side, the 7 projects, which have been already excluded in the previous verification, would not be considered in the 2nd crediting period either.

With respect to the other 28 projects in other Provinces (Yunnan, Sichuan and Guizhou Provinces), since no regional ETS scheme operated in those provinces, there will be not any impact by those 28 projects. As for the impact on China National ETS, similar to what is mentioned above, since the emission data of year 2013 to 2015 have been used by NDRC as the baseline value, and those 28 projects started operation years before 2013, there would be no impact by those projects.

1.12.3 Other Forms of Environmental Credit

The grouped project and any of its project activity instances have no intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS.

1.12.4 Participation under Other GHG Programs

The Grouped Project has not been registered, or is seeking registration under any other GHG programs.

1.12.5 Projects Rejected by Other GHG Programs

The grouped project and any of its project activity instances have not been rejected by any other GHG programs.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

There is no new instances of each projects would be included in this and the following crediting period. No further information is required.

Leakage Management

According to applied CDM methodology AMS I.D. – Grid connected renewable electricity generation (Version 18), leakage is not considered.

Sustainable Development

The project activity contributes significantly to the region's sustainable development in the following ways:

- (1) To improve the local and regional economy development by providing electricity to meet its increasing demands;
- (2) To displace electricity from coal-fired power plants and thus directly reduces environmental pollution caused by the burning of coal;
- (3) To make greater commercial use of hydroelectric resources, increase tax revenue of the local government and income of local residents, improve local traffic conditions, boost local standard of living, create new job opportunities for local people and thus promote the sustainable development in the local regions.

Further Information

No further information.

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

Methodology: AMS I.D. – Grid connected renewable electricity generation (Version 18)

For more information about the methodology, please refer to the following website:

<http://cdm.unfccc.int/methodologies/SSCmethodologies/approved>

For the calculation of the combined margin baseline emission factor, the approved "Tool to calculate the emission factor for an electricity system" (Version 05) is used. For more information, please refer to the following link:

<http://cdm.unfccc.int/Reference/tools/index.html>

The "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period", Version 03.0.1 is used to demonstrate the additionality of the project activity.

The tool is available at:

<http://cdm.unfccc.int/methodologies/PAMethodologies/approved.html>

2.2 Applicability of Methodology

The total installed capacity of all the hydropower stations of the Grouped Project is 210.25MW. The maximum installed capacity of an individual power station is 14MW, which is well below the specified limits of 15 MW of maximum output capacity. Further, the project activity sells electricity to regional grid: CSPG and CCPG.

Justification for the choice has been provided in the table as per requirements set in para 2-11 in the methodology AMS-I.D. (Version 18).

Applicability Criterion (with para number reference)	Project Case
2. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid. (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	All the hydropower plants under the Grouped project are the Renewable Energy Project i.e. Hydro Power Project that supplies electricity to the national grid. Hence option (a) is applicable.
3. Illustration of respective situations under which each of the methodology (i.e. "AMS -I.D.: Grid connected renewable electricity generation", "AMS- I.F.: Renewable electricity generation for captive use and mini-grid" and "AMS-I.A.: Electricity generation by the user) applies is included in the appendix	All the hydropower plants under the Grouped project supply electricity to the national grid. Hence, AMS -I.D.: Grid connected renewable electricity generation is applied.
4. This methodology is applicable to project activities that: (a) Install a Greenfield plant; (b) Involve a capacity addition in (an) existing plant(s); (c) Involve a retrofit of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s).	All the hydropower plants under the Grouped project installed the new power plant at the site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant). Hence option (a) is applicable.
5. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: (a) The project activity is implemented in an existing reservoir with no change in the volume of reservoir; (b) The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4 W/m²; (c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m².	There are only two hydropower plants under the grouped project having reservoirs (74_Puti 1 and 75_Puti 2), and the power densities of the two individual components (given as the total capacity (in W) divided by the surface area of the full reservoir (in m²)) are shown to be 18 W/m² and 59 W/m² (to the nearest whole W/m²). Hence option (c) is applicable.
6. If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	The project activity uses hydropower as the source of energy. Unit does not co-fires fossil fuels since solar is the only source of power. Thus, the proposed project activity has only renewable component and any non -renewable component is not applied. The maximum installed capacity of an individual power station is 14MW, which is well below the specified limits of 15 MW of maximum output capacity.
7. Combined heat and power (co-generation) systems are not eligible under this category.	There are no combined heat and power (co-generation) systems involved in the project. Thus, this criterion is not applicable to the project activity.
8. In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct¹ from the existing units.	The project is a new hydropower project. It does not involve any capacity addition at an existing renewable power generation facility. Thus, this criterion is not applicable to the project activity.
9. In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement power plant/unit shall not exceed the limit of 15 MW.	Not applicable. The project is a green field project.
10. In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS-I.C.: Thermal energy production with or without electricity" shall be explored.	Not applicable. The project is a renewable green field project, the source of which is hydropower only.

11. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply	Not applicable. The project is a renewable green field project, the source of which is hydropower only.
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2.3 Project Boundary

The spatial extent of the project boundary includes the project site and all power plants connected physically to the China Southern Power Grid (CSPG) and the Central China Power Grid (CCPG). The system boundary of the proposed project is defined as the CSPG and CCPG grids due to following reasons:

1. China has a layered dispatch system, therefore the grid boundary definitions are determined based upon regional grids;
2. The project power plants are connected to CSPG and CCPG. CSPG is a large regional grid, which consists of 6 sub-grids: Guangdong Power Grid, Guangxi Power Grid, Yunnan Power Grid and Guizhou Power Grid, Hainan Power Grid; CCPG likewise consists of 6 sub-grids: Sichuan Power Grid, Chongqing Power Grid, Hunan Power Grid, Jingxi Power Grid, Henan Power Grid and Hubei Power Grid.
3. There is a substantial inter-grid power exchanges among the above mentioned sub-grids of CSPG and CCPG respectively;
4. CSPG and CCPG can be clearly identified as regional grids and the information on the characteristics of the grids is publicly available;
5. There is a guidance from the Chinese CDM Designated National Authority (National Climate Change Coordination Office) ⁴ on identifying project boundaries and calculating the grid emission factor for specific regional power grids, including CSPG and CCPG.
6. Further to this, there are only two hydropower plants under the grouped project having reservoirs (74_Puti 1 and 75_Puti 2), and the power densities of the two individual components (given as the total capacity (in W) divided by the surface area of the full reservoir (in m²)) are shown to be 18 W/m² and 59 W/m² (to the nearest whole W/m²). According to Annex 5, EB 23, hydroelectric power plants with power densities greater than 4 but less than 10 W/m² can use current approved methodologies but have to use a default emission factor of 90 gCO₂eq/kWh and hydro electric power plants with a power density greater than 10 W/m² may neglect project emissions from the reservoir. So in the grouped

⁴ National Climate Change Coordination Office <http://cdm.ccchina.gov.cn/zyDetail.aspx?newsId=61598&TId=161>

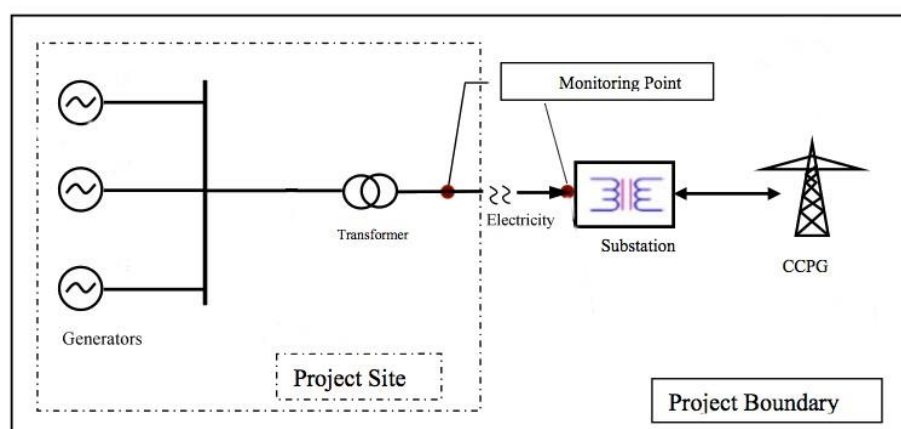
project activity, there is no need to consider the project emission from the reservoir.

In the baseline scenario, the main GHG sources are the emissions from the electricity produced by the fossil fuel based power plants connected to CSPG and CCPG, which will be displaced by the electricity generated by the proposed Grouped Project activity (see table below).

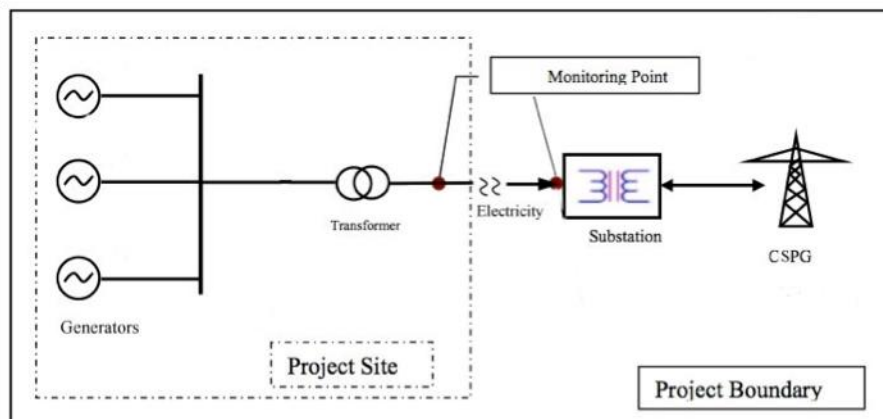
Source		Gas	Included?	Justification/Explanation
Baseline	China Southern Power Grid Electricity production and China Central Power Grid Electricity Production	CO ₂	Included	According to AMS I.D, only CO ₂ emissions from electricity generation should be accounted for.
		CH ₄	Excluded	As defined under AMS I.D
		N ₂ O	Excluded	As defined under AMS I.D
Project	Project activity: Hydropower	CO ₂	Excluded	As defined under AMS I.D
		CH ₄	Excluded	As the power density of the two individual component projects with reservoirs are more than 10 W/m ² , no greenhouse gas emissions from the project have to be considered according to the methodology
		N ₂ O	Excluded	As defined under AMS I.D

Figure 2-1 Flow diagram of the Grouped Project boundary

There are 73 plants under the Grouped Project Activity exporting electricity to the Central China Power Grid



There are 15 plants under the Grouped Project Activity exporting electricity to the China Southern Power Grid



2.4 Baseline Scenario

In the baseline scenario, the main GHG sources are the emissions from the electricity produced by the fossil fuel based power plants connected to CSPG and CCPG, which will be displaced by the electricity generated by the proposed Group Project activity.

For the second crediting period, the continued validity of the original baseline should be assessed.

According to the tool “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (Version 03.0.1)”, follow steps should be adopted:

Step 1: Assess the validity of the current baseline for the next crediting period

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

There are no new national and/or sectoral policies that could affect the baseline scenario during the renewal of the crediting period.

Step 1.2: Assess the impact of circumstances

There is no impact of circumstances existing at the time of requesting renewal of crediting period on the current baseline emissions.

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.

This sub-step is applicable to the project activity since the baseline is the continuation of the current practice, i.e. the electricity would be supplied by the power grid in the absence of the project activity. It is clear that the power grid as an electricity system would maintain its technical possibility for a much longer time than the crediting period of the project activity.

Step 1.4: Assessment of the validity of the data and parameters

There are some parameters, which are determined at the start of the first crediting period and not monitored during the first crediting period, are not valid anymore. So the current baseline needs to be updated for the second crediting period according to the tool. This update includes Grid Emission Factor and all values used in its calculation (including OM, BM and emission factors from fuels etc.).

It is confirmed that the current baseline is valid for the second crediting period. And the data and parameters need to be updated. Therefore step 2 is used.

Step 2: Update the current baseline and the data and parameters

Step 2.1: Update the current baseline

The baseline emissions for the second crediting period have been updated, without reassessing the baseline scenario, based on the latest approved version of the methodology. This update was applied in the context of the sectoral policies and circumstances that is applicable at the time of requesting for renewal of the crediting period.

Step 2.2: Update the data and parameters

As mentioned in step 1.4, all parameters regarding the grid emission factor calculation is updated in the second crediting period.

2.5 Additionality

According to the section 3.8.5 of VCS Standard, a full reassessment of additionality is not required when renewing the project crediting period. However, regulatory surplus shall be demonstrated in accordance with Section 4.6.3).

It is confirmed that the proposed project is not mandated by any law, statute or other regulatory framework. And the laws, statutes, regulatory frameworks or policies implemented since 11 December 1997 that give comparative advantage to more emissions-intensive technologies or activities relative to less emissions-intensive technologies or activities is not taken into account.

2.6 Methodology Deviations

There are no methodology deviations.

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been

generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} * EF_{grid,y} \quad (\text{Equation 1})$$

Where:

BE_y	=	Baseline Emissions in year y (tCO ₂ /yr);
$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y (MWh/yr);
$EF_{grid,y}$	=	Combined margin CO ₂ emission factor for grid connected power generation in year y (tCO ₂ /MWh);

According to Methodology, if the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, then:

$$EG_{PJ,y} = EG_{PJ, facility,y} \quad (\text{Equation 2})$$

Where:

$EG_{PJ,y}$	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
$EG_{PJ, facility,y}$	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

The emission coefficient (measured in tCO₂e/MWh) should be calculated in a transparent and conservative manner according to the procedures prescribed in the “Tool to calculate the emission factor for an electricity system” (Version 5.0).

The data used for calculation are from an official source (where available) and publicly available. The calculation processes are as follows:

STEP 1: Identify the relevant electricity system.

STEP 2: Choose whether to include off-grid power plants in the project electricity system.

STEP 3: Select a method to determine the operating margin (OM).

STEP 4: Calculate the operating margin emission factor according to the selected method.

STEP 5: Calculate the build margin (BM) emission factor;

STEP 6: Calculate the combined margin (CM) emissions factor.

Step 1. Identify the relevant electricity systems

In China, the delineation of the project electricity system and connected electricity system is published by Chinese DNA, which is clear defined. So the project electricity system and the connected electricity system delineated by Chinese DNA will be used⁵. The electricity generated by the project are connected to the CCPG and CSPG. Therefore, the project electric systems are the CCPG and CSPG.

In addition, there is net imported power to the CSPG from the Central China Power Grid and East China Power Grid. And the net imported power to the CCPG from North China Power Grid and Northwest Power Grid. Therefore, the East China Power Grid, North China Power Grid and Northwest Power Grid are considered as part of the connected electricity systems.

To determine the CO₂ emission factor(s) for net electricity, the tool provides four options:

- a) 0 t CO₂/MWh; or
- b) The simple operating margin emission rate of the exporting grid; or
- c) The simple adjusted operating margin emission rate of the exporting grid: or
- d) The weighted average operating margin (OM) emission rate of the exporting grid.

The PDD will choose option b).

Step 2. Choose whether to include off-grid power plants in the project electricity system (optional)

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.

Option II: Both grid power plants and off-grid power plants are included in the calculation.

The project chooses only to include the grid power plants in the calculation (Option I), as information of the off-grid power plants is not completely publicly accessible.

Step 3. Select a method to determine the operating margin (OM)

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods :

- (a) Simple OM; or

⁵ “2015 Baseline Emission Factors for Regional Power Grids in China”, updated by the Chinese DNA on June 06, 2016

- (b) Simple adjusted OM; or
- (c) Dispatch data analysis OM; or
- (d) Average OM.

From 2009 to 2013, in the composition of gross annual power generation for CSPG, the ratio of power generated by hydro-power and other low cost/compulsory resources is as following: 39.23% in 2009, 40.58% in 2010, 40.73% in 2011, 39.42% in 2012 and 40.99% in 2013.

From 2009 to 2013, in the composition of gross annual power generation for CCPG, the ratio of power generated by hydro-power and other low cost/compulsory resources is as following: 42.92% in 2009, 43.39% in 2010, 43.75% in 2011, 43.90% in 2012 and 45.86% in 2013.

All of the data are obviously lower than 50%. Based on these considerations, the OM has been calculated according to the Simple OM is appropriate, because low cost/must run resources account for far less than 50% of the power generation in the CSPG and CCPG in most recent years.

The Simple OM method has been chosen instead. For simple OM, the emission factor can be calculated using either of the two following data vintages:

- Ex-ante option: A 3-year generation weighted average, based on the most recent data available at the time of submission of the CDM-PDD for validation, without requirement to monitor and recalculate the emissions factor during the crediting period, or
- Ex-post option: The year, in which the project activity displaces grid electricity, requiring the emission factor to be updated annually during the crediting period. The data, which require calculating the emission factor for year y, is usually only available later than six months after the end of year y.

The ex-ante option will be employed for OM calculation of the project.

Step 4. Calculate the operating margin emission factor according to the selected method

Simple OM

The simple OM emission factor is calculated as the generation-weighted average CO₂ emissions per unit net electricity generation (t CO₂/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

The simple OM may be calculated by one of the following two options:

- (a) **Option A:** Based on the net electricity generation and a CO₂ emission factor of each power unit; or

(b) **Option B:** Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Option B can only be used if:

- (a) The necessary data for Option A is not available; and
- (b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
- (c) Off-grid power plants are not included in the calculation (i.e. if Option I has been chosen in Step 2).

Since neither the data of fuel consumption nor the net electricity generation for every single electricity generation plant/unit is publicly available for CSPG and CCPG, nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known and Off-grid power plants are not included in the calculation, the proposed project uses Option B for simple OM calculation.

