

GROUPED HYDROPOWER PLANTS IN CHONGQING, YUNNAN, SICHUAN AND GUIZHOU PROVINCES, P.R. CHINA MONITORING REPORT



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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The Grouped Project consists of 95¹ individual hydropower plants with a total installed capacity of 215.71 MW, and the maximum installed capacity of an individual power plant is 14 MW. All projects are run-of-river hydropower stations, spread widely across the less developed rural areas of southwestern China, consisting of four provinces. Out of 95 hydropower plants, 9 projects are located in Yunnan, 67 in Chongqing, 13 in Sichuan and 6 in Guizhou Province; and out of 95 hydropower plants, 81 plants exporting electricity to the Central China Power Grid (CCPG), and 14 plants exporting electricity to the Southern China Power Grid (SCPG). The entire Grouped Project complies with the VCS.

For the implementation dates of each project plant under the Grouped Project please see the table in Appendix 1.

During this monitoring period from 26-06-2011 to 25-06-2013², the total GHG emission reductions generated by the Grouped Project are 1,016,115 tCO₂e GHG, with 787,108 tCO₂e within the CCPG and 229,007 tCO₂e within the SCPG.

According to VCS requirement, sampling should be carried out for a grouped project, and the sampling of a grouped project shall take account of any sub groups and associated activities within each sub group. Please see section 3.3.1 for details about the implementation of sampling approach.

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.

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)

¹ Previously there were 98 hydropower plants included in the grouped project, three hydropower plants (17_Luotian, 19_Baidongyan and 89_Dashi Stage I) have already been withdrawn from the grouped project according to the agreement between VVB and the project proponents during the validation processes, with the projects serial numbers remaining unchanged. Please see details in the VCS PD.

² The 1st and 2nd monitoring periods of the Grouped Project are respectively from 01-04-2006 to 05-06-2009 and from 14-06-2009 to 25-06-2011. This time the 3rd monitoring period is from 26-06-2011 to 25-06-2013. There is no overlap between the first and second monitoring periods.

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	Zhijie Duan
Title	Project Manager
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Telephone	+41 43 501 35 50
Email	j.duan@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 Chepanchengmending Hydroelectric Plant 23 Wulong Yajiang Longbao Hydroelectric Plant 24&26&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 33 Wulong Chushuitang Hydroelectric Plant 34 Wulong Shuangqiao Hydroelectric Plant 35 Wulong Longyuan Science & Technology Development
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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.

	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 43 Wulong Leyuan Hydropower Co., Ltd. 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 64 Wulong Haoyun Hydropower Co., Ltd. 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. Liao Zhenghua
Title	Chairman of Chongqing Wulong County Small Hydropower Industry Association
Address	Wulong County, Chongqing City
Telephone	+86 62522468

Email	yu.deng@ecochain.cn
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Organization name	5&6 Wanzhou Yongfa Water Conservancy Development Co., Ltd. 7 Wanzhou Huiyin Hydropower Development Co., Ltd. 8 Wanzhou Ertunhe 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. 14 Wanzhou Lianmeng Hydropower Equipments Co., Ltd. 15 Wanzhou Wanlin Hydroelectric Plant 16 Wanzhou Rongchuan Hydropower Development Co., Ltd. 20 Wanzhou Runfeng Hydropower Development Co., Ltd. 21 Chongqing Wanzhou Xianfeng Hydroelectric Plant
Contact person	Mr. Yin Xianyun
Title	Legal Representative of Chongqing Wanzhou Electric Development Co., Ltd.
Address	No. 64, Ningboyizhi Road, Wanzhou District, Chongqing City, 404020, P.R. China
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
Address	8, Fumin Str. Huangcaoban, Xingyi City, Guizhou Province, P.R. China
Telephone	+86 859 3912799
Email	gz_chen@126.com

Organization name	76 Yingjing County Sanhe Township Wumaxi Stage I Hydroelectric Station
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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
Telephone	+86 13908163238
Email	yu.deng@ecochain.cn

Organization name	77 Yingjing Sanhe Mozigou Hydroelectric Plant 85 Yingjing County Sanhe Daihuanggou Hydroelectric Plant
Contact person	Mr. Mao Jiong
Title	Legal Representative
Address	Sanhe Village, Yingjing County, Ya'an City, Sichuan Province, P.R. China
Telephone	+86 835 7630286
Email	yu.deng@ecochain.cn

Organization name	78 Yingjing Mayihe Hydropower Station
Contact person	Mr. Mou Wei
Title	Legal Representative
Address	Hospital of Integrated Traditional Chinese Medicine with Western Medicine, Yingjing County, Ya'an City, Sichuan Province, P.R. China
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

Email	yu.deng@ecochain.cn
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Organization name	80 Yingjing County Toudaoshui Hydroelectric Station
Contact person	Mr. Dong Guozhong
Title	Legal Representative
Address	Yingjing bureau for industry and commerce, Yingjing County, Ya'an City, Sichuan Province, P.R. China
Telephone	+86 13908163614
Email	yu.deng@ecochain.cn

Organization name	81 Sichuan Yingjing Sanhui Electric Power Co., Ltd.
Contact person	Mr. Ren Ruxiang
Title	Legal Representative
Address	Dianli Village, Yingjing County, Ya'an City, Sichuan Province, P.R. China
Telephone	+86 835 7623901
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
Telephone	+86 835 7630338
Email	yu.deng@ecochain.cn

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
Email	yu.deng@ecochain.cn

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
Email	yu.deng@ecochain.cn

Organization name	88 E'bian Longxin Electric Power Co., Ltd.
Contact person	Mr. Wei Yi
Title	General Manager
Address	Heizhugou Township, Ebian Yi Autonomous County, Leshan City, Sichuan Province, P.R. China
Telephone	+86 833 5280518
Email	wydgx@163.com