Option B: Calculation based on total fuel consumption and electricity generation of the system

Under this option, the simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost/must-run power plants/units, and based on the fuel type(s) and total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_y} \quad \text{Equation (3)}$$

Where

$EF_{grid,OMsimple,y}$	=	Simple operating margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$FC_{i,y}$	=	Amount of fuel type <i>i</i> consumed in the project electricity system in year y (mass or volume unit)
$NCV_{i,j}$	=	Net calorific value (energy content) of fuel type <i>i</i> in year y (GJ/mass or volume unit)
$EF_{CO2,i,y}$	=	CO ₂ emission factor of fuel type <i>i</i> in year y (t CO ₂ /GJ)

EG_y	=	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must-run power plants/units, in year y (MWh)
i	=	All fuel types combusted in power sources in the project electricity system in year y
y	=	The relevant year as per the data vintage chosen in Step 3

The Operating Margin emission factors for 2012, 2013 and 2014 are calculated separately and then the three- year average is calculated as a full-generation-weighted average of the emission factors.

The result of the Operation Margin Emission Factor of CCPG calculation is 0.9515 tCO₂e/MWh.

The result of the Operation Margin Emission Factor of CSPG calculation is 0.8959 tCO₂e/MWh.

The operating margin emission factor of the baseline is calculated as a fixed ex-ante value and will not be renewed within the second crediting period of the project activity.

Step 5: Calculate the build margin (BM) emission factor

In terms of vintage of data, project participants can choose between one of the following two options:

- (a) **Option 1** - For the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.
- (b) **Option 2** - For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period,

the build margin emissions factor shall be calculated ex ante, as described in Option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

The **Option 1** is chosen to calculate BM without requirement to monitor and recalculate the emissions factor during the crediting period.

The sample group of power units m used to calculate the build margin should be determined as per the following procedure, consistent with the data vintage selected above:

- (a) Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently ($SET_{5 \text{ units}}$) and determine their annual electricity generation ($AEG_{SET-5-units}$, in MWh);
- (b) Determine the annual electricity generation of the project electricity system; excluding power units registered as CDM project activities (AEG_{total} , in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20 per cent of AEG_{total} (if 20 per cent falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ($SET_{\geq 20 \text{ per cent}}$) and determine their annual electricity generation ($AEG_{SET-\geq 20 \text{ per cent}}$, in MWh);
- (c) From $SET_{5-units}$ and $SET_{\geq 20 \text{ per cent}}$ select the set of power units that comprises the larger annual electricity generation (SET_{sample}); Identify the date when the power units in SET_{sample} started to supply electricity to the grid. If none of the power units in SET_{sample} started to supply electricity to the grid more than 10 years ago, then use SET_{sample} to calculate the build margin.

The build margin emissions factor is the generation-weighted average emission factor (t CO₂/MWh) of all power units m during the most recent year y for which electricity generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad \text{Equation}$$

(4)

Where

- $EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (t CO₂/MWh)
- $EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)

$FE_{EL,m,y}$	=	CO ₂ emission factor of power unit m in year y (tCO ₂ /MWh)
m	=	Power units included in the build margin
y	=	Most recent historical year for which electricity generation data is available

As per the method of Chinese NDRC accepted by EB, since there is no way to separate the different generation technology capacities based on coal, oil or gas fuel etc from the generic term “thermal power” in the present energy statistics, the following calculation measures will be taken:

- Firstly, according to the energy statistical data of most recent one year, determine the ratio of CO₂ emissions produced by solid, liquid, and gas fuels consumption for power generation;
- Secondly, multiply this ratio by the respective emission factors based on commercially available best practice technology in terms of efficiency;
- Finally, this emission factor for thermal power is multiplied with the ratio of thermal power identified within the approximation for the latest 20% installed capacity addition to the grid. The result is the BM emission factor of the grid.

The calculation is conducted as follows:

Sub-step 1

Calculate the proportion of CO₂ emissions related to consumption of coal, oil and gas fuel used for power generation as compared to total CO₂ emissions from the total fossil fuel electricity generation (sum of CO₂ emissions from coal, oil and gas).

$$I_{Coal,y} = \frac{\sum_{i,j} F_{i,j,y} \cdot NCV_{i,y} \cdot EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \cdot NCV_{i,y} \cdot EF_{CO_2,i,j,y}} \quad \text{Equation (5)}$$

$$I_{Oil,y} = \frac{\sum_{i,j} F_{i,j,y} \cdot NCV_{i,y} \cdot EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \cdot NCV_{i,y} \cdot EF_{CO_2,i,j,y}} \quad \text{Equation (6)}$$

$$I_{Gas,y} = \frac{\sum_{i,j} F_{i,j,y} \cdot NCV_{i,y} \cdot EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \cdot NCV_{i,y} \cdot EF_{CO_2,i,j,y}} \quad \text{Equation (7)}$$

Where

$F_{i,j,y}$ is the amount of fuel (in a mass or volume unit, tonnes for solid and liquid fuels, m³ for gas fuels) consumed by power sources j in year(s) y;

$NCV_{i,y}$ is the Net calorific value (energy content) of fossil fuel type i in year y (GJ/t for solid and liquid fuels, GJ/m³ for gas fuels);

$EF_{CO_2,i,j,y}$ is the emission coefficient of fuel (tCO₂/GJ).

Coal, Oil and Gas stands for solid, liquid and gas fuels respectively.

Sub-step 2: Calculate the operating margin emission factor of fuel-based generation.

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} \quad \text{Equation (8)}$$

Where

are the emission factors of coal, oil and gas-fired power generation with efficiency levels of the best commercially available technology in China in the previous three years.

The calculation formula is shown as below:

$$EF_{Fuel,Adv,y} = \frac{3.6}{10,000} \times \frac{\text{Efficiency of Power Supply (\%)}}{10,000} \times \text{Fuel Emission Factor} \times \text{Oxidation Rate} \quad \text{Equation (9)}$$

Sub-step 3: Calculate the Build Margin emission factor

$$EF_{grid,BM,y} = \frac{CAP_{Thermal,y}}{CAP_{Total,y}} \times EF_{Thermal,y} \quad \text{Equation (10)}$$

Where

$CAP_{Total,y}$ is total capacity additions (MW)

$CAP_{Thermal,y}$ is capacity addition of thermal power (MW)

As mentioned above, the build margin emission factor of the baseline is calculated as a fixed ex-ante value and will not be renewed within the first crediting period.

The Build Margin emission factor of CCPG is 0.3500 t CO₂/MWh

The Build Margin emission factor of CSPG is 0.3648 t CO₂/MWh

Step 6: Calculate the combined margin emissions factor

The Baseline Emission Factor is calculated as a Combined Margin, using the weighted average of the Operating Margin and Build Margin.

$$EF_{grid,CM,y} = w_{OM} \times EF_{grid,OM,y} + w_{BM} \times EF_{grid,BM,y} \quad \text{Equation (11)}$$

Where

$EF_{grid,BM,y}$	Build margin CO ₂ emission factor in year y (tCO ₂ e/MWh);
$EF_{grid,OM,y}$	Operating margin CO ₂ emission factor in year y (tCO ₂ e/MWh);
w_{OM}	Weighting of the operating margin emission factor (%);
w_{BM}	Weighting of build margin emission factor (%);

The defaults weights value for hydropower projects are used as specified in “ Tool to calculate the emission factor for an electricity system” ($w_{OM} = 0.25$ and $w_{BM} = 0.75$ for the second crediting period.)

The Combined Margin emission factor of CCPG is 0.5003 t CO₂e/MWh.

The Combined Margin emission factor of CSPG is 0.4975 t CO₂e/MWh.

3.2 Project Emissions

According to Methodology, the project emissions shall be calculated by the following equation:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y} \quad \text{(Equation 12)}$$

Where:

PE_y	=	Project emissions in year y (tCO ₂ e/yr);
$PE_{FF,y}$	=	Project emissions from fossil fuel consumption in year y (tCO ₂ /yr);
$PE_{GP,y}$	=	Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO ₂ e/yr);
$PE_{HP,y}$	=	Project emissions from water reservoirs of hydro power plants in year y (tCO ₂ e/yr);

The project does not involve the fossil fuel consumption and geothermal power, so $PE_{FF,y}=0$, $PE_{GP,y}=0$. For hydro power project activities that result in new reservoirs and hydro power project activities that result in the increase of existing reservoirs, project

proponents shall account for project emissions, estimated as follows:

- a) If the power density (PD) of power plant is greater than 4 W/m^2 and less than or equal to 10 W/m^2 :

$$PE_{HP,y} = \frac{EF_{Res} \cdot TEG_y}{1000} \quad (\text{Equation 13})$$

Where:

$PE_{HP,y}$	=	Project emissions from water reservoirs (tCO ₂ e/yr);
EF_{Res}	=	Default emission factor for emissions from reservoirs, and the default value as per EB23 is 90 kg CO ₂ e/MWh;
TEG_y	=	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y (MWh);

- b) If the power density (PD) of the power plant is greater than 10 W/m^2

$$PE_{HP,y}=0 \quad (\text{Equation 14})$$

The PD of the project activity is calculated as follows:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}} \quad (\text{Equation 15})$$

Where:

PD	=	Power density of the project activity (W/m^2);
Cap_{PJ}	=	Installed capacity of the hydro power plant after the implementation of the project activity (W);
Cap_{BL}	=	Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plants, this value is zero;
A_{PJ}	=	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2);
A_{BL}	=	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero;

There are only two hydropower plants under the grouped project having reservoirs (74_Puti 1 and 75_Puti 2), and the power densities of the two individual components are shown to be 18 W/m² and 59 W/m².⁶ The other projects do not involve the reservoir, so $PE_{HP,y}=0$.

3.3 Leakage

No leakage emissions are considered.

3.4 Net GHG Emission Reductions and Removals

Project emission

$$PE_y=0 \text{ tCO}_2\text{e}$$

Baseline emission

According to section B.6.1, in second crediting period, the baseline emission factor of the CCPG:

$$EF_{CO_2,grid,y} = EF_{grid,CM,y} = w_{OM} \times EF_{grid,OM,y} + w_{BM} \times EF_{grid,BM,y} = 0.5003 \text{ tCO}_2\text{e/MWh}.$$

The baseline emission factor of the CSPG:

$$EF_{CO_2,grid,y} = EF_{grid,CM,y} = w_{OM} \times EF_{grid,OM,y} + w_{BM} \times EF_{grid,BM,y} = 0.4975 \text{ tCO}_2\text{e/MWh}.$$

Baseline scenario for China Central Power Grid

$$BE_y = EG_{PJ,y} \times EF_{CO_2,grid,y} = 442,169 \text{ MWh} \times 0.5003 \text{ tCO}_2\text{e/MWh} = 221,216 \text{ tCO}_2\text{e/year}$$

Baseline scenario for China Southern Power Grid

$$BE_y = EG_{PJ,y} \times EF_{CO_2,grid,y} = 365,596 \text{ MWh} \times 0.4975 \text{ tCO}_2\text{e/MWh} = 181,884 \text{ tCO}_2\text{e/year}$$

The total Baseline scenario emissions for the Grouped Project amounts therefore to 403,101 tCO₂e/year once all individual projects are constructed and operating.

Project leakage

No leakage emissions are considered.

Emission reductions

$$ER_y = BE_y - PE_y - L_y = 403,101 - 0 - 0 = 403,101 \text{ tCO}_2\text{e}$$

⁶ 74_Puti 1 and 75_Puti 2 plants are newly built hydropower plant, hence A_{BL} and Cap_{BL} of this two plants are zero. The A_{PJ} of these two plants are 0.334km² and 0.161 km² respectively. The Cap_{BL} of these two projects are 6MW and 9.5 MW. Therefore, the PD of 74_Puti 1 plant is $18\text{W/m}^2 = (6-0) \times 10^6 / (0.334-0) \times 10^6$, the PD of 75_Puti 2 plant is $59\text{W/m}^2 = (9.5-0) \times 10^6 / (0.161-0) \times 10^6$.

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
28/03/2016-27/03/2017	403,101	0	0	403,101 ⁷
28/03/2017-27/03/2018	403,101	0	0	403,101
28/03/2018-27/03/2019	403,101	0	0	403,101
28/03/2019-27/03/2020	403,101	0	0	403,101
28/03/2020-27/03/2021	403,101	0	0	403,101
28/03/2021-27/03/2022	403,101	0	0	403,101
28/03/2022-27/03/2023	402,271 ⁸	0	0	402,271
28/03/2023-27/03/2024	361,965	0	0	361,965
28/03/2024-27/03/2025	291,634	0	0	291,634
28/03/2025-27/03/2026	222,519	0	0	222,519
Total	3,696,995	0	0	3,696,995

4 MONITORING

4.1 Data and Parameters Available at Validation

Data / Parameter	$EG_{m,y}$
Data unit	MWh
Description	Electricity delivered to the grid by relevant power sources m in (years) y
Source of data	China Electric Power Yearbook

⁷ $ER_y = BE_y - PE_y - L_y$

⁸ Some plant in this and the following years are came to the end of their lifetime and the BE_y after that are not calculation for conservation.

Value applied:	Provided in Appendix 1
Justification of choice of data or description of measurement methods and procedures applied	Officially released statistics; publicly accessible and reliable data source
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	$FC_{i,m,y}$
Data unit	$10^4\text{t}/10^8\text{m}^3$
Description	Amount of fuel i consumed by relevant power sources m in (years) y
Source of data	China Energy Statistics Yearbook
Value applied:	Provided in Appendix 1
Justification of choice of data or description of measurement methods and procedures applied	Officially released statistics; publicly accessible and reliable data source
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	$EF_{CO_2,i}$
Data unit	tCO_2/TJ
Description	CO_2 emission factor per energy unit of fuel i
Source of data	Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	Provided in Appendix 1
Justification of choice of data or description of measurement methods and procedures applied	IPCC 2006 default value
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	NCV_i
Data unit	$\text{TJ}/10^3 \text{ t}$
Description	Net calorific value per mass or volume unit of fuel i
Source of data	Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Value applied:	Provided in Appendix 1
Justification of choice of data or description of measurement methods and procedures applied	Officially released statistics; publicly accessible and reliable data source
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	Efficiency level of best technology commercially available in China for coal-fired power generation
Data unit	%
Description	Efficiency level of best technology commercially available in China for coal-fired power generation
Source of data	China DNA: Notification on Determining the Regional Grid Emission Factors of China
Value applied:	Provided in Appendix 1
Justification of choice of data or description of measurement methods and procedures applied	Officially released statistics; publicly accessible and reliable data source
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	Efficiency level of best technology commercially available in China for oil and gas-fired power generation
Data unit	%
Description	Efficiency level of best technology commercially available in China for oil and gas-fired power generation
Source of data	China DNA: Notification on Determining the Regional Grid Emission Factors of China
Value applied:	Provided in Appendix 1
Justification of choice of data or description of measurement methods and procedures applied	Officially released statistics; publicly accessible and reliable data source
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	CAP _{y,j}
Data unit	MW
Description	The Installed Capacity of Power Sources j of Province m in the year y

Source of data	China Electric Power Yearbook
Value applied:	Provided in Appendix 1
Justification of choice of data or description of measurement methods and procedures applied	Officially released statistics; publicly accessible and reliable data source
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	Cap _{BL}
Data unit	MW
Description	Installed capacity of the hydro power plant before the implementation of the project activity. For new hydro power plants, this value is zero
Source of data	Project site
Value applied:	0
Justification of choice of data or description of measurement methods and procedures applied	For new hydro power plants, the value is zero.
Purpose of Data	Calculation of project emissions
Comments	-

Data / Parameter	A _{BL}
Data unit	m ²
Description	Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full. For new reservoirs, this value is zero.
Source of data	Project site
Value applied:	0
Justification of choice of data or description of measurement methods and procedures applied	For new reservoirs, the value is zero.
Purpose of Data	Calculation of project emissions
Comments	-

4.2 Data and Parameters Monitored

Data and parameters monitored for individual project activities exporting electricity to Central China Power Grid:

Data / Parameter	EG _{PJ,y}
Data unit	MWh/y
Description	The accumulated net electricity exported to the Central China Power Grid by all the hydropower plants under the Grouped project located in Chongqing City and Sichuan Province in the year y
Source of data	Measured by meters
Description of measurement methods and procedures to be applied	Measured continuously by kilowatt-hours meters and recorded on a monthly basis by monitoring personnel. All data collected as part of monitoring should be archived electronically and be kept at least for 2 years after the end of the crediting period.
Frequency of monitoring/recording	Measured continuously and recorded on a monthly basis
Value applied:	The electricity exported to the CCPG by the Grouped project is expected to be 450,914 MWh ⁹ .
Monitoring equipment	The detailed information including type, accuracy class, serial number of the monitoring equipment is provided in section 4.3
QA/QC procedures to be applied	- The exported electricity to the grid is measured by kilowatt-hours meters (Gateway meters), which are installed on the property rights division points, and are appointed by the Power Purchase Agreements - Trained and qualified staff is responsible for recording electricity export data from the kilowatt meters - Meters will be calibrated periodically according to relevant national standards - The data measured by meters will be crosschecked with electricity receipts, which is used as the basis of calculating electricity sales income. Considering possible limitations and errors in accounting or payment conversion, the more conservative amount shall be used, if there is a difference. - Only the net electricity exported to the grid shall be taken into account. This means the monitoring measurement method shall exclude the electricity imported by the project activity. - The net electricity exported will be verified by electricity receipts. - Calibration of the gateway meter (owned by the grid company) will be performed by a qualified entity in regular intervals.
Purpose of the data	Calculation of baseline emissions
Calculation method	Only the net electricity export to the grid shall be taken into account. This means that the monitoring measurement method shall exclude electricity imported from the grid by the project activity and possible transmission losses.
Comments	-

⁹It is the estimated annual electricity exported to CCPG when all turbines put into operation.