Organization name	90&91&92 Lingcang Runda Hydropower Co., Ltd.
Contact person	Mr. Zhang Jin
Title	General Manager
Address	Building B, Kangfa Business-living Building, Hongqiao Street, Linxiang District, Lincang City, Yunnan Province, P.R. China
Telephone	+86 883 8881577
Email	rundasd_lc@163.com

Organization name	93 Midu County Taishan Power Co., Ltd.
Contact person	Mr. Zhi Jianping
Title	Legal Representative
Address	Niujie Kanglang Village, Midu County, Yunnan Province, P.R. China
Telephone	-
Email	zhangqingxi@263.net

Organization name	94 Zhenyuan Yi, Hani and Lahu Autonomous County Xiaojiehe Hydropower Co., Ltd.
Contact person	Mr. Zhang Jizhong
Title	Legal Person
Address	Nongfaban, Zhenyuan County, Puer City, Yunnan Province, P.R. China
Telephone	+86 879 5861888

Email	zhangqingxi@263.net
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Organization name	95 Xishuangbanna Chuangye Hydropower Development Co., Ltd.
Contact person	Mr. Wei Yulin
Title	Legal Person
Address	Jinghong Road 26, Jinghong City, Xishuangbanna, Yunnan Province, P.R. China
Telephone	+86 691 2122286
Email	zhangqingxi@263.net

Organization name	96 Yingjiang County Tianchao Hydropower Co. Ltd.
Contact person	Mr. Zhao Chuanshan
Title	Director
Address	Jiemao Village, Yingjiang County, Yunnan Province, P.R. China
Telephone	+86 871 8151606
Email	zengs11999@sina.com

Organization name	97 Jinping Mengqiao Datan Electricity Co. Ltd.
Contact person	Mr. Zhu Tianchao
Title	Director
Address	Hengxin Yinshicheng, Xinan Str., Kaiyuan City, Yunnan Province, P.R. China
Telephone	+86 873 7272738
Email	zhaochenchen126@126.com

Organization name	98 Yunnan Fugong Huatai Electricity Development Co. Ltd.
Contact person	Mr. Zhao Chuanshan
Title	Director

Address	Shangpa Mnicipality, Fugong County, Yunnan Province, P.R. China
Telephone	+86 871 8151606
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)

1.6 Project Crediting Period

The starting date of the crediting period of the project activity is 28 March 2006 and the end date is 27 March 2016. The total number of years: 10 years.

It is a renewable crediting period and can be renewed twice.

1.7 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 geodetic coordinate of each hydropower plants under the Grouped project are all provided in Appendix 3, 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, 15 hydropower plants are located in Wanzhou County along the Northeast direction from Chongqing city (project numbers included: 5~16, 18, 20~21), whereas 52 hydropower plants are located in Wulong County to the Southeast of Chongqing (project numbers included: 1~4, 22~69).



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 plants 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 plants 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

1.8 Title and Reference of Methodology

As per Appendix B of the UNFCCC's "Simplified modalities and procedures for small-scale clean development mechanism project activities", following approved small-scale CDM methodology is applied to the Project:

Project Type (i): Renewable energy projects

Project Category/Methodology: AMS-I.D. – Grid connected renewable electricity generation (Version 13.0)

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 1.1) is used. For more information, please refer to the following link:
http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v2.pdf/history_view

1.9 Other Programs

None of all individual project activities under the Grouped Project is included in any emissions trading programs or any other mechanisms that include GHG allowance trading. The net GHG emission reductions generated by the Grouped Project during this monitoring period have not been used for compliance under any emission trading programs or mechanisms.

The project have not sought or received any other form of GHG-related environmental credit during this monitoring period.

List of all and any other programs under which the project is eligible to create another form of GHG-related environment credit: CDM, GS VER.

The project has been only registered under the VCS Program, and it has not been registered under any other approved or not approved GHG programs.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

During this monitoring period, all the individual project plant under this Grouped Project are operating normally, and no events happened, which may impact the GHG emission reductions or removals and monitoring.

2.2 Deviations

2.2.1 Methodology Deviations

No methodology deviations during this monitoring period.

2.2.2 Project Description Deviations

No project description deviations during this monitoring period.

2.3 Grouped Project

There is no new instance of the project activity included under this Grouped project during this monitoring period.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data and parameters of Central China Power Grid (CCPG) that are available at validation, required for estimating the baseline grid emission factor.

Data / Parameter	EG _{CCPG,y}
Data unit	MWh
Description	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 (years) y (2004-2006, Central China Power Grid)
Source of data	China Electric Power Yearbook 2000-2007
Value applied:	Provided in Annex I of the PD
Justification of choice of data or description of measurement methods and procedures applied	Official statistical data
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	Electricity Imports from Connected Electricity Systems to Central China Power Grid
Data unit	MWh
Description	Electricity Imports from Connected Electricity Systems to Central China Power Grid in (years) y (2004-2006)
Source of data	China Electric Power Yearbook 2000-2007
Value applied:	Provided in Annex I of the PD
Justification of choice of data or description of measurement methods	Official statistical data

and procedures applied	
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	$FC_{i,y}$
Data unit	$10^4 t / 10^8 m^3$
Description	Amount of fuel i consumed in the project electricity system in (years) y (2004-2006, Central China Power Grid)
Source of data	China Energy Statistics Yearbook 2005-2007
Value applied:	Provided in Annex I of the PD
Justification of choice of data or description of measurement methods and procedures applied	Official statistical data
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	$NCV_{i,y}$
Data unit	$TJ / 10^3 t$
Description	Net calorific value per mass or volume unit of fuel i
Source of data	China Energy Statistics Yearbook 2007
Value applied:	Provided in Annex I of the PD
Justification of choice of data or description of measurement methods and procedures applied	Official statistical data
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	$EF_{CO_2,i,y}$
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 Annex I of the PD
Justification of choice of data or description of measurement methods and procedures applied	Official statistical data
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	Efficiency level of best technology commercially available in China for coal, oil and gas-fired power generation
Data unit	%
Description	Efficiency level of best technology commercially available in China for coal, oil and gas-fired power generation
Source of data	China DNA: Notification on Determining the Regional Grid Emission Factors of China
Value applied:	Coal: 37.28% Oil and Gas: 48.81%
Justification of choice of data or description of measurement methods and procedures applied	Official statistical data
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	CAP _{Total,y}
Data unit	MWh
Description	The total capacity addition of the selected period in which approximately 20% capacity has been added to the grid in (years) y (2000-2007, Central China Power Grid)
Source of data	China Electric Power Yearbook 2000-2007
Value applied:	Provided in Annex I of the PD
Justification of choice of data or description of	Official statistical data

measurement methods and procedures applied	
Purpose of the data	Calculation of baseline emissions
Comments	-

Date and parameters of Southern China Power Grid (SCPG) that are available at validation, required for estimating the baseline grid emission factor.

Data / Parameter	$EF_{SCPG,y}$
Data unit	MWh
Description	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) (2004-2006, Southern China Power Grid)
Source of data	China Electric Power Yearbook 2005-2007
Value applied:	Provided in Annex I of the PD
Justification of choice of data or description of measurement methods and procedures applied	Official statistical data
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	Electricity Imports from Connected Electricity Systems to Southern China Power Grid
Data unit	MWh
Description	Electricity Imports from Connected Electricity Systems to Southern China Power Grid in (years) y (2004-2006)
Source of data	China Electric Power Yearbook 2000-2007
Value applied:	Provided in Annex I of the PD
Justification of choice of data or description of measurement methods and procedures applied	Official statistical data
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	$FC_{i,y}$
Data unit	$10^4 t / 10^8 m^3$
Description	Amount of fuel i consumed in the project electricity system in (years) y (2004-2006, Southern China Power Grid)
Source of data	China Energy Statistics Yearbook 2005-2007
Value applied:	Provided in Annex I of the PD
Justification of choice of data or description of measurement methods and procedures applied	Official statistical data
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	$NCV_{i,y}$
Data unit	$TJ / 10^3 t$
Description	Net calorific value per mass or volume unit of fuel i
Source of data	China Energy Statistics Yearbook 2007
Value applied:	Provided in Annex I of the PD
Justification of choice of data or description of measurement methods and procedures applied	Official statistical data
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	$EF_{CO_2,i,y}$
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 Annex I of the PD
Justification of choice of data or description of	Official statistical data

measurement methods and procedures applied	
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	Efficiency level of best technology commercially available in China for coal, oil and gas-fired power generation
Data unit	%
Description	Efficiency level of best technology commercially available in China for coal, oil and gas-fired power generation
Source of data	China DNA: Notification on Determining the Regional Grid Emission Factors of China
Value applied:	Coal: 37.28% Oil and Gas: 48.81%
Justification of choice of data or description of measurement methods and procedures applied	Official statistical data
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	CAP _{Total,y}
Data unit	MWh
Description	The total capacity addition of the selected period in which approximately 20% capacity has been added to the grid in (years) y (2004-2006, Southern China Power Grid)
Source of data	China Electric Power Yearbook 2005-2007
Value applied:	Provided in Annex I of the PD
Justification of choice of data or description of measurement methods and procedures applied	Official statistical data
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	EF _{Res}
Data unit	kgCO ₂ e/MWh
Description	Default emission factor for emissions from reservoirs of hydro power plants in year y
Source of data	ACM0002 Version 10
Value applied:	90
Justification of choice of data or description of measurement methods and procedures applied	Default emission factor for emissions from reservoirs from methodology
Purpose of the data	Calculation of project emissions
Comments	-

3.2 Data and Parameters Monitored

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

Data / Parameter	EG _{Export,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.
Frequency of monitoring/recording	Measured continuously and recorded on a monthly basis
Value monitored:	The electricity exported to the CCPG by the Grouped project is 808,687.463 MWh during this monitoring period.
Monitoring equipment	The detailed information including type, accuracy class, serial number of the monitoring equipment is provided in Table 3-4 in section 3.3.2.
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	-

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

Data / Parameter	$EG_{\text{Export},y}$
Data unit	MWh/y
Description	The accumulated net electricity exported to the Southern China 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	Measured continuously by kilowatt-hours meters and recorded on a monthly basis by monitoring personnel.

applied	
Frequency of monitoring/recording	Measured continuously and recorded on a monthly basis
Value monitored:	The electricity exported to the SCPG by the Grouped project is 262,886.216 MWh during this monitoring period.
Monitoring equipment	The detailed information including type, accuracy class, serial number of the monitoring equipment is provided in Table 3-4 in section 3.3.2.
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	-

3.3 Monitoring Plan

3.3.1 The implementation of sampling approach

According to VCS requirement, sampling should be carried out for a grouped project, and the sampling of a grouped project shall take account of any sub groups and associated activities within each sub group.