Data and parameters monitored for individual project activities exporting electricity to China Southern Power Grid:

Data / Parameter	$EG_{PJ,y}$
Data unit	MWh/y
Description	The accumulated net electricity exported to the China Southern Power Grid by all the hydropower plants under the Grouped project located in Yunnan and Guizhou Provinces in the year y
Source of data	Measured by meters
Description of measurement methods and procedures to be applied	Measured continuously by kilowatt-hours meters and recorded on a monthly basis by monitoring personnel. All data collected as part of monitoring should be archived electronically and be kept at least for 2 years after the end of the crediting period.
Frequency of monitoring/recording	Measured continuously and recorded on a monthly basis
Value applied:	The electricity exported to the CSPG by the Grouped project is 356,851 ¹⁰ MWh during this monitoring period.
Monitoring equipment	The detailed information including type, accuracy class, serial number of the monitoring equipment is provided in in section 4.3.
QA/QC procedures to be applied	- The exported electricity to the grid is measured by kilowatt-hours meters (Gateway meters), which are installed on the property rights division points, and are appointed by the Power Purchase Agreements - Trained and qualified staff is responsible for recording electricity export data from the kilowatt meters - Meters will be calibrated periodically according to relevant national standards - The data measured by meters will be crosschecked with electricity receipts, which is used as the basis of calculating electricity sales income. Considering possible limitations and errors in accounting or payment conversion, the more conservative amount shall be used, if there is a difference. - Only the net electricity exported to the grid shall be taken into account. This means the monitoring measurement method shall exclude the electricity imported by the project activity. - The net electricity exported will be verified by electricity receipts. - Calibration of the gateway meter (owned by the grid company) will be performed by a qualified entity in regular intervals.
Purpose of the data	Calculation of baseline emissions

¹⁰ It is the estimated annual electricity exported to CSPG when all turbines put into operation.

Calculation method	Only the net electricity export to the grid shall be taken into account. This means that the monitoring measurement method shall exclude electricity imported from the grid by the project activity and possible transmission losses.
Comments	-

Data / Parameter	Cap _{PJ}
Data unit	MW
Description	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data	Project site
Description of measurement methods and procedures to be applied	Determine the installed capacity based on manufacturer's specifications or commissioning data or recognized standards.
Frequency of monitoring/recording	Once at the beginning of each crediting period. All data collected as part of monitoring should be archived electronically and be kept at least for 2 years after the end of the crediting period.
Value applied:	There are only two hydropower plants under the grouped project having reservoirs ((74_Puti 1 and 75_Puti 2). The value of Guizhou Province Xingyi City Puti Hydropower Plant Technical Reform Project (No.74) is 6 MW. The value of Guizhou Province Xingyi City Puti 2nd Stage (Xiniutang) Hydropower Plant Technical Reform Project is 9.5 MW.
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of the data	To calculate the Project Emission
Calculation method	-
Comments	-

Data / Parameter	A _{PJ}
Data unit	m ²
Description	Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Source of data	Project site
Description of measurement methods and procedures to be applied	Measured from topographical surveys, maps, satellite pictures, etc.

Frequency of monitoring/recording	Once at the beginning of each crediting period. All data collected as part of monitoring should be archived electronically and be kept at least for 2 years after the end of the crediting period.
Value applied:	There are only two hydropower plants under the grouped project having reservoirs ((74_Puti 1 and 75_Puti 2). The value of Guizhou Province Xingyi City Puti Hydropower Plant Technical Reform Project (No.74) is 0.334 km ² . The value of Guizhou Province Xingyi City Puti 2nd Stage (Xiniutang) Hydropower Plant Technical Reform Project is 0.161 km ² .
Monitoring equipment	–
QA/QC procedures to be applied	–
Purpose of the data	To calculate the Project Emission
Calculation method	–
Comments	–

4.3 Monitoring Plan

The objective of the monitoring plan is to ensure the complete, consistent, clear, and accurate monitoring and calculation of the emissions reductions during the whole crediting period. The project owner is mainly responsible for the implementation of the monitoring plan, and the Grid Company will cooperate with the project owner.

1. Monitoring Objective

The main monitoring data are electricity supplied to the grid and power supplied to the grouped projects from the grid because the baseline emission factor is fixed by ex-ante calculation. Further, A_{PJ} and Cap_{PJ} will be monitored during the second monitoring period.

2. Monitoring Organizational

The central GHG information system is based on a clear organization structure integrating functional units: projects owners, Intermediary companies, South Pole's China teams and our Global Quality Control and Technical Support Team. South Pole's Beijing implementation team, which will allocate four project managers to the Grouped Project, is responsible for assessment of all relevant data and documents for the GHG information system and compilation of the Monitoring Report. Beijing senior VER experts undertake the initial quality check of the Monitoring Report compiled by the implementation team. VER experts are specialised in the VER methodology and also have local hydro electricity industry sector knowledge for a better assessment of the documents.

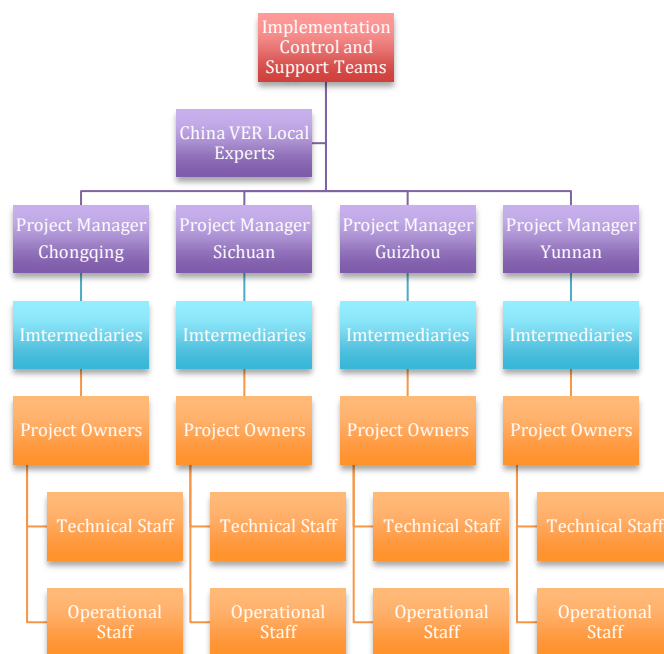


Figure 5-1 Monitoring Organizational Structure

3. Project Monitoring Management Approach

South Pole brings a successful track record and a wealth of experience in the development of CDM methodologies, project and programme activities under CDM and the VCS. Team members include experienced local and international experts. Given the novelty of the Grouped Project approach, South Pole is putting together a team comprising senior experts with deep methodological and programme experience.

South Pole's internal quality check procedure follows strict and efficient practices in order to ensure that all deliverables meet its high quality standards. To this end it deploys the 'RACI' approach, which splits responsibilities for project management into four categories, as illustrated in Figure 3-2:

1. *Responsible (R)* – The team members who carry out the analyses and writing required to complete the task. In other words, who do the work to achieve the task
2. *Accountable (A)* – The team member who is accountable for the completion of the task. Accountable must sign off (Approve) on work that Responsible provides.
3. *Consulted (C)* – South Pole colleagues who are consulted during the completion of the tasks(two-way communication).
4. *Informed (I)* – South Pole colleagues who are kept up-to-date on progress (one-way communication) and should be notified of result.

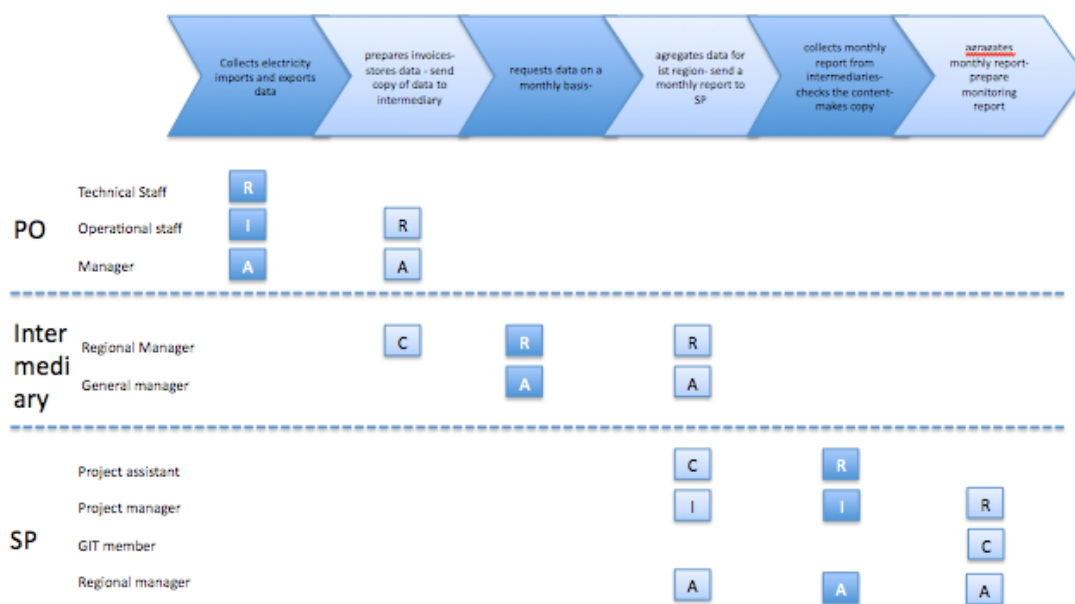


Figure 5-2 Quality assurance process in project management at South Pole

To explain the graph more explicitly:

At the PO level, the monitoring team is responsible for gathering the data of the electricity generation daily and monthly from the electrical meters and also for sending the recorded electricity generation data to intermediaries. The following are the work break down for this monitoring process.

Responsible (Action 1, Operational staff): who do the electricity generation recording and collect electricity imports of the hydro power station

(Action 2, Operational staff): who are also responsible to keep copies of electricity generation monitoring data and also send them to the intermediaries between us.

Informed (Technical staff): operational staff of hydro power station who are kept up-to-date on electricity generation recording

Consulted (Manager): suggestions and opinions can be asked by both technical staffs and operational staffs regarding electricity generation monitoring.

Accountable (Action 1, Manager): the manager of the monitoring power station needs to approve the accuracy of the electricity generation monitoring results.

(Action 2, manager): the manager of the monitoring power station needs to make sure the accuracy of data transferring process between its organisation and the intermediate.

At the intermediary level, intermediaries from the four project provinces are responsible for gathering EG data monthly from all the project owners and collaborate between SP and POs to ensure the quality of each steps of monitoring process.

Responsible (Action 1, regional manager of intermediaries), who need to request data from POs contracted with their organisation.

(Action 2, regional manager of intermediaries), who need to aggregate EG data and send these to the South Pole.

Accountable (Action 1&2, general manager of intermediaries), who are accountable and responsible for the action the regional manager delivers, i.e. action 1: request data from the POs and action 2: aggregate EG data and send these data to South Pole.

At South Pole level, the involvement of different level of organisation is there to make sure that the central information system is well-functioned. The following demonstrates the actions that South Pole's internal organisation delivered subjects to the RACI model.

1. interaction between intermediaries:

Consulted (Action 1, assistant project manager) Assistant project managers consult the intermediaries for the EG aggregation and make sure the aggregation is delivered subjects to relevant guidances and are eligible under VSC standard. Assistant project managers need to cross check with aggregation data that the intermediaries provided.

Informed (Action 2, local VER expert) Assistant project manager should inform the local VER experts the outcomes of the consultation with the intermediaries and any other communications regarding the grouped monitoring process.

Accountable (Action 1, regional manager) Regional manager are accountable for the above mentioned actions that assistant project managers and local VER experts deliver regarding the monitoring process.

2. monitoring process during internal at South Pole

Responsible (Action 1, assistant project managers) who are responsible for collecting monthly reports from intermediaries and make copies

Informed (Action 2, local VER expert) Assistant project manager should inform the local VER experts the outcomes of EG data collection from intermediaries

Accountable (Action 1, regional manager) Regional manager are accountable for the above mentioned actions which assistant project managers and local VER experts deliver regarding the monitoring process.

Consulted (Action 2, ICS member), South Pole's ICS members provides their opinions and suggestions for the monitoring report

4. Monitoring Roles and Responsibilities

The project proponents are involved for collecting the monitoring information, operation and maintenances. The structure is given below identifying job description for each parties involved.



Figure 5-3 The detailed information of the roles and responsibilities

5. Monitoring Procedures

The monitoring procedures is summarized in the table below:

Table 3-1 Selection and management of the GHG data and information;

Parameter	Source of data	Data	Management	Remark
EG (kWh)	Electronic measurement and monitored by Gateway meter	Local grid company Monthly Electricity Generation bill Electricity generation record/report/statement/produce by Project owner on the site project	The proper calibration of electronic meter is maintained by certified calibration entity and the O&M operator.	The electronic meter used for electricity generation measurement at substation are kept in custody, sealed, maintained by state electricity utility.

Table 3-2 Processes for collecting, processing, consolidating and reporting GHG data and information

Data collection	Data processing	Data consolidation	Reporting GHG data	Information
The EG is jointly recorded by POs authority and electricity utilities every month	Onsite staff take record of the EG on a daily basis. Daily data are aggregated before the settlement with grid company. The EG by each project is process for issuing Electricity generation bill	Local grid company monthly bills or the EG records/reports are considered for GHG reduction calculation.	The monthly electricity generation bill, electricity or/and generation records/reports/statements are considered for reporting the GHG data	The measured electricity generated will be cross check with records (i.e. invoice) for sold electricity.

6. Site level monitoring guidance

The grid company and the project owners are responsible for operation and maintenance of their respective electricity meters. All parties guarantee that the measuring equipments are in good condition and completely sealed.

- (i) The project owner reads and checks the electricity meter and records the data periodically as a primary record of the amount of the electricity supplied to the grid;
- (ii) The project owner compiles the data recorded for the amount of electricity supplied to the grid in a monthly report and provides the monthly status sheet of electricity sales to the grid company;
- (iii) The grid company confirms the amount of exported electricity after verification and acceptance of the electricity data supplied by the project owner;

- (iv) The project owner provides an electricity sales invoice to the grid company according to the actual amount of electricity delivery reflected in the grid company's confirmation. A copy of the invoice is kept by the project owner;
- (v) The project owner keeps also copies of the status sheet of electricity sales to the grid company. The periodical records of the electricity meter's measurements are archived on paper.

If either the project owner or the grid company detects any distortion or mal-function of the electricity meter, it promptly informs the other party to jointly investigate and solve the problem.

If for some projects, either the project owner or the grid company detects any distortion or mal-function of the electricity meter, a conservative discount factor on the emission reductions from the projects shall be applied.

The meter reading will be readily accessible for the Designated Operational Entity (DOE) carrying out the verification of monitoring data. The project owner will keep the calibration test records for verification.

7. Monitoring Equipment and program

According to Technical Administrative Code of Electric Energy Metering (DL/T448-2000), the electric energy metering equipment is properly configured, and is checked by the project owner and the grid company before the project is put into operation.

The electric energy metering equipments comprise an electric energy meter (or kilowatt meter) and other electric energy metering devices. The amount of electricity exported to and imported from the power grid is measured by the electric energy meter. The electric energy meter is installed at the physical metric point determined by both of the project owner and the grid company according to the electricity sales/purchase contract. The monitoring plan will utilize the measurement, which is used in the balance sheet of the grid company and is measured by the meter set up by the grid company.

The detailed information of the monitoring meters for each Grouped Project (i.e. accuracy, installation position) are demonstrated as followed.