A sampling approach was applied to the Grouped Project according to the relevant Sampling Guidance by the VVB⁴. 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. By considering the project amount within different sub-groups and classified scale of the project activity (i.e. installed capacity $\leq 5\text{MW}$ or $> 5\text{MW}$), in the end, 18⁵ projects of the total 95 hydropower plants under this Grouped project are sampled. The final sampling result is demonstrated in the table below:

Table 3-1 Sampling Projects

Province	Number of Projects	Number of Samples Required	Sampling Project Serial No.
Sichuan	13	4	78, 85, 86, 87
Chongqing	67	9	21, 37, 55, 57, 59, 62, 63, 67, 69
Yunnan	9	3	90, 92, 98
Guizhou	6	2	72, 73
Total	95	18	-

Based on the main characteristics of the Grouped project, such as the geographical distribution, to which power grid the electricity is supplied, project type and similarity, installed capacity of the individual project and so on, the sampling projects are the most representative projects for the whole 95 projects under the Grouped project. Therefore, during the verification, only the sampling projects need to be verified and under completeness check.

3.3.2 Monitoring Plan Description

The objective of the monitoring plan is to ensure the complete, consistent, clear, and accurate monitoring and calculation of emission reductions during the entire crediting period of the project

⁴ For details please refer to section 3.2 of the validation report.

⁵ Since all the retrofitted projects (i.e. Project No. 17, 19 and 89) were withdrawn by the project participants during validation process, the total project amount is finally 95 sub projects with the Grouped Project; And since one of the withdrawn projects (Project No. 89) was also the sampled project (the previous total number of sampled projects was 19 before all three retrofitted projects were withdraw), so the total sampling project amount is finally 18 projects within the Grouped Project.

activity. The project owners will be responsible for the implementation of the monitoring plan, and the grid company will cooperate with the project owners.

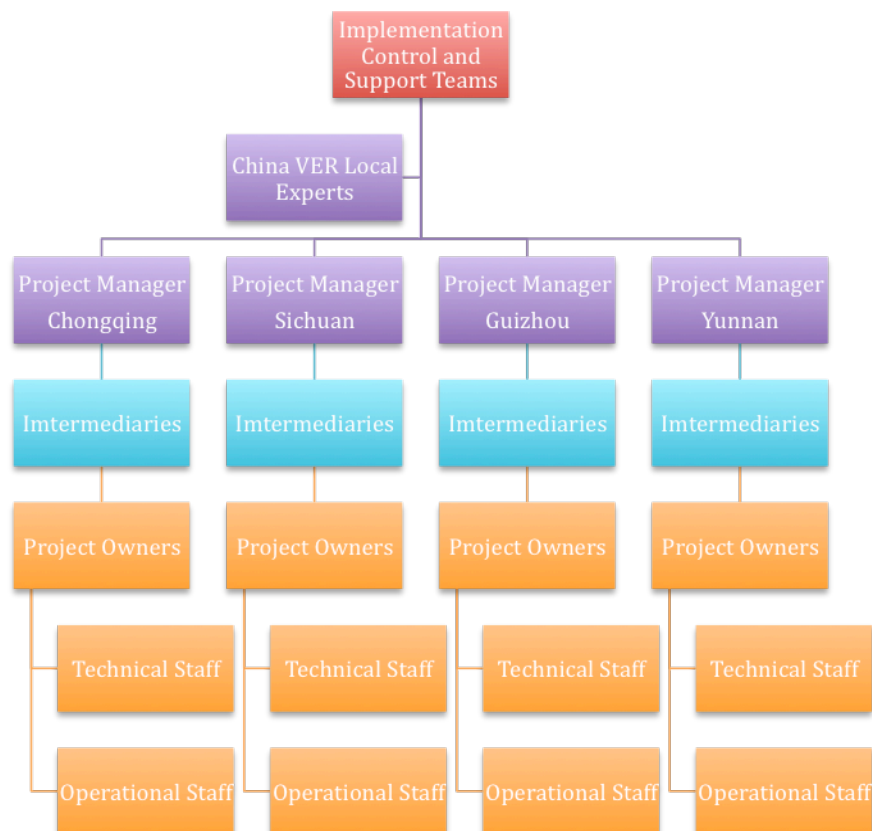
According to the VCS requirements, for a Grouped Project, a central GHG information system and control is associated with the project and its monitoring. South Pole Carbon Asset Management Ltd is setting up this central information system for this Grouped Project. South Pole is responsible for gathering and managing individual projects' information and their monitoring relevant documents. Each project owner sends monthly monitoring information and associated evidences to South Pole Carbon Asset Management Ltd. South Pole checks all documents and compiles the central monitoring report, which shows emission reductions per year for each individual hydropower plant under the Grouped Project. The monitoring report is then submitted to a qualified independent third party (VVB) which checks the correctness of the data by carrying out desk reviews of submitted documentation and conducting on-site spot checks for a randomly selected sample of projects.

The central GHG information system and control

As per VCS guidelines, the central GHG information system was established to ensure accurate monitoring control and management of individual projects. The system will specify the organization, control and procedures required for certain key monitoring system features.

Monitoring Organizational Structure

Figure 3-1



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 specialized in the VER methodology and also have local hydro electricity industry sector knowledge for a better assessment of the documents. Last but not least, the revised Monitoring Report will be revised by South Pole's central internal Quality Control and Technical Support team, ensuring compliance with VCS and related guidelines.

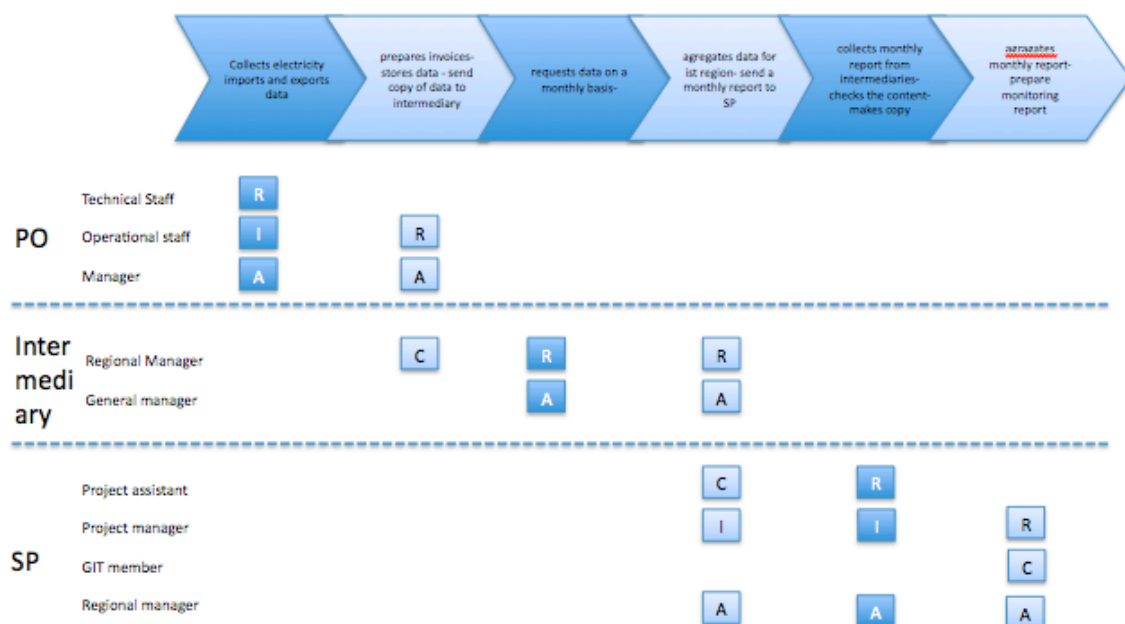
Project Monitoring Management Approach

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 3-2 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 response to keep of 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 organization 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 organization.

(Action 2, regional manager of intermediaries), who need to aggregate EG data and send these to 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 guidance 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 managers 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 managers are accountable for the above mentioned actions which assistant project managers and local VER experts deliver regarding the monitoring process.

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

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 3-3



Monitoring Procedures

Selection and management of the GHG data and information;

Table 3-2

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.

Processes for collecting, processing, consolidating and reporting GHG data and information;

Table 3-3

Data collection	Data	Data	Reporting GHG data	Information
-----------------	------	------	--------------------	-------------

	processing	consolidation		
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.

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 VVB carrying out the verification of monitoring data. The project owner will keep the calibration test records for verification.

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 type, accuracy class, serial number, and calibration information of the monitoring meters for the sampling projects are listed in the tables below, the detailed information of the monitoring meters for each individual project under the Grouped Project (i.e. accuracy, installation position, transmission pathway) is demonstrated in Appendix 4, and the monitoring flow diagrams for the sampling projects are demonstrated in Appendix 5.

In Table 3-4.1, the sampling projects with the calibration certificates for their invoice meters issued by the corresponding calibration entities are listed.

In Table 3-4.2, the sampling projects with the certification illustration letters issued by the calibration entities are listed.

Several certification illustration letters have been respectively issued by the local power grid companies (Chongqing City Wulong County Power Supply Limited Company and Chongqing Fuling Electric Power Industrial Co., Ltd.), who are also the calibration entities for the Table 3-4.2 listed sampling projects. Meters of sampling projects, with the project numbers included 37, 57, 59, 67, 69 and 72, have been calibrated by Chongqing City Wulong County Power Supply Limited Company during this whole monitoring period. And meters of sampling projects, with the project number included 55, 62, 63 and 73, have been calibrated by Chongqing Fuling Electric Power Industrial Co., Ltd. during this whole monitoring period. The calibration illustration letters confirm that all the invoice meters of these included projects have been calibrated and verified according to the relevant national regulations and standards (DL/T448-2000) during this whole monitoring period and all calibration results for invoice meters meet the required standards. Certified labels are posted on the calibrated meters.

All the calibrations for the monitoring meters of all sampling projects are valid during this whole monitoring period.

Table 3-4.1

Project No.	Project title	Meter Serial No.	Meter Model Number	Accuracy Class	Calibration Certificate Serial No.	Calibration Entity	Calibration Date	Calibration Valid Until
21	Chongqing Wanzhou Xianfeng Hydroelectric Plant	254729	DSSD536	0.5S	087100001	Chongqing City Wanzhou Measurement Quality Testing Center	2008-08-11	2013-08-10
78	Mayihe Hydroelectric Plant	09110204330092	DSSD331	1	201011015	Ya'an Yingjing Power Supply Limited Company Metrological Verification Station	2010-08-28	2015-08-27
85	Daihuanggou Hydroelectric Plant	10010237920004	DSSD331	1	201111032	Ya'an Yingjing Power Supply Limited Company Metrological Verification Station	2011-04-28	2016-04-27
86	Gaoqiaohe Hydroelectric Plant	09110204330008	DSSD331	1	201011001	Ya'an Yingjing Power Supply Limited Company Metrological Verification Station	2010-01-12	2015-01-13