Table 3-3 The detailed information of the monitoring meters for each Grouped Project

Project No.	Project Title	Accuracy of the gateway meter	Position of the gateway meter	Substation
1	Zengfuyoujiang Hydroelectric Plant	1	On the main transformer in the hydropower plant	10kV-Xinmiao 35kv substation-Chongqing grid-grid,400V-10KV
2	Jianshitan Hydroelectric Plant	1	On the main transformer in	10kV-Nanchuan Chengjiao 35kv substation-

			the hydropower plant	Chongqing grid-grid,400V-10KV
3	Jinxing Hydroelectric Plant	0.2	Substation	10kV-Runxi 35kv substation-Pengshui grid-grid,400V-10KV
4	Huzhong Hydroelectric Plant	0.2	Substation	10kV-Shangtang 35kv substation-Pengshui grid-grid,6.3KV-35KV
5	Chongqing Wanzhou Fengmu Hydroelectric Plant	0.5s	On the transformer in substation	The electricity round voltage is 0.4kv,the voltage step-up into 10kV and then transmitted to Baitu 35kv substation, finally the electricity fed into CCPG via Chongqing power grid.
6	Chongqing Wanzhou Longdong Hydroelectric Plant	0.5s	On the transformer in substation	The electricity round voltage is 0.4kv,the voltage step-up into 10kV and then transmitted to Baitu 35kv substation, finally the electricity fed into CCPG via Chongqing power grid.
7	Chongqing Wanzhou Dengta Hydroelectric Plant	0.5s	On the transformer in substation	The electricity round voltage is 0.4kv,the voltage step-up into 10kV and then transmitted to Xinxiang 35kv substation, finally the electricity fed into CCPG via Chongqing power grid.
9	Chongqing Wanzhou Xiaolong Hydroelectric Plant	0.5s	On the transformer in substation	The electricity round voltage is 0.4kv,the voltage step-up into 10kV and then transmitted to Baitu 35kv substation, finally the electricity fed into CCPG via Chongqing power grid.
10	Chongqing Wanzhou Yihe Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	The electricity round voltage is 0.4kv,the voltage step-up into 10kV and then transmitted to Xiaopei 35kv substation, finally the electricity fed into CCPG via Chongqing power grid.
11	Chongqing Wanzhou Tiande Hydroelectric Plant	1.0	On the main transformer in the hydropower plant	The electricity round voltage is 0.4kv,the voltage step-up into 10kV and then transmitted to Xiaopei 35kv substation, finally the electricity fed into CCPG via Chongqing power grid.
12	Chongqing Wanzhou Puziling Hydroelectric Plant	0.5s	On the transformer in substation	The electricity round voltage is 0.4kv,the voltage step-up into 10kV and then

				transmitted to Longju 35kv substation, finally the electricity fed into CCPG via Chongqing power grid.
13	Chongqing Wanzhou Yanshan Hydroelectric Plant	0.5	On the transformer in substation	The electricity round voltage is 0.4kv,the voltage step-up into 10kV and then transmitted to Longju 35kv substation, finally the electricity fed into CCPG via Chongqing power grid.
15	Chongqing Wanzhou Wanlin Hydroelectric Plant	1.0	On the transformer in substation	The electricity round voltage is 0.4kv,the voltage step-up into 10kV and transmitted to Baitu 35kv substation then to the 35kv Fenshui substation, and finally the electricity fed into CCPG.
18	Chongqing Wanzhou Yanjingxi Hydroelectric Plant	0.5s	On the transformer in substation	The electricity round voltage is 0.4kv,the voltage step-up into 10kV and then transmitted to Baitu 35kv substation, finally the electricity fed into CCPG via Chongqing power grid.
21	Chongqing Wanzhou Xianfeng Hydroelectric Plant	1.0	On the transformer in substation	6.3KV-main substation-35KV-Longju power station-local grid-grid
22	Heba Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Yangjiao substation-Wulong grid-grid,400V-10KV
23	Sandaoguai Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Yajiangdaqiao substation-Wulong grid-grid,380V-10KV
24	Beiya Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Yangjiao substation-Wulong grid-grid,400V-10KV
25	Wulong Guanqiao Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	10kV-Xiannvshan substation-Wulong grid-grid,400V-10KV
27	Qingtongxi Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Baima substation-Wulong grid-grid,400V-10KV

28	Heping Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Yangjiao substation-Wulong grid-grid,400V-10KV
29	Guanziya Hydroelectric Plant	0.5	Booster station of Baiguo power station	10kV-Baiguo power station-Chengguan substation-Wulong grid-grid,400V-10KV
30	Baiyangping Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Zhongbaowan substation-Fuling grid-grid,400V-10KV
31	Chengmending Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Yangjiao substation-Wulong grid-grid,400V-10KV
32	Shuanglong Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	10kV-Zhongbaowan substation-Fuling grid-grid,380V-10KV
33	Chushuitang Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	10kV-Tongzi substation-Wulong grid-grid,400V-10KV
34	Shuangqiao Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	10kV-Tongzi substation-Wulong grid-grid,400V-10KV
35	Shiqiao Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	10kV-Jiangkou substation-Wulong grid-grid,400V-10KV
36	Shuanglian Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	10kV-Tongzi substation-Wulong grid-grid,400V-10KV
37	Baijia Hydroelectric Plant	0.5	Substation	10kV-MUzonghe stage 3 substation-Wulong grid-grid,400V-10KV
38	Xinqiao Hydroelectric Plant	0.5	Substation	10kV-Tongzi substation-Wulong grid-grid,400V-10KV
39	Luchi Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	10kV-Zhongbaowan substation-Fuling grid-grid,400V-10KV)
40	Xiangyang Stage III Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Huolu substation-Wulong grid-grid,400V-10KV 35kv

41	Xiangyun Hydroelectric Plant	0.5	Telegraph pole outside of the Booster station	10kV-Yangjiao substation-Wulong grid,400V-10KV	35kv grid-
42	Hongshan Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Tongzi substation-Wulong grid,400V-10KV	35kv grid-
44	Yong'an Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	10kV-Yangjiao substation-Wulong grid,400V-10KV	35kv grid-
45	Suokousi Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	10kV-Tukan substation-Fuling grid-grid,400V-10KV	
46	Xinli Hydroelectric Plant	0.2	Muzonghe Stage 4 hydropower plant main transformer	10kV-Muzonghe substation-Wulong grid,400V-10KV	110kv grid-
47	Caijiagou Stage III Hydroelectric Plant	0.5	Zhongli Power station Booster station	10kV-Zhongli substation-Fuling grid-grid,400V-10KV	
48	Xiangyang Stage I Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10KV-Huolu35KV substation —Wulong grid — grid, 400V-10KV	
49	Cheqingyan Hydroelectric Plant	0.2	Dongshan Heng 14# telegraph pole	10kV-Changba substation-Wulong grid-grid,400V-10KV	
50	Lianghekou Hydroelectric Plant	0.2	Substation	10kV-Zhongbaowan substation-Fuling grid-grid, 400V-10KV	
51	Wuhe Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Jiguang substation-Wulong grid-grid, 400V-10KV	
52	Sihe Hydroelectric Plant		Switch station of Yancanghe stage 1 power station	10KV-switch station of Yancanghe stage 1-Tongzi 35KV substation-Wuling grid-grid,400V-10KV	
53	Shilingyan Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	10KV-Pingqiao substation —Fuling grid — grid, 400V-10KV.	
54	Nanmu Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Tongzi substation-Wulong grid-grid,400V-10KV	
55	Canglong Hydroelectric Plant		On the main transformer in the	10kV-Huangyingxiang substation	35kv

			hydropower plant	
56	Daheba Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	10kV – Chenghuang 35kv substation – Wulong grid – grid , 400V-10KV)
57	Heixigou Hydroelectric Plant	0.5s	On the main transformer in the hydropower plant	6.3KV-Muzonghe stage 3-110KV-grid
58	Yanchanghe Stage III Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Tongzi substation – Wulong grid – grid, 400V-10KV
59	Muzonghe Stage IV Hydroelectric Plant	0.5s	On the main transformer in the hydropower plant	400v-10KV
60	Dengta Hydroelectric Plant	0.2	Substation	10KV-Zhongli power station-Tukan substation – Fuling grid-grid ,400V-10KV
61	Banqiao Stage II Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	10KV-Chenghuang substation 35KV – Wulong grid – grid, 400V-10KV
62	Shuangchahe Hydroelectric Plant	0.2	Substation	10kV-Zhongbaowan substation – Fuling grid – grid, 400V-10KV
63	Songshigou Hydroelectric Plant	2	On the main transformer in the hydropower plant	0.4KV-booster station-10KV-Tukan power station-Chuandong grid - grid
65	Shujiahe Hydroelectric Plant	0.2	Substation	1 、 10kV-Chengguan substation-Wulong grid - grid ; 6.3KV-10KV
66	Yangyan Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	6.3KV-Yajingdaqiao substation – Fuling grid – grid, voltage change from 6.3KV to 35KV
67	Baiguo Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	0.4KV-booster station of the power station and T connect to Wulong grid - grid
68	Longqiao Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	0.4KV-booster station-10KV-T connect to Xinmin stage 2 power station-grid

69	Baiyang Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	0.4KV-booster station-Chengguan substation-grid
70	Xinmin Tailwater Stage II Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10KV-Luolong substation – Fuling grid – grid and voltage change from 400V to 10KV
71	Dongliuhe Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10KV-Huangying substation – Wulong grid – grid voltage change from 400V to 10KV
72	Dahegou Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	Stage1, 10kv-Stage 2-Nanchuan grid Stage2, 10kv-Nanchuan grid-Chongqing grid
73	Xinmin Stage II Hydroelectric Plant	0.2	Substation	35KV-Tukan substation – Fuling grid – grid, voltage change from 6.3KV into 35KV when pass Booster station
74	Guizhou Province Xingyi City Puti Hydropower Plant Technical Reform Project	0.5s	On the transformer in substation	35KV-Wusha substation – city grid – southern grid, voltage is lowered down when pass Booster station
75	Guizhou Province Xingyi City Puti 2nd Stage (Xiniutang) Hydropower Plant Technical Reform Project	0.2s	On the transformer in substation	35KV-Wusha substation – city grid – southern grid, voltage is lowered down when pass Booster station
76	Wumaxi Stage I Hydroelectric Plant	2	On the main transformer in the hydropower plant	The power is transmitted to Ya'an grid via Sanhe substation through 10kv line finally to the grid, and the voltage changes from 10KV into 35KV when pass through the substation.
77	Mozigou Hydroelectric Plant	1	On the main transformer in the hydropower plant	The power is transmitted to Ya'an grid via Sanhe substation through 35kv line finally to the grid, and the voltage changes from 35KV into 110KV.
78	Mayihe Hydroelectric Plant	1	On the main transformer in the hydropower plant	The power is transmitted to Ya'an grid via Xinmiao substation through 35kv line finally to the grid, and the voltage changes from 35KV into 110KV.
79	Jinyatan Hydroelectric Plant	2	On the main transformer in the	The power is transmitted to Ya'an grid via Xingfu substation through 35kv line finally to the grid, and

			hydropower plant	the voltage changes from 35KV into 110KV.
80	Toudaoshui Hydroelectric Station	1	On the main transformer in the hydropower plant	The power is transmitted to Ya'an grid via Xinmiao substation through 35kv line finally to the grid, and the voltage changes from 35KV into 110KV.
81	Sanhui Hydroelectric Plant	Sanhui 1 Sanhuiwe i 2	On the main transformer in the hydropower plant	The power is transmitted to Ya'an grid via Sanhe substation through 35kv line finally to the grid, and the voltage changes from 35KV into 110KV.
82	Qingshuihe Stage I Hydroelectric Plant	2	On the main transformer in the hydropower plant	The power is transmitted to Ya'an grid via Gangshang substation through 35kv line finally to the grid, and the voltage changes from 35KV into 110KV.
83	Gongjiagou Hydroelectric Plant	1	On the main transformer in the hydropower plant	The power is transmitted to Tangjiagou substation via 35kv line finally to the grid through the Tangli line of 110kv, and the voltage changes from 35KV into 110KV
84	Chahe Stage III Hydroelectric Plant	1	On the main transformer in the hydropower plant	The power is transmitted to Ya'an grid via Sanhe substation through 35kv line finally to the grid, and the voltage changes from 35KV into 110KV
85	Daihuanggou Hydroelectric Plant	1	On the main transformer in the hydropower plant	The power is transmitted to Ya'an grid via Sanhe substation through 35kv line finally to the grid, and the voltage changes from 35KV into 110KV
86	Gaoqiaohe Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	The power is transmitted to Ya'an grid via Gangshang substation through 35kv line finally to the grid, and the voltage changes from 35KV into 110KV.
87	Zhuyeshan Hydroelectric Plant	0.1	On the main transformer in the hydropower plant	110KV-Dabao substation – Chinese central grid
88	Lianghekou Hydroelectric Plant	0.2	Switch Exit of line Yangcun35KV	The power is transmitted to Yangcun substation via Yang35KV and then through to Hetaoping substation finally to the grid, and the voltage changes from 35KV into 110KV when pass the booster station

90	Dabaishu Hydroelectric Plant	0.2	Switch Exit of line Shiyun35KV	The power is transmitted to Shiyun substation , finally to the grid, and the voltage changes from 35KV into 110KV when pass the booster station
91	Dashi Stage III Hydroelectric Plant	0.2	Switch Exit of line Shiyun35KV	The power is transmitted to Shiyun substation , finally to the grid, and the voltage changes from 35KV into 110KV when pass the booster station
92	Dashi Stage II Hydroelectric Plant	0.2	Switch Exit of line Shiyun35KV	The power is transmitted to Shiyun substation , finally to the grid, and the voltage changes from 35KV into 110KV when pass the booster station
93	Yunnan Midu County Taishanhe Hydropower Station	0.2s	35kV Niujie Substation	The power is transformed from 6.3kV to 35kV on-site and then transmitted from Taishanhe power station through 3.1km transmission line to Niujie Substation in Midu County then to China Southern Power Grid.
94	Zhenyuan County Xiaojiehe Hydropower Station	0.5	35kv Zhedong Substation	The power is transmitted from Xiaojiehe power station through 35kv Zhedong Substation via Pu'er substaion, finally to China Southern Power Grid, and the voltage changes from 6.3 kv to 35 kv when pass the Zhedong substation
95	Jinghong City Chuangye Hydropower Station	0.5	on-site, at the point after power has been transformed to 35kV voltage.	The power is transformed from 6.3kV to 35kV on-site and then transmitted from Chuangye power station through 14km transmission line to Chengxi Substation in Jinghong City then to China Southern Power Grid.
96	Yingjiang Husa River 5th Stage Hydropower Plant	0.5s	On high voltage side of main transformer in substation	The power is transmitted to Husa River stage 4 substation via Yang35KV and finally to the Hongzhou grid, and the voltage changes from 35KV into 110KV when pass the booster station

97	Yunnan Province Jinping County Mengqiao Village Datan Hydropower Station	0.2	On high voltage side of main transformer in substation	The power is transmitted from Datan Power Station T-connected to a 110kv line which is from Mengqiao Power station and Lvshui Power Station via 2km 110KV line, finally to the grid
98	Fugong County Lishadi Hydropower Plant Project	0.2s	On high voltage side of main transformer in substation	The power is transmitted to Aluodi Switch station via Lia line 110KV and finally to the Lanfu line via 220KV

8. Calibration of major electricity meters

A metrical institute authorized by the Administration of Standard Measurement will periodically carry out the verification of the electricity metering equipment according to relevant national electric industry standards and regulations. After the verification of every meter, the electricity metering equipment is sealed, stamped or by other means closed. Either party shall not unseal, change the structure, layout or any wire connection of the electricity equipment nor manipulate the equipment.

9. Training

Operational staff are a crucial element for the GHG information quality control system. Training packages ensure that staff receive adequate training to collect, and to achieve complete and accurate data necessary for VCU monitoring. All staff should follow this procedure on site prior to performing any monitoring duties for the Grouped Project:

1. Equip relevant staff with necessary mechanical, electric techniques.
2. Teach staff the structure of hydro power plant, and understand the common malfunctions and corresponding solutions
3. Design emergency plan and get staff familiar with the emergency plan
4. Organize professional training periodically to maintain and improve the professional skills of operating staff.
5. Additional learning session to comprehend the understanding of the requests of VCS on the monitoring system.
6. Set up monitoring knowledge exam for new staff to control the quality of training programm

10. Data Management System

This procedure provides details on how data are managed on a complete and accurate level. Data and records are stored and archived according to this procedure.

All monitoring data and records will be archived in electronic documents and paper documents. The project owners will also keep the copies of electricity generation record and sales receipts, The Central Information System Centre at South Pole provides integrated monitoring data services, hence an additional monitoring database is in place to prevent data loss as well as to ensure the consistency of all the data. Data have been input manually by project managers into the Project Management Tool System, which will be described in more detail in the following section. The project database is saved on South Pole's local China server which is synchronized daily with the headquarter main server in Zurich to allow access of data between headquarter and regional offices.

All data records will be kept for an additional period of 2 years following the end of the crediting period.

11.PMT- Central Information Control Tool

Technical specifications

South Pole uses a custom-tailored project management software to monitor its project pipeline. The Project Management Tool (PMT) is a web-based application running on South Pole's web server and is accessible from any computer with Internet access.

Connections between clients and the web server are secured with 128-bit SSL encryption. The backend is an apache web server, the web application is written in PHP5, and data is stored in a my SQL database. Utilizing mainstream open source technology, South Pole guarantees flexibility and reliability with regards to development and maintenance.

As South Pole has nine offices on four continents as of today, quality of the Internet connections varies significantly. To ensure optimal speed, the PMT utilizes techniques such as AJAX and asynchronous requests to load content on demand and provide short-loading times even with several hundreds of projects displayed at the same time.

The PMT's server-client architecture guarantees that all data is kept consistent and always up to date for each user. The separation of presentation and data allows for flexible interfaces with other applications, easy data export and automated backups of sensitive and valuable project data.

Features

The PMT can be used to track individual projects under various standards, with different credit types and crediting periods, as well as groups of projects or entire pipelines of projects.

On the project level, tools such as milestone management, a sophisticated comment and notification system to facilitate communication between different team members, deadline alerts, etc. allow project managers and supervisors to meet targets and deadlines and monitor or project both past and future amount of emission reductions resulting out of a project.

One level above, various features allow grouping and manipulating several projects together, with combined overviews on milestone deadlines, generated emission reductions, and applied standards.

Data can be directly exported to Excel from within the PMT, both for individual projects as well as for groups of projects, to run custom evaluations or to visualize data.

Project identification

Our PMT system created 88 project tags. Each project has its identical project number, a brief project description, project owner's information, methodology and other information, vintage volume and milestones and related payment.