87	Zhuyeshan Hydroelectric Plant	0097635245	DSZY719-G	1	201080042	Leshan Local Energy Measurement Test Station	2010-11-24	2015-11-23
90	Dabaishu Hydroelectric Plant	Old :030641	Old: DSSD281	Old: 0.5S	Old: 200705019	Yunnan Power Grid Company Lincang Power Supply Bureau Power Energy Metrological Center	Old: 2007-05-09	Old: 2013-05-08
		New: 021620	New: DSSD103F4	New: 0.5S	New: Lindianjijian Neng zi [2012] No. 053		New: 2013-01-18	New: 2017-10-23
92	Dashi Stage II Hydroelectric Plant	Old: 080002001398	Old: DSSD142	Old: 0.5S	Old: 200811019	Yunnan Power Grid Company Lincang Power Supply Bureau Power Energy Metrological Center	Old: 2008-11-19	Old: 2013-11-18
		New: 021616	New: DSSD103F4	New: 0.5S	New: Lindianjijian Neng zi [2012] No. 050		New: 2013-01-18	New: 2017-10-23
98	Fugong County Lishadi Hydropower Plant Project	ZZ00063	DTSD341	0.2S	2011ZXDdg-00064 2012ZXDdg-00039 2013ZXDdg-10026	Yunnan Institute of Metrology And Testing Technology	2011-01-20 2012-01-19 2013-01-19	2012-01-19 2013-01-18 2014-01-18

Table 3-4.2

Project No.	Project title	Meter Serial No.	Meter Model Number	Accuracy Class	Calibration Entity	Calibration Date	Calibration Valid Until
37	Baijia Hydroelectric Plant	6012584356	DSSD71	0.5S	Chongqing City Wulong County Power Supply Limited Company	2010-10-01	2013-08-31
55	Canglong Hydroelectric Plant	200410419Q0313	DSSD331	1	Chongqing Fuling Electric Power Industrial Co., Ltd.	2009-06-15	2014-06-14
57	Heixigou Hydroelectric Plant	6012584355	DSSD71	0.5S	Chongqing City Wulong County Power Supply Limited Company	2009-12-15	2013-07-01
59	Muzonghe Stage IV Hydroelectric Plant	6012584359	DSSD71	0.5S	Chongqing City Wulong County Power Supply Limited Company	2009-12-15	2013-07-01
62	Shuangchahe Hydroelectric Plant	10099436	ZFH405	0.5S	Chongqing Fuling Electric Power Industrial Co., Ltd.	2010-10	2016-10
63	Songshigou Hydroelectric Plant	10099435	ZFH405	0.5S	Chongqing Fuling Electric Power Industrial Co., Ltd.	2010-09	2016-09

67	Baiguo Hydroelectric Plant	6012765144	DSSD71	0.5S	Chongqing City Wulong County Power Supply Limited Company	2010-10-30	2013-07-31
69	Baiyang Hydroelectric Plant	6012693715	DSSD71	0.5S	Chongqing City Wulong County Power Supply Limited Company	2010-10-31	2013-07-31
72	Dahegou Hydroelectric Plant	6011788924	DSSD71	0.5S	Chongqing City Wulong County Power Supply Limited Company	2010-10-01	2013-07-31
73	Xinmin Stage II Hydroelectric Plant	099512	ZFH405	0.5S	Chongqing Fuling Electric Power Industrial Co., Ltd.	2011-06-01	2013-08-01

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.

Training

Operational staffs are a crucial element for the GHG information quality control system. Training packages ensure that staffs 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

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 headquarter main server in Zurich to allow access of data between headquarter and regional offices.

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 MySQL 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 95 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.

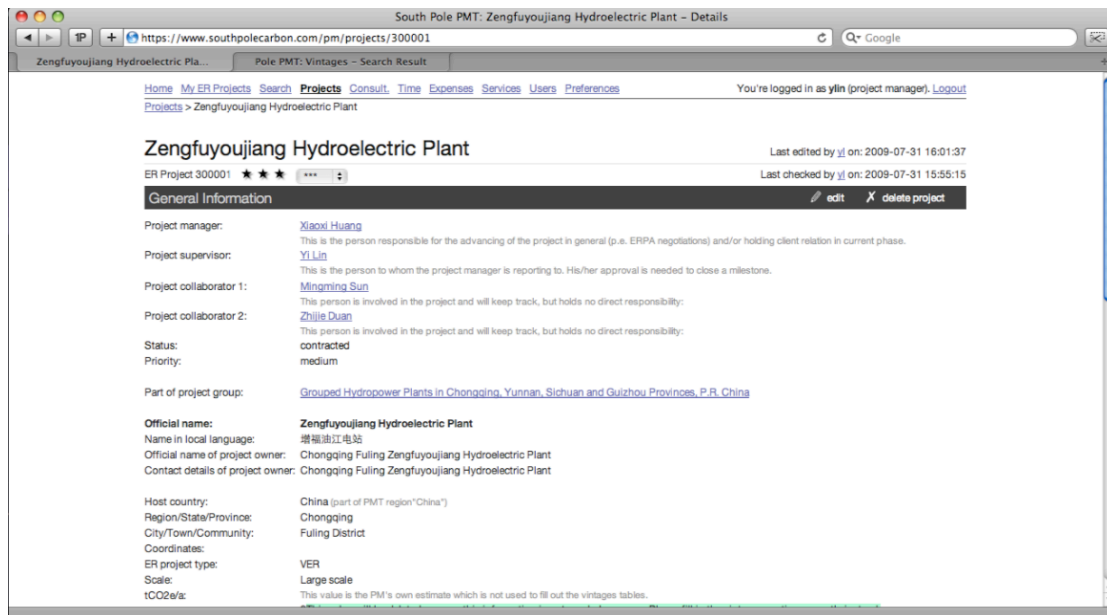


Figure-3-4

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 95 projects will be spot checked with electronic copies of electrical sale invoices.

South Pole PMT: Vintages - Search Result

Home My ERI Projects Search Projects Consult Time Expenses Services Users Preferences You're logged in as yfin (project manager). Logout

Bookmarked Vintage Packages - Search Result for Group [advanced search](#)

Emission Reduction Vintages - Group Grouped Hydropower Plants in Chongqing, Yunnan, Sichuan and Guizhou Provinces, P.R. China [switch to projects overview](#)

Vintages Overview - 20 Packages

The numbers show available credits (expected plus issued minus assigned or delivered). Dark turquoise vintages have not been quality checked.

scroll back scroll ahead

Package	Type	Project	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
300001 - A		Zenafuouliana 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		Jinxing 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 Hydroele	144	574	574	574	574	574	574	574	574	574
300006 - A		Chongqing Wanzhou Lengdonga Hydroel	545	545	545	545	545	545	545	545	545	545
300007 - A		Chongqing Wanzhou Dangata Hydroele	1019	1528	1528	1528	1528	1528	1528	1528	1528	1528
300008 - A		Chongqing Wanzhou Maowei Hydroele	0	0	535	584	584	584	584	584	584	584
300009 - A		Chongqing Wanzhou Xiaolona Hydroel	198	1188	1188	1188	1188	1188	1188	1188	1188	1188
300010 - A		Chongqing Wanzhou Yha Hydroeletr	0	97	1168	1168	1168	1168	1168	1168	1168	1168
300011 - A		Chongqing Wanzhou Tiande Hydroele	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142
300012 - A		Chongqing Wanzhou Pupling Hydroel	0	574	1149	1149	1149	1149	1149	1149	1149	1149
300013 - A		Chongqing Wanzhou Yanahan Hydroele	383	1149	1149	1149	1149	1149	1149	1149	1149	1149
300014 - A		Chongqing Wanzhou Lianmana Hydroel	0	1778	1778	1778	1778	1778	1778	1778	1778	1778
300015 - A		Chongqing Wanzhou Wanlin Hydroele	0	501	2005	2005	2005	2005	2005	2005	2005	2005
300016 - A		Chongqing Wanzhou Gaodongazi Hydroe	0	0	2439	2439	2439	2439	2439	2439	2439	2439
300017 - A		Chongqing Wanzhou Luotian Hydroele	0	584	1752	1752	1752	1752	1752	1752	1752	1752
300018 - A		Chongqing Wanzhou Yanjinazi Hydroe	0	1142	1713	1713	1713	1713	1713	1713	1713	1713
300019 - A		Chongqing Wanzhou Bayadongda Hydro	0	0	1229	2950	2950	2950	2950	2950	2950	2950

Figure-3-5

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.

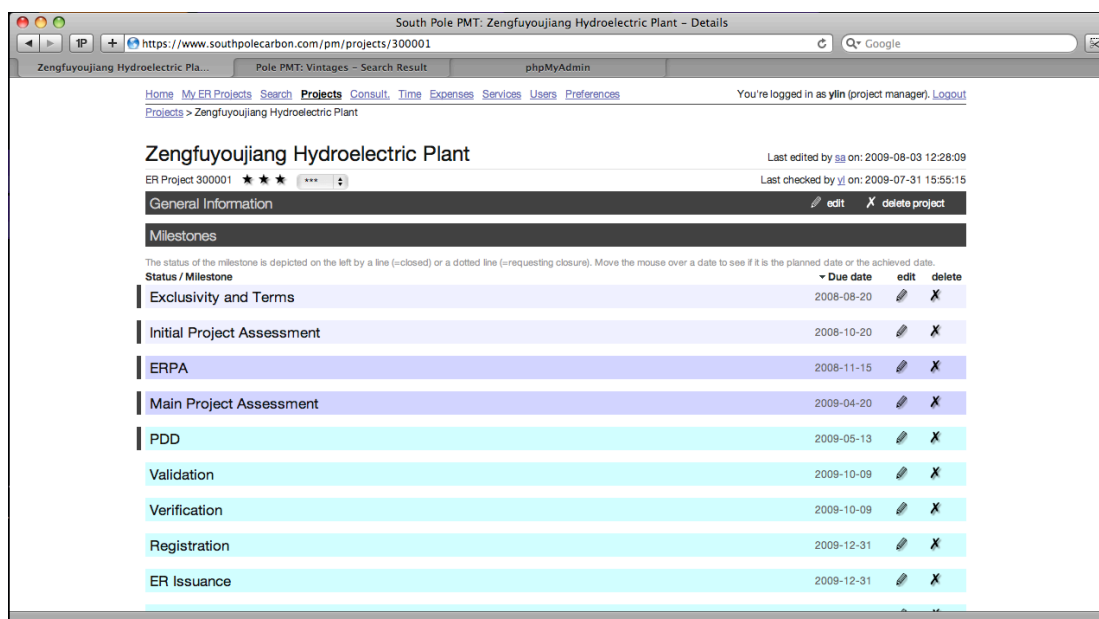


Figure 3-6

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.