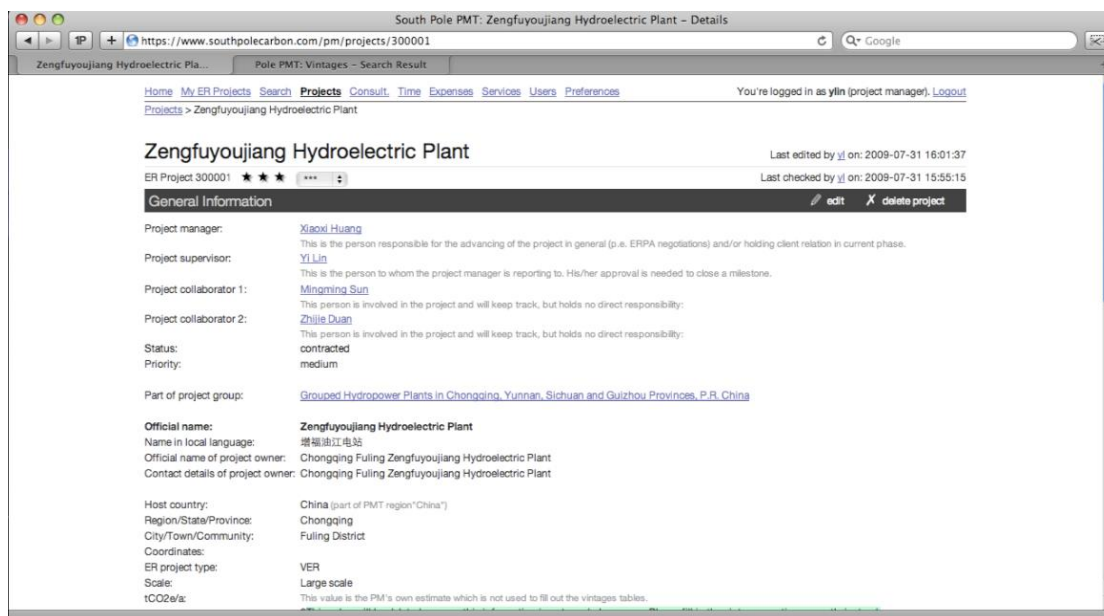


Figure-5-4 The project information in the PMT system

Quantity Assurance

Overview of vintages and emission reduction over crediting period

The Project Management Tool has a vintages review function. The PMT is able to store the existing emission reductions and estimate the foreseeable emission reductions. The vintage review function is linked to each project tag, which means any updates or/and changes by project managers regarding the project's emission reductions will be reflected in the vintages review section. Vintages review function allows the project manager and Implementation Control and Technical Teams to overview the entire Grouped Project and conduct spot checks. Aggregation for emission reductions of annual total, emission reductions of crediting period total etc. is applicable.

At the end of each crediting period, the emission reduction of the 88 projects will be spot checked with electronic copies of electrical sale invoices.

Package	Type	Project	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
300001 - A		Zhenfuyouliana Hydroelectric Plant	0	91	1090	1090	1090	1090	1090	1090	1090	1090
300002 - A		Jianshilan Hydroelectric Plant	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015
300003 - A		Jinina Hydroelectric Plant	2590	2590	2590	2590	2590	2590	2590	2590	2590	2590
300004 - A		Huzhong Hydroelectric Plant	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
300005 - A		Chongqing Wanzhou Fengmu Hydroelectric	144	574	574	574	574	574	574	574	574	574
300006 - A		Chongqing Wanzhou Longdong Hydroelectric	545	545	545	545	545	545	545	545	545	545
300007 - A		Chongqing Wanzhou Dengta Hydroelectric	1019	1528	1528	1528	1528	1528	1528	1528	1528	1528
300008 - A		Chongqing Wanzhou Maoyue Hydroelectric	0	0	535	584	584	584	584	584	584	584
300009 - A		Chongqing Wanzhou Xiaolou Hydroelectric	198	1188	1188	1188	1188	1188	1188	1188	1188	1188
300010 - A		Chongqing Wanzhou Yha Hydroelectric	0	97	1168	1168	1168	1168	1168	1168	1168	1168
300011 - A		Chongqing Wanzhou Tiande Hydroelectric	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142
300012 - A		Chongqing Wanzhou Puzhina Hydroelectric	0	574	1149	1149	1149	1149	1149	1149	1149	1149
300013 - A		Chongqing Wanzhou Yanhan Hydroelectric	383	1149	1149	1149	1149	1149	1149	1149	1149	1149
300014 - A		Chongqing Wanzhou Lianmen Hydroelectric	0	1778	1778	1778	1778	1778	1778	1778	1778	1778
300015 - A		Chongqing Wanzhou Wanlin Hydroelectric	0	501	2005	2005	2005	2005	2005	2005	2005	2005
300016 - A		Chongqing Wanzhou Gaodongzi Hydroelectric	0	0	2439	2439	2439	2439	2439	2439	2439	2439
300017 - A		Chongqing Wanzhou Luotian Hydroelectric	0	584	1752	1752	1752	1752	1752	1752	1752	1752
300018 - A		Chongqing Wanzhou Yanjinzi Hydroelectric	0	1142	1713	1713	1713	1713	1713	1713	1713	1713
300019 - A		Chongqing Wanzhou Beiyangzi Hydroelectric	0	0	1229	2950	2950	2950	2950	2950	2950	2950

Figure-5-5 The vintage information in the PMT system

Time management-Milestone featuring

Once a project is established in the PMT, all the milestones of the project identifying the critical project path of the project cycle are automatically in place. For each milestone, PMT automatically inserts an estimate of the plausible milestones completion time, and indicated the due dates to the project manager. A milestones overview feature lets supervisors keep track of statistics of the estimated milestones completion time compared to the actual milestones implementing time, which will be preserved as part of project history for later project management evaluation. This feature is the key time management tool; it allows project managers and the supervisors to always be aware of the deadlines and trace the status and progress of the each project.

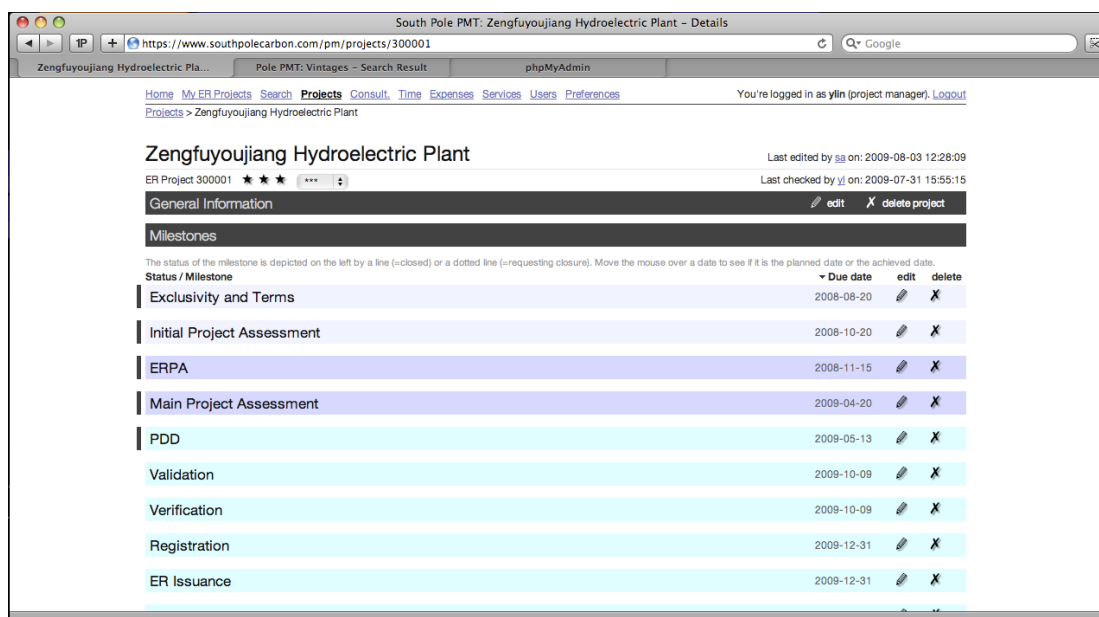


Figure 5-6 The milestone in the PMT system

Quality Assurance- quality check and commenting

Projects have to pass each single step consisting of Initial Project Assessment, Main Project Assessment, ERPA, validation, monitoring and verification milestones of the project cycle.

A project manager can request for closing of a project milestone if tasks of such milestone have been accomplished subjected to South Pole's company internal guidance. A quality stamp by the Implementation Control and Technical Team must be given to close milestone completely and to leave way to process the next milestones.

The comment function is designed to identify problems and to collect ways of possible solutions within the project management team. When one comment is inserted into the PMT entry of a specific project, subsequently the notification will appear on the PMT home screen of the corresponding project manager. If project manager has new findings regarding the project, the comment system is able to feedback updates on the project to the quality control team. The project manager can also trace which person raised the question and follow up a further discussion if necessary.

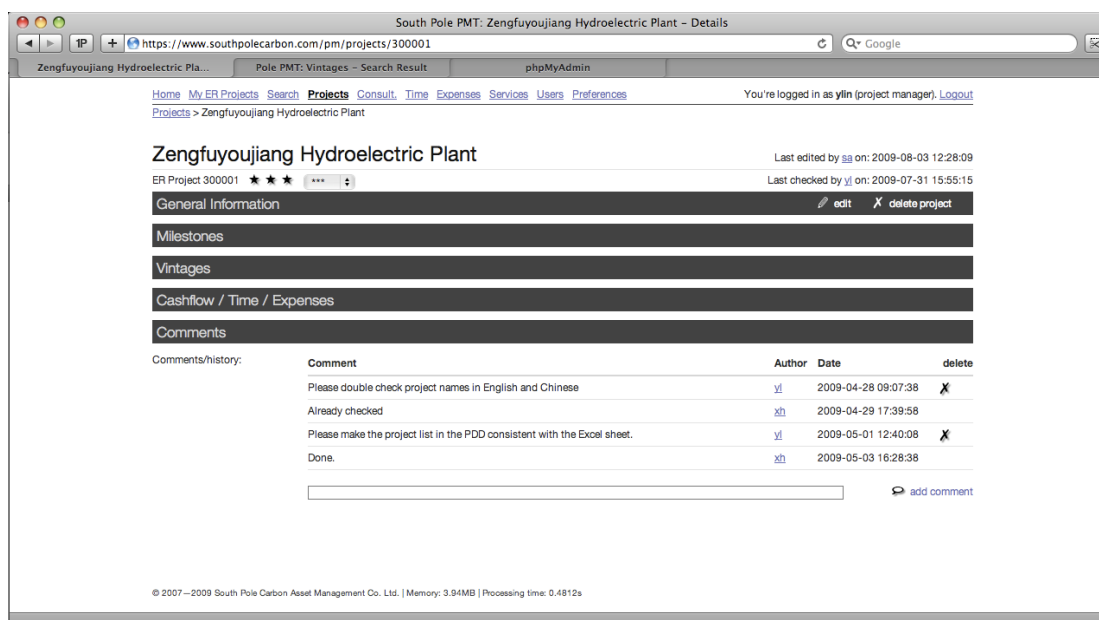


Figure 5-7 The comment function in the PMT system

5 SAFEGUARDS

5.1 No Net Harm

All of the projects are small scale hydropower project with the installed capacities from 0.1 MW to 14 MW. According to the EIA approval, the environmental impacts of these small hydro power stations are not considered to be significant after the compensation measures. Thus, the project is not involve of net harm

5.2 Environmental Impact

Use of a renewable energy source helps in conservation of natural resources. In China, the largest share of total electricity production is derived from coal-based power plants. This project, in addition to its inherent contribution to climate change mitigation, implicates environmental benefits for the country's air, soil and water resources. The project increases the share of renewable energy generation in China while making a contribution to avoiding the construction of new fossil-fuel-fired power plants. Compared to these power plants, the project reduces CO₂, SO_x and NO_x emissions significantly, thus consequently mitigate air pollution and its adverse impacts on human health.

As hydropower projects produce no end products in the form of solid waste (ash, etc.), they do not meet the problem of solid waste disposal encountered by most other sources of power.

The environmental impacts of small hydro power stations are not considered to be significant. With very small installed capacities (0.1MW~14MW) and almost no reservoirs with regulating ability, all the hydropower plants under the Grouped project are run-of-river hydropower projects, only using the hydraulic heads for power generation, therefore, there were no resettlements of any buildings or houses required, which in the end the social or environmental impacts were relatively partial, short term, and reversible.

According to the relevant regulations and applicable laws, each project activity must analyze environmental impacts related to the project activity before exploiting natural resources, therefore, an Environmental Impact Assessments (EIA) were conducted for individual components of the Grouped Project by a third party, and EIAs are approved by corresponding local Environmental Protection Bureau.

The environmental impacts during the construction phase and the operation phase were identified, mitigation measures were suggested, which are highlighted and summarized below. All pollutants generated during construction and operation periods would be properly disposed up to the relevant standards and regulations.

Construction phase:

Sources	Mitigation measures
Water pollution	
Oil water from vehicles	Oil filter and sedimentation tank and recycle.
On the construction site Build up a buffer zone/	Make the drain connected to the sedimentation tank.
Land erosion and solid waste	
solid waste deposition, construction debirs	Solid wastes and construction debirs were kept together and closed to the construction site, when it is necessary, these debirs can be used for filling purpose for the construction process. Re-planting were implemented when construction is finished and the left debirs were properly managed to prevent land erosion
Noise pollution	

Blast and excavation during construction	Arrange construction time, and construction activity is banned in the evenings.
Air pollution	
Dust during the transportation.	Supervision during the material/construction waste's transportation.
Dust during the construction	showering system is to be installed to dampen and control dust/particulate matter.

Operation phase

Sources	Mitigation measures
Water pollution	
Wastewater from the staff	Treated in the wastewater treatment plant, decomposite to produce organic matter which can be utilised again as fertiliser
Air pollution	
	Staff utilise electricity for domestic activity therefore no fossil fuel related air pollution
Other sources	
	Diesel oil used for the equipment maintenance is recycled to avoid water pollution is generated.

The two projects which have reservoirs, there were no resettlement involved, and the power densities of these two projects have been calculated and met the methodology in section 2.3 which shows that no GHGs emission required to be considered as the projects emission.

There is no endangered fishes or other aquatic species found in the hydrologic basin of the two project activities, and there is no impact on the terrestrial species, therefore the negative impacts of the project activities on the ecosystem and biodiversity with new built reservoirs are considered to be insignificant.

The table containing detail information(i.e. EIA accomplishment entity, EIA approval entity and issue date) of the EIA and status of EIA approval of each project is listed in Annex 3.

5.3 Local Stakeholder Consultation

Outcomes: No relevant comments were received until 25/03/2009 in the web consultation that took place from November 2008 on <http://southpolecarbon.com/chinese.htm>.

For the individual hydropower projects, environmental impact assessments were carried out. Comments by local stakeholders were collected as part of the environmental impact assessment process, mostly through direct interviews with neighbouring stakeholders. This process is standardized in the four provinces where the projects are placed. Stakeholders have the right to bring up concerns to the local environmental agency, which is in charge of accepting the environmental assessments. As the projects are to a large extent driven by initiative from the local communities and/or do not affect any people directly, it is not surprising that no negative comments were received. On site visits by South Pole Carbon Asset Management all comments were very positive.

The majority of the projects are greenfield micro hydro projects with a very low potential of disturbing or hindering local people. The few projects with a capacity of 10 MW or above have undergone a more detailed assessment, especially regarding agricultural and environmental minimal water flow.

The stakeholder consultation of large project was taken in a way that representatives of different society groups have been invited into the stakeholder consultation meetings. Those society groups include local government staffs who have the best knowledge about the local development and are experienced in managing other similar development project. They can response to the questions that other stakeholder raised and provide supports and solution; work union representatives from companies or entities which have collaborations with the proposed projects are also invited to take part in the stakeholder consultation, since they can identity the different perspectives of the proposed project. Stakeholder consultation also invite local residents whose livelihood are directly impacted by the construction and operation of the projects.

Stakeholder consultation have been implement in different formats. Formal meeting of above mentioned interests parties have conducted at the project EIA compiling stage. Questionairs regarding the projects sustainable development, positive and negative impacts have been asked to fill out by representatives from the local neighborhood.

DOE is invited to verify the generally positive opinion of local stakeholders during site visits. In addition, South Pole Carbon Asset Management has uploaded a non-technical description with feedback possibility on their Chinese website, which has not received any negative comments.

Although most of the project are Greenfield and have very limited environmental impact, South Pole conduct representative stakeholder consultation, representative stakeholder consultation destination have been pointed where they can represent the diverse characteristics of the entire south-west China region. South Pole reporter interviewed people with various background within the local community of the project development region. The stakeholder material, such as questionnaires, video have been archived as part of South Pole's central information system.

There following are stakeholder interviews notes:

Interviewee: Ms Xingxia Dou

Project name: Baijia Hydroelectric Plant

Time: 25th April 2009

Female employee Ms Xingxia Dou from Baijia village says: "Before I started here in October 2008, I needed to go out to the cities to work. But now my life has changed: I can work here earning more or less the same income as I earned as a babysitter, and I can spend more time with my children. There are skills training courses, and safety and security lessons every year. Because abundant water can be saved, we now can grow both rice and corn. Rain has fallen less and less in recent years, we experienced heavy snow for two months of last year, which severely damaged our crops"

Interviewee: Mr Wanlu Dai

Project name: Qingtongxi Hydroelectric Plant

Time: 25th April 2009

Mr Wanlu Dai from Qingtongxi: "The power station was built by ourselves, who know the place best and certainly would use it for long. So, it is very nice fitted within the area, No harms to us or to our animals. We are very pleased that we can both look after our own crops and plants and also be able to work in the station. Now we have doubled the income, but it is not a big deal of workload. Further more I now have learnt some skills we can try other type of job in the future!"

All interviewed person have agree on published their opinions, photos and content of the interviews, and all relevant evidences, such as the web consultation, the signatures of the interviewees and so on, have been provided.

5.4 . Public Comments

N/A

APPENDIX 1

Energy Consumption Statistics of Power Generation of the China Southern Power Grid in 2011

Fuel type	Unit	Guangdong	Guangxi	Guizhou	Yunnan	Hainan	Total	Carbon content	Carbon oxidation rate	Fuel emission factor	Average low calorific value	CO ₂ emission (tCO ₂)
								(tC/TJ)	(%)	(kgCO ₂ /TJ)	(MJ/t, km ³)	$K = F \times J \times I / 100000$ (mass unit) $K = F \times J \times I / 10000$ (volume unit)
		A	B	C	D	E	F=A+...+E	G	H	I	J	
Raw coal	10 ⁴ t	11,799.44	2,807.29	4,266.00	3,520.42	607.41	23,000.56	25.8	100	87,300	20,908	419,821,954
Washed coal	10 ⁴ t						0.00	25.8	100	87,300	26,344	0
Other washed coal	10 ⁴ t			1,291.29	22.96		1,314.25	25.8	100	87,300	8,363	9,595,207
Moulded coal	10 ⁴ t	182.83					182.83	26.6	100	87,300	20,908	3,337,138
Coke	10 ⁴ t						0.00	29.2	100	95,700	28,435	0
Gangue	10 ⁴ t	320.15		71.26	36.78		428.19	25.8	100	87,300	8,363	3,126,172
Coke oven gas	10 ⁸ m ³		3.05	1.88	2.66		7.59	12.1	100	37,300	16,726	473,525
Blast furnace gas	10 ⁸ m ³	1.58	44.78	9.16	50.65		106.17	70.8	100	219,000	3,763	8,749,438
Converter gas	10 ⁸ m ³	0.33	2.71		2.38		5.42	46.9	100	145,000	7,945	624,398
Other gas	10 ⁸ m ³						0.00	12.1	100	37,300	5,227	0
Crude oil	10 ⁴ t						0.00	20	100	71,100	41,816	0
Gasoline	10 ⁴ t						0.00	18.9	100	67,500	43,070	0
Diesel oil	10 ⁴ t	2.80	0.58	3.58	1.05	0.03	8.04	20.2	100	72,600	42,652	248,961
Fuel oil	10 ⁴ t	24.44	0.07				24.51	21.1	100	75,500	41,816	773,807
Naphtha	10 ⁴ t						0.00	20.2	100	72,600	43,906	0
Lubricating oil	10 ⁴ t						0.00	20	100	71,900	41,398	0

Paraffin	10 ⁴ t						0.00	20	100	72,200	39,934	0
Solvent oil	10 ⁴ t						0.00	20	100	72,200	42,945	0
Petroleum asphalt	10 ⁴ t						0.00	21	100	69,300	38,931	0
Petroleum coke	10 ⁴ t	16.51			1.38		17.89	26.6	100	82,900	31,947	473,800
LNG	10 ⁴ t	195.10					195.10	15.3	100	54,300	51,434	5,448,882
LPG	10 ⁴ t						0.00	17.2	100	61,600	50,179	0
Refinery gas	10 ⁴ t	0.91					0.91	15.7	100	48,200	46,055	20,201
Natural gas	10 ⁸ m ³	38.19		0.76		6.83	45.78	15.3	100	54,300	38,931	9,677,678
Other petroleum products	10 ⁴ t	0.53					0.53	20	100	72,200	41,816	16,001
Other coking products	10 ⁴ t						0.00	25.8	100	95,700	28,435	0
Other energy	10 ⁴ t standard coal	34.53	159.22		25.20		218.95	0	0	0	0	0
											Total	462,387,161

<China Electric Power Yearbook 2012>

Fuel-fired Electricity Generation of CSPG for Year 2011

Province	Electricity generation	Electricity generation	Internal use rate	Supplied electricity
	(10 ⁸ kWh)	(MWh)	(%)	(MWh)
Guangdong	3,046	304,600,000	5.6	287,542,400
Guangxi	637	63,700,000	6.6	59,495,800
Guizhou	1,022	102,200,000	7.3	94,739,400
Yunnan	536	53,600,000	7.7	49,472,800
Hainan	158	15,800,000	7.8	14,567,600
Total				505,818,000

<China Electric Power Yearbook 2012>

Calculation of emission factor for the CSPG in 2011

	2011
Electricity imported from CCPG(MWh)	16,118,680
Simple OM of CCPG	0.9827
Total CO ₂ emission (tCO ₂)	478,226,988
Total supplied electricity (MWh)	521,936,680
Emission factor(tCO ₂ /MWh)	0.9163

Energy Consumption Statistics of Power Generation of the China Southern Power Grid in 2012

Fuel type	Unit	Guangdong	Guangxi	Guizhou	Yunnan	Hainan	Total	Carbon content	Carbon oxidation rate	Fuel emission factor	Average low calorific value	CO ₂ emission (tCO ₂)
								(tC/TJ)	(%)	(kgCO ₂ /TJ)	(MJ/t, km ³)	$K = F \times J \times I / 100000$ (mass unit) $K = F \times J \times I / 10000$ (volume unit)
		A	B	C	D	E	F=A+...+E	G	H	I	J	
Raw coal	10 ⁴ t	11,112.44	2,765.45	4,033.75	3,083.23	691.39	21,686.26	25.8	100	87,300	20,908	395,832,451
Washed coal	10 ⁴ t						0.00	25.8	100	87,300	26,344	0
Other washed coal	10 ⁴ t			1,358.00	40.06		1,398.06	25.8	100	87,300	8,363	10,207,095
Moulded coal	10 ⁴ t	167.41					167.41	26.6	100	87,300	20,908	3,055,682
Gangue	10 ⁴ t	337.97		84.06	30.47		452.50	25.8	100	87,300	8,363	3,303,657
Coke	10 ⁴ t						0.00	29.2	100	95,700	28,435	0
Coke oven gas	10 ⁸ m ³		3.69	2.05	2.29		8.03	12.1	100	37,300	16,726	500,975
Blast furnace gas	10 ⁸ m ³	18.19	52.40	15.63	56.48		142.70	70.8	100	219,000	3,763	11,759,864
Converter gas	10 ⁸ m ³	1.69	3.46		3.59		8.74	46.9	100	145,000	7,945	1,006,870
Other gas	10 ⁸ m ³			0.80			0.80	12.1	100	37,300	5,227	15,597

PROJECT DESCRIPTION: *VCS Version 3*

Other coking products	10 ⁴ t						0.00	25.8	100	95,700	28,435	0
Crude oil	10 ⁴ t						0.00	20	100	71,100	41,816	0
Gasoline	10 ⁴ t						0.00	18.9	100	67,500	43,070	0
Kerosene	10 ⁴ t						0.00	19.6	100	71,900	43,070	0
Diesel oil	10 ⁴ t	2.63	0.85	1.89	0.87	0.03	6.27	20.2	100	72,600	42,652	194,153
Fuel oil	10 ⁴ t	20.63	0.08				20.71	21.1	100	75,500	41,816	653,837
Naphtha	10 ⁴ t						0.00	20.2	100	72,600	43,906	0
Lubricating oil	10 ⁴ t						0.00	20	100	71,900	41,398	0
Paraffin	10 ⁴ t						0.00	20	100	72,200	39,934	0
Solvent oil	10 ⁴ t						0.00	20	100	72,200	42,945	0
Petroleum asphalt	10 ⁴ t						0.00	21	100	69,300	38,931	0
Petroleum coke	10 ⁴ t	28.37			1.39		29.76	26.6	100	82,900	31,947	788,166
LPG	10 ⁴ t		0.11				0.11	17.2	100	61,600	50,179	3,400
Refinery gas	10 ⁴ t	1.27					1.27	15.7	100	48,200	46,055	28,192
Other petroleum products	10 ⁴ t	0.47					0.47	20	100	72,200	41,816	14,190
Natural gas	10 ⁸ m ³	32.49				6.84	39.33	15.3	100	54,300	38,931	8,314,178
LNG	10 ⁴ t	178.80	0.11				178.91	15.3	100	54,300	51,434	4,996,717
Other energy	10 ⁴ t standard coal	283.26	160.43		46.52	4.50	494.71	0	0	0	0	0
											Total	440,675,024

<China Energy Statistical Yearbook 2013>

Fuel-fired Electricity Generation of CSPG for Year 2012

Province	Electricity generation	Electricity generation	Internal use rate	Supplied electricity
	(10 ⁸ kWh)	(MWh)	(%)	(MWh)
Guangdong	2,848	284,800,000	5.8	268,281,600
Guangxi	647	64,700,000	6.7	60,365,100

Guizhou	1,046	104,600,000	7.2	97,068,800
Yunnan	480	48,000,000	7.5	44,400,000
Hainan	182	18,200,000	7.6	16,816,800
Total				486,932,300

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Calculation of emission factor for the CSPG in 2012

	2012
Electricity imported from CCPG(MWh)	16,752,770
Simple OM of CCPG	0.9437
Total CO ₂ emission (tCO ₂)	456,484,613
Total supplied electricity (MWh)	503,685,070
Emission factor(tCO ₂ /MWh)	0.9063

Energy Consumption Statistics of Power Generation of the China Southern Power Grid in 2013

Fuel type	Unit	Guangdong	Guangxi	Guizhou	Yunnan	Hainan	Total	Carbon content	Carbon oxidation rate	Fuel emission factor	Average low calorific value	CO ₂ emission (tCO ₂)
								(tC/TJ)	(%)	(kgCO ₂ /TJ)	(MJ/t, km ³)	K=F×J×I/100000 (mass unit) K=F×J×I/10000 (volume unit)
		A	B	C	D	E	F=A+...+E	G	H	I	J	
Raw coal	10 ⁴ t	11,458.81	3,105.02	4,372.74	2,706.19	794.95	22,437.71	25.8	100	87,300	20,908	409,548,430
Washed coal	10 ⁴ t				1.04		1.04	25.8	100	87,300	26,344	23,918
Other washed coal	10 ⁴ t			1,341.30	20.13		1,361.43	25.8	100	87,300	8,363	9,939,663
Moulded coal	10 ⁴ t	171.26					171.26	26.6	100	87,300	20,908	3,125,955
Gangue	10 ⁴ t	433.90		79.03	26.88		539.81	25.8	100	87,300	8,363	3,941,098
Coke	10 ⁴ t						0.00	29.2	100	95,700	28,435	0
Coke oven gas	10 ⁸ m ³		4.65	2.18	1.68		8.51	12.1	100	37,300	16,726	530,922
Blast furnace gas	10 ⁸ m ³	19.74	58.46	18.54	77.26		174.00	70.8	100	219,000	3,763	14,339,288

Converter gas	10 ⁸ m ³	2.13	3.31		5.63		11.07	46.9	100	145,000	7,945	1,275,292
Other gas	10 ⁸ m ³			1.83			1.83	12.1	100	37,300	5,227	35,679
Other coking products	10 ⁴ t						0.00	25.8	100	95,700	28,435	0
Crude oil	10 ⁴ t	0.02					0.02	20	100	71,100	41,816	595
Gasoline	10 ⁴ t						0.00	18.9	100	67,500	43,070	0
Kerosene	10 ⁴ t						0.00	19.6	100	71,900	43,070	0
Diesel oil	10 ⁴ t	1.99	0.51	2.29	0.79	0.03	5.61	20.2	100	72,600	42,652	173,716
Fuel oil	10 ⁴ t	19.72	0.07				19.79	21.1	100	75,500	41,816	624,792
Naphtha	10 ⁴ t						0.00	20.2	100	72,600	43,906	0
Lubricating oil	10 ⁴ t						0.00	20	100	71,900	41,398	0
Paraffin	10 ⁴ t						0.00	20	100	72,200	39,934	0
Solvent oil	10 ⁴ t						0.00	20	100	72,200	42,945	0
Petroleum asphalt	10 ⁴ t						0.00	21	100	69,300	38,931	0
Petroleum coke	10 ⁴ t	17.27					17.27	26.6	100	82,900	31,947	457,380
LPG	10 ⁴ t						0.00	17.2	100	61,600	50,179	0
Refinery gas	10 ⁴ t	1.57					1.57	15.7	100	48,200	46,055	34,852
Other petroleum products	10 ⁴ t	0.65					0.65	20	100	72,200	41,816	19,624
Natural gas	10 ⁸ m ³	32.09	0.10			4.23	36.42	15.3	100	54,300	38,931	7,699,018
LNG	10 ⁴ t	168.56	0.12			0.03	168.71	15.3	100	54,300	51,434	4,711,845
Other energy	10 ⁴ t standard coal		100.38		44.23	11.54	156.15	0	0	0	0	0
											Total	456,482,065

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Fuel-fired Electricity Generation of CSPG for Year 2013

Province	Electricity generation	Electricity generation	Internal use rate	Supplied electricity
	(10 ⁸ kWh)	(MWh)	(%)	(MWh)

Guangdong	2,955	295,500,000	5.64	278,833,800
Guangxi	755	75,500,000	6.22	70,803,900
Guizhou	1,240	124,000,000	7.26	114,997,600
Yunnan	479	47,900,000	6.98	44,556,580
Hainan	201	20,100,000	7.82	18,528,180
Total		563,000,000		527,720,060

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Calculation of emission factor for the CSPG in 2013

	2013
Electricity imported from CCPG(MWh)	12,007,880
Simple OM of CCPG	0.9291
Electricity imported from ECPG(MWh)	22,000
Simple OM of ECPG	0.8222
Total CO ₂ emission (tCO ₂)	467,656,674
Total supplied electricity (MWh)	539,749,940
Emission factor(tCO ₂ /MWh)	0.8664

Calculation of average emission factor for the CSPG in 2011-2013

	2011	2012	2013
Total CO ₂ emission (tCO ₂)	478,226,988	456,484,613	467,656,674
Total supplied electricity (MWh)	521,936,680	503,685,070	539,749,940
Emission factor(tCO ₂ /MWh)	0.9163	0.9063	0.8664

Weighted average OM	0.8959
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BM Emission Factor Calculation of CSPG

Fuel type	Unit	Guangdong	Guangxi	Guizhou	Yunnan	Hainan	Total	Average low calorific value	Fuel emission factor	Carbon oxidation rate	CO2 emission (tCO2)
								(MJ/t, km ³)	(kgCO2/TJ)	(%)	J=F×G×H×I/100000
		A	B	C	D	E	F=A+...+E	G	H	I	
Raw coal	10 ⁴ t	11,458.81	3,105.02	4,372.74	2,706.19	794.95	22,437.71	20,908	87,300	1	409,548,430
Washed coal	10 ⁴ t	0	0	0	1.04	0	1.04	26,344	87,300	1	23,918
Other washed coal	10 ⁴ t	0	0	1,341.30	20.13	0	1,361.43	8,363	87,300	1	9,939,663
Moulded coal	10 ⁴ t	171.26	0	0	0	0	171.26	20,908	87,300	1	3,125,955
Coal gangue	10 ⁴ t	433.9	0	79.03	26.88	0	539.81	8,363	87,300	1	3,941,098
Coke	10 ⁴ t	0	0	0	0	0	0.00	28,435	95,700	1	0
Other coking products	10 ⁴ t	0	0	0	0	0	0.00	28,435	95,700	1	0
Sub-total										1	426,579,064
Crude oil	10 ⁴ t	0.02	0	0	0	0	0.02	41,816	71,100	1	595
Gasoline	10 ⁴ t	0	0	0	0	0	0.00	43,070	67,500	1	0
Kerosene	10 ⁴ t	0	0	0	0	0	0.00	43,070	71,900	1	0
Diesel oil	10 ⁴ t	1.99	0.51	2.29	0.79	0.03	5.61	42,652	72,600	1	173,716
Fuel oil	10 ⁴ t	19.72	0.07	0	0	0	19.79	41,816	75,500	1	624,792
Petroleum coke	10 ⁴ t	17.27	0	0	0	0	17.27	31,947	82,900	1	457,380
Other petroleum products	10 ⁴ t	0.65	0	0	0	0	0.65	41,816	72,200	1	19,624
Sub-total										1	1,276,106
Natural gas	10 ⁷ m ³	320.90	1	0	0	42.30	364.20	38,931	54,300	1	7,699,018

PROJECT DESCRIPTION: vcs Version 3

LNG	10 ⁴ t	168.56	0.12	0	0	0.03	168.71	51,434	54,300	1	4,711,845
Coke oven gas	10 ⁷ m ³	0	46.50	21.80	16.80	0	85.10	16,726	37,300	1	530,922
Blast furnace gas	10 ⁷ m ³	197.40	584.60	185.40	772.60	0	1,740.00	3,763	219,000	1	14,339,288
Converter gas	10 ⁷ m ³	21.30	33.10	0	56.30	0	110.70	7,945	145,000	1	1,275,292
Other gas	10 ⁷ m ³	0	0	18.30	0	0	18.30	5,227	37,300	1	35,679
LPG	10 ⁴ t	0	0	0	0	0	0.00	50,179	61,600	1	0
Refinery gas	10 ⁴ t	1.57	0	0	0	0	1.57	46,055	48,200	1	34,852
Sub-total										1	28,626,894
Other energy	10 ⁴ t Standard Coal	0	100.38	0	44.23	11.54	156.15	0	0	1	0
Total										1	456,482,065

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Calculation of Fuel Emission Factors

	Parameter	Electricity supply efficiency(%)	Fuel emission factor(kgCO ₂ /TJ)	Carbon oxidation rate	Fuel emission factor(tCO ₂ /MWh)
		A	B	C	D=3.6/A/10,000×B×C
Coal-fired power plant	$EF_{Coal,Adv,y}$	42	87,300	1	0.7483
Oil-fired power plant	$EF_{Oil,Adv,y}$	52.9	75,500	1	0.5138
Gas-fired power plant	$EF_{Gas,Adv,y}$	52.9	54,300	1	0.3695

Calculation of Thermal Emission Factor

$\lambda_{Coal,y}$	93.45%	$\lambda_{Oil,y}$	0.28%	$\lambda_{Gas,y}$	6.27%
				0.72389	

Installed Capacity of CSPG for 2013

Installed capacity	Unit	Guangdong	Guangxi	Yunnan	Guizhou	Hainan	Total
Thermal power	MW	64,880	15,420	13,940	24,330	3,750	122,320

PROJECT DESCRIPTION: *vcs Version 3*

Hydro power	MW	13,190	15,820	44,090	19,080	830	93,010
Nuclear power	MW	6,120	0	0	0	0	6,120
Wind power & others	MW	1784	162	1760	1350	389	5,445
Total	MW	85,974	31,402	59,790	44,760	4,969	226,895

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Installed Capacity of CSPG for 2012

Installed capacity	Unit	Guangdong	Guangxi	Yunnan	Guizhou	Hainan	Total
Thermal power	MW	57,520	14,910	21,860	13,850	3,880	112,020
Hydro power	MW	13,060	15,360	17,280	33,060	810	79,570
Nuclear power	MW	6,120	0	0	0	0	6,120
Wind power & others	MW	1401	100	960	1340	320	4,121
Total	MW	78,101	30,370	40,100	48,250	5,010	201,831

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Installed Capacity of CSPG for 2011

Installed capacity	Unit	Guangdong	Guangxi	Yunnan	Guizhou	Hainan	Total
Thermal power	MW	56,350	11,770	11,360	20,300	3,150	102,930
Hydro power	MW	13,020	15,260	28,420	18,660	810	76,170
Nuclear power	MW	6,120	0	0	0	0	6,120
Wind power & others	MW	748	50	690	40	275	1,803
Total	MW	76,238	27,080	40,470	39,000	4,235	187,023

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Installed Capacity of CSPG for 2010

Installed capacity	Unit	Guangdong	Guangxi	Yunnan	Guizhou	Hainan	Total
Thermal power	MW	52,870	10,390	11,330	17,530	2,970	95,090
Hydro power	MW	12,600	14,940	24,350	16,550	750	69,190
Nuclear power	MW	5,030	0	0	0	0	5,030

PROJECT DESCRIPTION: *VCS Version 3*

Wind power & others	MW	620	0	360	0	210	1,190
Total	MW	71,120	25,330	36,040	34,080	3,930	170,500

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Calculation of BM of CSPG

	2010	2011	2012	2013	Capacity addition from 2010 to 2013 ¹	Capacity addition from 2011 to 2013 ²	Capacity addition from 2012 to 2013 ³	Ratio to the total capacity addition from 2010 to 2013
Thermal power	95,090	102,930	112,020	122,320	29,334	21,180	11,182	50.40%
Hydro power	69,190	76,170	79,570	93,010	23,520	16,840	13,440	40.41%
Nuclear power	5,030	6,120	6,120	6,120	1,090	0	0	1.87%
Wind power & others	1,190	1,803	4,121	5,445	4,255	3,642	1,324	7.31%
Total	170,500	187,023	201,831	226,895	58,199	41,662	25,946	100.00%
Ratio to 2012's capacity					25.65%	18.36%	11.44%	

OM	0.8959	tCO ₂ /MWh
BM	0.3648	tCO ₂ /MWh
CM	0.4975	tCO ₂ /MWh

Energy Consumption Statistics of Power Generation of the Central China Power Grid in 2011

Fuel type	Unit	Jiang xi	Hena n	Hube i	Hunan	Chongqing	Sichuan	Total	Carbon content	Carbon oxidation rate	Fuel emission factor	Average low calorific value	CO2 emission (tCO2)
									(tC/TJ)	(%)	(kgCO ₂ /TJ)	(MJ/t, km ³)	L=G×J×K/100000 (mass unit) L=G×J×K/10000 (volume unit)
		A	B	C	D	E	F	G=A+...+F	H	I	J	K	
Raw coal	10 ⁴ t	3,080.51	12,081.67	4,076.95	4,204.70	1,780.22	2,783.89	28,007.94	25.8	100	87,300	20,908	511,220,078
Washed coal	10 ⁴ t		30.51					30.51	25.8	100	87,300	26,344	701,678

Other washed coal	10 ⁴ t		129.50			154.05	118.68	402.23	25.8	100	87,300	8,363	2,936,641
Moulded coal	10 ⁴ t							0.00	26.6	100	87,300	20,908	0
Coke	10 ⁴ t							0.00	29.2	100	95,700	28,435	0
gangu	10 ⁴ t	40.79	299.59	54.56	57.15	255.32	79.66	787.07	25.8	100	87,300	8,363	5,746,319
Coke oven gas	10 ⁸ m ³	0.55	6.08	0.02	0.15	1.38	5.11	13.29	12.1	100	37,300	16,726	829,136
blast furnace gas	10 ⁸ m ³	11.89	29.60	147.59	53.35	42.53	50.76	335.72	70.8	100	219,000	3,763	27,666,584
Converter gas	10 ⁸ m ³	1.82			2.98	0.33	6.85	11.98	46.9	100	145,000	7,945	1,380,126
Other gas	10 ⁸ m ³		0.06					0.06	12.1	100	37,300	5,227	1,170
Crude oil	10 ⁴ t		0.04					0.04	20	100	71,100	41,816	1,189
Gasoline	10 ⁴ t							0.00	18.9	100	67,500	43,070	0
Diesel oil	10 ⁴ t	0.50	1.67	1.04	0.78	0.69	1.01	5.69	20.2	100	72,600	42,652	176,193
Fuel oil	10 ⁴ t		1.82	0.22	0.91			2.95	21.1	100	75,500	41,816	93,135
Naphta	10 ⁴ t							0.00	20.2	100	72,600	43,906	0
Lubricating oil	10 ⁴ t							0.00	20	100	71,900	41,398	0
Paraffin	10 ⁴ t							0.00	20	100	72,200	39,934	0
Solvent oil	10 ⁴ t							0.00	20	100	72,200	42,945	0
Petroleum asphalt	10 ⁴ t							0.00	21	100	69,300	38,931	0
Petroleum coke	10 ⁴ t		5.58					5.58	26.6	100	82,900	31,947	147,781
LPG	10 ⁴ t							0.00	17.2	100	61,600	50,179	0

PROJECT DESCRIPTION: *vcs Version 3*

Refine ry gas	10 ⁴ t		1.15	0.88	0.77			2.80	15.7	100	48,200	46,05 5	62,156
Natura l gas	10 ⁸ m ³	0.38	13.93	1.75		0.02	0.71	16.79	15.3	100	54,300	38,93 1	3,549,328
Other petrole um produc ts	10 ⁴ t				5.01			5.01	20	100	72,200	41,81 6	151,258
Other coking produc ts	10 ⁴ t							0.00	25.8	100	95,700	28,43 5	0
Other energy	104 t standard coal		69.79		47.07	16.14	2.08	135.08	0	0	0	0	0
												Total	554,662,77 1

Fuel-fired Electricity Generation of CCPG for Year 2011

Province	Electricity generation	Electricity generation	Internal use rate	Supplied electricity
	(10 ⁸ kWh)	(MWh)	(%)	(MWh)
Jiangxi	665	66,500,000	5.6	62,776,000
Henan	2,498	249,800,000	5.9	235,061,800
Hubei	933	93,300,000	5.8	87,888,600
Hunan	899	89,900,000	6	84,506,000
Chongqing	387	38,700,000		38,700,000
Sichuan	596	59,600,000	7.3	55,249,200
Total		597,800,000		564,181,600

<China Electric Power Yearbook 2012>

Calculation of emission factor for the CCPG in 2011

	2011
Electricity imported from NWCPG (MWh)	15,526,260
Simple OM of NWCPG	0.9404

Electricity imported from NCPG (MWh)	4,154,580
Simple OM of NCPG (MWh)	1.0798
Total CO2 emission (tCO2)	573,749,782
Total supplied electricity (MWh)	583,862,440
Emission factor (tCO2/MWh)	0.9827

Energy Consumption Statistics of Power Generation of the Central China Power Grid in 2012

Fuel type	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total	Carbon content	Carbon oxidation rate	Fuel emission factor	Average low calorific value	CO2 emission (tCO2)
									(tC/TJ)	(%)	(kgCO ₂ /TJ)	(MJ/t, km ³)	
		A	B	C	D	E	F	G=A+...+F	H	I	J	K	L=G×J×K/100000 (mass unit) L=G×J×K/10000 (volume unit)
Raw coal	10 ⁴ t	2,649.47	11,393.35	3,454.97	3,233.93	1,408.27	2,549.04	24,689.03	25.8	100	87,300	20,908	450,641,063
Washed coal	10 ⁴ t		22.71					22.71	25.8	100	87,300	26,344	522,292
Other washed coal	10 ⁴ t		126.80			138.05	93.58	358.43	25.8	100	87,300	8,363	2,616,861
Moulded coal	10 ⁴ t							0.00	26.6	100	87,300	20,908	0
Gangue	10 ⁴ t	66.29	234.49	60.51	85.62	215.65	207.23	869.79	25.8	100	87,300	8,363	6,350,249
Coke	10 ⁴ t			0.49				0.49	29.2	100	95,700	28,435	13,334
Coke oven gas	10 ⁸ m ³	0.37	4.23	0.03	0.15	1.59	4.57	10.94	12.1	100	37,300	16,726	682,525
blast furnace gas	10 ⁸ m ³	17.39	72.19	124.33	65.88	61.12	52.07	392.98	70.8	100	219,000	3,763	32,385,364
Converter gas	10 ⁸ m ³	2.58	1.51		3.19	0.71	8.38	16.37	46.9	100	145,000	7,945	1,885,865
Other gas	10 ⁸ m ³		0.11			0.32		0.43	12.1	100	37,300	5,227	8,384
Other coking products	10 ⁴ t							0.00	25.8	100	95,700	28,435	0
Crude oil	10 ⁴ t		0.03					0.03	20	100	71,100	41,816	892

PROJECT DESCRIPTION: *VCS Version 3*

Gasoline	10 ⁴ t							0.00	18.9	100	67,500	43,070	0
Kerosene	10 ⁴ t							0.00	19.6	100	71,900	43,070	0
Diesel oil	10 ⁴ t	0.33	1.35	0.85	0.63	0.85	1.59	5.60	20.2	100	72,600	42,652	173,406
Fuel oil	10 ⁴ t		0.82	0.25	1.03			2.10	21.1	100	75,500	41,816	66,299
Naphtha	10 ⁴ t							0.00	20.2	100	72,600	43,906	0
Lubricating oil	10 ⁴ t							0.00	20	100	71,900	41,398	0
Paraffin	10 ⁴ t							0.00	20	100	72,200	39,934	0
Solvent oil	10 ⁴ t							0.00	20	100	72,200	42,945	0
Petroleum asphalt	10 ⁴ t							0.00	21	100	69,300	38,931	0
Petroleum coke	10 ⁴ t		5.71		2.22			7.93	26.6	100	82,900	31,947	210,019
LPG	10 ⁴ t							0.00	17.2	100	61,600	50,179	0
Refinery gas	10 ⁴ t		0.74	0.85	0.34			1.93	15.7	100	48,200	46,055	42,843
Other petroleum products	10 ⁴ t							0.00	20	100	72,200	41,816	0
Natural gas	10 ⁸ m ³	0.11	10.01	1.71		0.05	0.21	12.09	15.3	100	54,300	38,931	2,555,770
LNG	10 ⁴ t							0.00	15.3	100	54,300	51,434	0
Other energy	10 ⁴ t standard coal		135.21	182.66	0.17	26.28		344.32	0	0	0	0	0
												Total	498,155,164

<China Energy Statistical Yearbook 2013>

Fuel-fired Electricity Generation of CCPG for Year 2012

Province	Electricity generation (10 ⁹ kWh)	Electricity generation (MWh)	Internal use rate (%)	Supplied electricity (MWh)
Jiangxi	610	61,000,000	5.4	57,706,000
Henan	2,465	246,500,000	6	231,710,000
Hubei	863	86,300,000	5.4	81,639,800
Hunan	765	76,500,000	6	71,910,000

PROJECT DESCRIPTION: *VCS Version 3*

Chongqing	336	33,600,000	8	30,912,000
Sichuan	584	58,400,000	6	54,896,000
Total		562,300,000		528,773,800

<China Energy Statistical Yearbook 2013>

Calculation of emission factor for the CCPG in 2012

	2012
Electricity imported from NWCPG (MWh)	15,965,910
Simple OM of NWCPG	0.9546
Electricity imported from NCPG (MWh)	5,673,710
Simple OM of NCPG (MWh)	1.0583
Total CO2 emission (tCO2)	519,400,709
Total supplied electricity (MWh)	550,413,420
Emission factor (tCO2/MWh)	0.9437

Energy Consumption Statistics of Power Generation of the Central China Power Grid in 2013

Fuel type	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total	Carbon content	Carbon oxidation rate	Fuel emission factor	Average low calorific value	CO2 emission (tCO2)
									(tC/TJ)	(%)	(kgCO ₂ /TJ)	(MJ/t, km ³)	L=G×J×K/100000 (mass unit) L=G×J×K/10000 (volume unit)
		A	B	C	D	E	F	G=A+...+F	H	I	J	K	
Raw coal	10 ⁴ t	3,032.32	11,618.93	3,874.80	3,526.21	1,682.96	2,873.73	26,608.95	25.8	100	87,300	20,908	485,684,756
Washed coal	10 ⁴ t		378.28					378.28	25.8	100	87,300	26,344	8,699,801
Other washed coal	10 ⁴ t		115.43			144.25	102.27	361.95	25.8	100	87,300	8,363	2,642,560
Moulded coal	10 ⁴ t							0.00	26.6	100	87,300	20,908	0

PROJECT DESCRIPTION: *VCS Version 3*

Gangue	10 ⁴ t	70.79	257.59	56.54	119.76	225.57	171.59	901.84	25.8	100	87,300	8,363	6,584,243
Coke	10 ⁴ t			0.10				0.10	29.2	100	95,700	28,435	2,721
Coke oven gas	10 ⁸ m ³	0.39	5.36	0.09	1.19	2.16	8.94	18.13	12.1	100	37,300	16,726	1,131,094
blast furnace gas	10 ⁸ m ³	62.66	83.92	140.49	69.05	91.99	76.21	524.32	70.8	100	219,000	3,763	43,209,054
Converter gas	10 ⁸ m ³	3.66	1.53			0.61	12.60	18.40	46.9	100	145,000	7,945	2,119,726
Other gas	10 ⁸ m ³		0.58					0.58	12.1	100	37,300	5,227	11,308
Other coking products	10 ⁴ t							0.00	25.8	100	95,700	28,435	0
Crude oil	10 ⁴ t		0.06					0.06	20	100	71,100	41,816	1,784
Gasoline	10 ⁴ t							0.00	18.9	100	67,500	43,070	0
Kerosene	10 ⁴ t							0.00	19.6	100	71,900	43,070	0
Diesel oil	10 ⁴ t	0.23	1.37	0.75	0.49	0.70	0.92	4.46	20.2	100	72,600	42,652	138,105
Fuel oil	10 ⁴ t		0.74	0.16	0.70	0.05		1.65	21.1	100	75,500	41,816	52,092
Naphtha	10 ⁴ t							0.00	20.2	100	72,600	43,906	0
Lubricating oil	10 ⁴ t							0.00	20	100	71,900	41,398	0
Paraffin	10 ⁴ t							0.00	20	100	72,200	39,934	0
Solvent oil	10 ⁴ t							0.00	20	100	72,200	42,945	0
Petroleum asphalt	10 ⁴ t							0.00	21	100	69,300	38,931	0
Petroleum coke	10 ⁴ t	0.11	6.73		4.05			10.89	26.6	100	82,900	31,947	288,411
LPG	10 ⁴ t							0.00	17.2	100	61,600	50,179	0
Refinery gas	10 ⁴ t	1.12	0.73	0.75	0.21			2.81	15.7	100	48,200	46,055	62,378
Other petroleum products	10 ⁴ t							0.00	20	100	72,200	41,816	0
Natural gas	10 ⁸ m ³	0.09	8.31	1.84		0.38	1.38	12.00	15.3	100	54,300	38,931	2,536,744
LNG	10 ⁴ t							0.00	15.3	100	54,300	51,434	0
Other energy	10 ⁴ t standard coal	32.03	158.25	256.25	52.36	9.12	38.19	546.20	0	0	0	0	0

												Total	553,164,779
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<China Energy Statistical Yearbook 2014>

Fuel-fired Electricity Generation of CCPG for Year 2013

Province	Electricity generation (10 ⁸ kWh)	Electricity generation (MWh)	Internal use rate (%)	Supplied electricity (MWh)
Jiangxi	723	72,300,000	5.16	68,569,320
Henan	2,691	269,100,000	5.57	254,111,130
Hubei	1,054	105,400,000	5.24	99,877,040
Hunan	843	84,300,000	5.85	79,368,450
Chongqing	412	41,200,000	7.7	38,027,600
Sichuan	593	59,300,000	5.2	56,216,400
Total		631,600,000		596,169,940

<China Energy Statistical Yearbook 2014>

Calculation of emission factor for the CCPG in 2013

	2012
Electricity imported from NWCPG (MWh)	13,823,150
Simple OM of NWCPG	0.9424
Electricity imported from NCPG (MWh)	8,703,210
Simple OM of NCPG (MWh)	0.9913
Total CO ₂ emission (tCO ₂)	574,819,207
Total supplied electricity (MWh)	618,696,300
Emission factor (tCO ₂ /MWh)	0.9291

Calculation of average emission factor for the CCPG in 2011-2013

	2011	2012	2013
Total CO ₂ emission (tCO ₂)	573,749,782	519,400,709	574,819,207
Total supplied electricity (MWh)	583,862,440	550,413,420	618,696,300
Emission factor(tCO ₂ /MWh)	0.9827	0.9437	0.9291

Weighted average OM	0.9515
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Energy Consumption Statistics of Power Generation of the Central China Power Grid in 2013

Fuel type	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total	Average low calorific value	Fuel emission factor	Carbon oxidation rate	CO2 emission (tCO2)
									(MJ/t, km ³)	(kgCO ₂ /TJ)		K=G×H×I×J/100000
		A	B	C	D	E	F	G=A+...+F	H	I	J	
Raw coal	10 ⁴ t	3,032.32	11,618.93	3,874.80	3,526.21	1,682.96	2,873.73	26,608.95	20,908	87,300	1	485,684,756
Washed coal	10 ⁴ t	0	378.28	0	0	0	0	378.28	26,344	87,300	1	8,699,801
Other washed coal	10 ⁴ t	0	115.43	0	0	144.25	102.27	361.95	8,363	87,300	1	2,642,560
Moulded coal	10 ⁴ t	0	0	0	0	0	0	0	20,908	87,300	1	0
Gangue	10 ⁴ t	70.79	257.59	56.54	119.76	225.57	171.59	901.84	8,363	87,300	1	6,584,243
Coke	10 ⁴ t	0	0	0.10	0	0	0	0.10	28,435	95,700	1	2,721
Other coking products	10 ⁴ t	0	0	0	0	0	0	0	28,435	95,700	1	0
Sub-total												503,614,082
Crude oil	10 ⁴ t	0	0.06	0	0	0	0	0.06	41,816	71,100	1	1,784
Gasoline	10 ⁴ t	0	0	0	0	0	0	0	43,070	67,500	1	0
Kerosene	10 ⁴ t	0	0	0	0	0	0	0	43,070	71,900	1	0
Diesel oil	10 ⁴ t	0.23	1.37	0.75	0.49	0.70	0.92	4.46	42,652	72,600	1	138,105
Fuel oil	10 ⁴ t	0	0.74	0.16	0.70	0.05	0	1.65	41,816	75,500	1	52,092
Petroleum coke	10 ⁴ t	0.11	6.73	0	4.05	0	0	10.89	31,947	82,900	1	288,411

Other petroleum products	10 ⁴ t		0	0	0	0	0	0	41,816	72,200	1	0
Sub-total												480,393
Natural gas	10 ⁸ m ³	0.90	83.10	18.40	0.00	3.80	13.80	120.00	38,931	54,300	1	2,536,744
LNG	10 ⁴ t	0	0.00	0.00	0.00	0	0	0.00	51,434	54,300	1	0
Coke oven gas	10 ⁸ m ³	3.90	53.60	0.90	11.90	21.60	89.40	181.30	16,726	37,300	1	1,131,094
Blast furnace gas	10 ⁸ m ³	626.60	839.20	1,404.90	690.50	919.90	762.10	5,243.20	3,763	219,000	1	43,209,054
Converter gas	10 ⁸ m ³	36.60	15.30	0.00	0.00	6.10	126.00	184.00	7,945	145,000	1	2,119,726
Other gas	10 ⁸ m ³	0.00	5.80	0.00	0.00	0.00	0.00	5.80	5,227	37,300	1	11,308
LPG	10 ⁴ t	0.00	0.00	0	0.00	0.00	0.00	0.00	50,179	61,600	1	0
Refinery gas	10 ⁴ t	1.12	0.73	0.75	0.21	0.00	0	2.81	46,055	48,200	1	62,378
Sub-total												49,070,304
Other energy	10 ⁴ t standard coal	31.03	158.25	256.35	52.36	9.12	38.19	545.30	0	0	0	0
									Total			553,164,779

<China Energy Statistical Yearbook 2014>

Calculation of Fuel Emission Factors

	Parameter	Electricity supply efficiency(%)	Fuel emission factor(kgCO ₂ /TJ)	Oxidation rate	Fuel emission factor(tCO ₂ /MWh)
		A	B	C	D=3.6/A/10,000×B×C
Coal-fired power plant	$EF_{Coal,Adv,y}$	42.0	87,300	1	0.7483
Oil-fired power plant	$EF_{Oil,Adv,y}$	52.9	75,500	1	0.5138
Gas-fired power plant	$EF_{Gas,Adv,y}$	52.9	54,300	1	0.3695

Calculation of Thermal Emission Factor

$\lambda_{Coal,y}$	91.04%	$\lambda_{Oil,y}$	0.09%	$\lambda_{Gas,y}$	8.87%
EF _{Thermal,y} (tCO ₂ /MWh)				0.71449	

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Installed Capacity of CCPG for 2013

Installed capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal power	MW	15,030	56,280	22,400	19,290	8,580	15,820	137,400
Hydro power	MW	4,570	3,950	36,160	14,010	6,420	52,660	117,770
Nuclear power	MW	0	0	0	0	0	0	0
Wind power and others	MW	385	290	403	338	102	143	1,661
Total	MW	19,985	60,520	58,963	33,638	15,102	68,623	256,831

<China Electric Power Yearbook 2014>

Installed Capacity of CCPG for 2012

Installed capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal power	MW	15,050	53,550	21,740	19,060	7,240	14,930	131,570
Hydro power	MW	4,200	3,950	35,950	13,720	6,110	39,640	103,570
Nuclear power	MW	0	0	0	0	0	0	0
Wind power and others	MW	216	150	182	190	50	20	808
Total	MW	19,466	57,650	57,872	32,970	13,400	54,590	235,948

<China Electric Power Yearbook 2013>

Installed Capacity of CCPG for 2011

Installed capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal power	MW	13,820	49,190	19,180	17,650	6,940	14,440	121,220
Hydro power	MW	4,110	3,950	33,860	13,370	5,980	33,420	94,690
Nuclear power	MW	0	0	0	0	0	0	0
Wind power and others	MW	137	110	103	106	50	20	526
Total	MW	18,067	53,250	53,143	31,126	12,970	47,880	216,436

<China Electric Power Yearbook 2012>

Installed Capacity of CCPG for 2010

Installed capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
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PROJECT DESCRIPTION: *VCS Version 3*

Thermal power	MW	12,940	46,870	18,150	16,090	6,740	12,580	113,370
Hydro power	MW	4,040	3,650	30,850	12,990	4,880	30,700	87,110
Nuclear power	MW	0	0	0	0	0	0	0
Wind power and others	MW	82	50	63	38	50	0	283
Total	MW	17,062	50,570	49,063	29,118	11,670	43,280	200,763

<China Electric Power Yearbook 2011>

BM calculation of CCPG

	2010	2011	2012	2013	Capacity addition from 2010 to 2013 ¹	Capacity addition from 2011 to 2013 ²	Capacity addition from 2012 to 2013 ³	Ratio to the total capacity addition from 2010 to 2013
Thermal power	113,370	121,220	131,570	137,400	30,470	19,247	7,858	48.98%
Hydro power	87,110	94,690	103,570	117,770	30,360	23,080	14,200	48.80%
Nuclear power	0	0	0	0	0	0	0	0.00%
Wind power and others	283	526	808	1,661	1,378	1,135	853	2.22%
Total	200,763	216,436	235,948	256,831	62,208	43,462	22,911	100.00%
Ratio to the capacity of 2012					24.22%	16.92%	8.92%	

Attention: ¹ and ² and ³ are capacity addition calculated considering installed capacity, shut-down capacity and pumped storage capacity.

OM	0.9515	tCO ₂ /MWh
BM	0.3500	tCO ₂ /MWh
CM	0.5003	tCO ₂ /MWh

APPENDIX 2

The date of trial operation of each hydropower plant under the grouped project is taken as the project start date. The following starting dates of each individual projects are collected from each construction accomplishment acceptance report, which can be seen as a third party proof for the project starting dates, and the operation lifetime of each individual projects are collected from each FSR.

Project No.	Project Title	Project Start Date	Project Operational Lifetime	End date of the second crediting period
1	Zengfuyoujiang Hydroelectric Plant	Dec 2007	25	27/03/2026
2	Jianshitan Hydroelectric Plant	Oct 2005	25	27/03/2026
3	Jinxing Hydroelectric Plant	Nov 2005	25	27/03/2026
4	Huzhong Hydroelectric Plant	Nov 2005	25	27/03/2026
5	Chongqing Wanzhou Fengmu Hydroelectric Plant	June 2006	20	27/03/2026
6	Chongqing Wanzhou Longdong Hydroelectric Plant	Sep 2005	20	31/08/2025
7	Chongqing Wanzhou Dengta Hydroelectric Plant	Dec 2005	20	30/11/2025
9	Chongqing Wanzhou Xiaolong Hydroelectric Plant	Dec 2006	20	27/03/2026
10	Chongqing Wanzhou Yihe Hydroelectric Plant	Dec 2007	20	27/03/2026
11	Chongqing Wanzhou Tiande Hydroelectric Plant	October 2003	20	30/09/2023
12	Chongqing Wanzhou Puziling Hydroelectric Plant	Jan 2007	20	27/03/2026
13	Chongqing Wanzhou Yanshan Hydroelectric Plant	Aug 2006	20	27/03/2026
15	Chongqing Wanzhou Wanlin Hydroelectric Plant	Apr 2007	20	27/03/2026
18	Chongqing Wanzhou Yanjingxi Hydroelectric Plant	Dec 2006	20	27/03/2026
21	Chongqing Wanzhou Xianfeng Hydroelectric Plant	Mar 2007	20	27/03/2026
22	Heba Hydroelectric Plant	Dec 2005	25	27/03/2026
23	Sandaoguai Hydroelectric Plant	Dec 2005	25	27/03/2026
24	Beiya Hydroelectric Plant	Oct 2003	25	27/03/2026
25	Wulong Guanqiao Hydroelectric Plant	Jun 2003	25	27/03/2026
27	Qingtongxi Hydroelectric Plant	May 2004	25	27/03/2026
28	Heping Hydroelectric Plant	Sep 2005	25	27/03/2026
29	Guanziya Hydroelectric Plant	Jun 2003	25	27/03/2026
30	Baiyangping Hydroelectric Plant	Jun 2003	25	27/03/2026
31	Chengmending Hydroelectric Plant	Jan 2005	25	27/03/2026
32	Shuanglong Hydroelectric Plant	Apr 2003	25	27/03/2026
33	Chushuitang Hydroelectric Plant	Dec 2005	25	27/03/2026
34	Shuangqiao Hydroelectric Plant	Dec 2007	25	27/03/2026
35	Shiqiao Hydroelectric Plant	Oct 2005	25	27/03/2026
36	Shuanglian Hydroelectric Plant	Aug 2004	25	27/03/2026
37	Baijia Hydroelectric Plant	Oct 2004	25	27/03/2026
38	Xinqiao Hydroelectric Plant	Apr 2004	25	27/03/2026
39	Luchi Hydroelectric Plant	Dec 2004	25	27/03/2026
40	Xiangyang Stage III Hydroelectric Plant	Oct 2005	25	27/03/2026

41	Xiangyun Hydroelectric Plant	May 2005	25	27/03/2026
42	Hongshan Hydroelectric Plant	Feb 2006	25	27/03/2026
44	Yong'an Hydroelectric Plant	Apr 2007	25	27/03/2026
45	Suokousi Hydroelectric Plant	Aug 2005	25	27/03/2026
46	Xinli Hydroelectric Plant	Apr 2004	25	27/03/2026
47	Caijiagou Stage III Hydroelectric Plant	May 2004	25	27/03/2026
48	Xiangyang Stage I Hydroelectric Plant	July 2005	25	27/03/2026
49	Cheqingyan Hydroelectric Plant	Oct 2003	25	27/03/2026
50	Lianghekou Hydroelectric Plant	Nov 2004	25	27/03/2026
51	Wuhe Hydroelectric Plant	Aug 2006	25	27/03/2026
52	Sihe Hydroelectric Plant	Jan 2006	25	27/03/2026
53	Shilingyan Hydroelectric Plant	June 2003	25	27/03/2026
54	Nanmu Hydroelectric Plant	Oct 2004	25	27/03/2026
55	Canglong Hydroelectric Plant	Oct 2004	20	30/09/2024
56	Daheba Hydroelectric Plant	Oct 2004	25	27/03/2026
57	Heixigou Hydroelectric Plant	Dec 1st 2002	20	30/11/2022
58	Yanchanghe Stage III Hydroelectric Plant	Dec 2005	25	27/03/2026
59	Muzonghe Stage IV Hydroelectric Plant	Dec 30th 2003	25	27/03/2026
60	Dengta Hydroelectric Plant	Oct 2004	25	27/03/2026
61	Bangqiao Stage II Hydroelectric Plant	Sep 2004	25	27/03/2026
62	Shuangchahe Hydroelectric Plant	Dec 2005	25	27/03/2026
63	Songshigou Hydroelectric Plant	July 2005	25	27/03/2026
65	Shujiahe Hydroelectric Plant	Aug 2004	25	27/03/2026
66	Yangyan Hydroelectric Plant	Apr 2003	25	27/03/2026
67	Baiguo Hydroelectric Plant	Jun 2003	20	30/05/2023
68	Longqiao Hydroelectric Plant	Apr 2004	25	27/03/2026
69	Baiyang Hydroelectric Plant	Jun 2003	20	30/05/2023
70	Xinmin Tailwater Stage II Hydroelectric Plant	Mar 2004	25	27/03/2026
71	Dongliuhe Hydroelectric Plant	Aug 2004	25	27/03/2026
72	Dahegou Hydroelectric Plant	Jan 20th 2007	20	27/03/2026
73	Xinmin Stage II Hydroelectric Plant	May 2004	25	27/03/2026
74	Guizhou Province Xingyi City Puti Hydropower Plant Technical Reform Project	June 2004	20	30/05/2024
75	Guizhou Province Xingyi City Puti 2nd Stage (Xiniutang) Hydropower Plant Technical Reform Project	June 2004	20	30/05/2024
76	Wumaxi Stage I Hydroelectric Plant	June 20th 2004	20	19/06/2024
77	Mozigou Hydroelectric Plant	Jan 2005	20	31/12/ 2024
78	Mayihe Hydroelectric Plant	Jan 2005	20	31/12/ 2024
79	Jinyatan Hydroelectric Plant	May 2005	20	30/04/2025
80	Toudaoshui Hydroelectric Station	June 2004	20	31/05/2024
81	Sanhui Hydroelectric Plant	April 2005	20	31/03/2025
82	Qingshuihe Stage I Hydroelectric Plant	Dec 2006	20	27/03/2026
83	Gongjiagou Hydroelectric Plant	July 1st 2005	20	30/06/2025
84	Chahe Stage III Hydroelectric Plant	Dec 25th, 2005	20	24/12/2025
85	Daihuanggou Hydroelectric Plant	Aug 2005	20	31/07/ 2025
86	Gaoqiaohe Hydroelectric Plant	June 2003	20	31/05/2023
87	Zhuyeshan Hydroelectric Plant	April 2003	30	27/03/2026
88	Lianghekou Hydroelectric Plant	Dec 2003	20	30/11/2023

90	Dabaishu Hydroelectric Plant	October 2004	20	30/09/ 2024
91	Dashi Stage III Hydroelectric Plant	September 2005	20	31/08/2025
92	Dashi Stage II Hydroelectric Plant	June 2004	20	31/05/2024
93	Yunnan Midu County Taishanhe Hydropower Station	Aug 2008	20	27/03/2026
94	Zhenyuan County Xiaojiehe Hydropower Station	Mar 2008	30	27/03/2026
95	Jinghong City Chuangye Hydropower Station	Aug 2006	20	27/03/2026
96	Yingjiang Husa River 5th Stage Hydropower Plant	Sep 2006	20	27/03/2026
97	Yunnan Province Jinping County Mengqiao Village Datan Hydropower Station	May 2005	30	27/03/2026
98	Fugong County Lishadi Hydropower Plant Project	Dec 16th 2005	20	15/12/2025

APPENDIX 3

Project No.	Project Title	Name and Date of EIA report/form accomplishment	Name and Date of Approval of EIA report/form
1	Zengfuyoujiang Hydroelectric Plant	Zengfuyoujiang Hydroelectric Plant EIA Registration Form, February 2002	Fuling district Environmental Protection Bureau, EIA Registration Form, February 2002
2	Jianshitan Hydroelectric Plant	Jianshitan Hydroelectric Plant EIA Registration Form, December 2004	Nanchuan district Environmental Protection Bureau, EIA Registration Form, December 2004
3	Jinxing Hydroelectric Plant	Jinxing Hydroelectric Plant EIA Registration Form, September 2004	Fuling district Environmental Protection Bureau, EIA Registration Form, September 2004
4	Huzhong Hydroelectric Plant	Huzhong Hydroelectric Plant EIA Registration Form, July 2003	Pengshui county Environmental Protection Bureau, EIA Registration Form, July 2003
5	Chongqing Wanzhou Fengmu Hydroelectric Plant	Wanzhou Environmental Scientific Research Institution, EIA Report Table, June 2005	Approval of the EIA Table Wanzhou Environment Bureau, June 2005
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