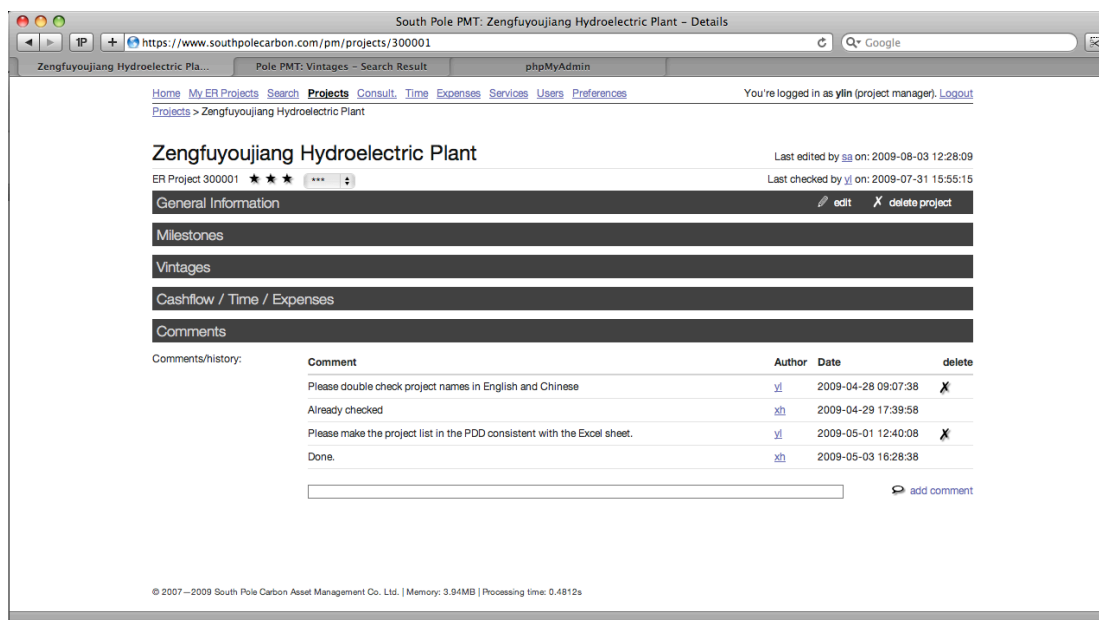


Figure 3-7

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

According to methodology AMS-I.D (Version 13), the baseline emissions of the project are the product of the baseline emissions factor (EF_y in tCO_2/MWh), calculated according to the "Tool to calculate the emission factor for an electricity system" (Version 1.1), times the electricity exported to the grid by the project activity (EG_y in MWh):

$$BE_y = EG_y \times EF_y$$

Grid Emission Factor was calculated in PD to be $0.97350 t CO_2e/MWh$ for Central China Power Grid and $0.87118 tCO_2e/MWh$ for Southern China Power Grid. These grid emission factors are determined ex-ante and fixed during the crediting period.

During this monitoring period, the baseline emission reductions for Central China Power Grid is:

$$BE = EG \times EF = 808687.463 \times 0.97350 = 787108 tCO_2e/year$$

During this monitoring period, the baseline emission reductions for South China Power Grid is:

$$BE = EG \times EF = 262886.216 \times 0.87118 = 229007 tCO_2e/year$$

The total baseline emissions for the Grouped Project during this monitoring period amounts therefore to $1,016,115 tCO_2e/year$.

4.2 Project Emissions

The project activity is a run-of-river hydropower project and, as per AMS-I.D, the GHGs emitted from such project activities are considered to be zero.

Project Emissions = 0

4.3 Leakage

According to AMS-I.D Version 13, there were neither energy generating equipment transferred from another activity nor existing equipment transferred to another activity, so no leakage calculation is required for the proposed project activity.

Leakage = 0

4.4 Net GHG Emission Reductions and Removals

The calculated net GHG emission reductions achieved by the project activity within the covered monitoring period amount to 1,016,115 tCO₂e in total, of which 787,108 tCO₂e occurred in the Central China Power Grid and 229,007 tCO₂e in the Southern China Power Grid. A summary of key results based on aggregated data on a yearly basis are provided in the table below⁶. Detailed calculation processes for each individual projects please see the ER calculation spreadsheets provided separately.

Summary for 95 sub-projects under the Grouped Project:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	246065	0	0	246065
Year 2012	565116	0	0	565116
Year 2013	204934	0	0	204934
Total	1016115	0	0	1016115

1 Zengfuyoujiang Hydroelectric Plant

Year	Baseline emissions or removals	Project emissions or removals	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or
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⁶ Data are not available during this monitoring period for some individual hydropower plants (project numbers included: 1 - 3, 23, 32, 45, 46, 74, 75, 79, 81, 82, 93 - 97). Therefore, these projects have claimed zero emission reductions during this monitoring period.

	(tCO ₂ e)	(tCO ₂ e)		removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

2 Jianshitan Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

3 Jinxing Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

4 Huzhong Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	3322	0	0	3322
Year 2012	11078	0	0	11078
Year 2013	4625	0	0	4625

Total	19025	0	0	19025
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5 Chongqing Wanzhou Fengmu Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	261	0	0	261
Year 2012	293	0	0	293
Year 2013	224	0	0	224
Total	778	0	0	778

6 Chongqing Wanzhou Longdong Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	320	0	0	320
Year 2012	370	0	0	370
Year 2013	147	0	0	147
Total	837	0	0	837

7 Chongqing Wanzhou Dengda Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	542	0	0	542
Year 2012	767	0	0	767
Year 2013	191	0	0	191
Total	1500	0	0	1500

8 Chongqing Wanzhou Mayuexi Hydroelectric Plant

Year	Baseline emissions or removals	Project emissions or removals	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or
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	(tCO ₂ e)	(tCO ₂ e)		removals (tCO ₂ e)
Year 2011	319	0	0	319
Year 2012	366	0	0	366
Year 2013	181	0	0	181
Total	866	0	0	866

9 Chongqing Wanzhou Xiaolong Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	565	0	0	565
Year 2012	775	0	0	775
Year 2013	351	0	0	351
Total	1691	0	0	1691

10 Chongqing Wanzhou Yihe Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	611	0	0	611
Year 2012	547	0	0	547
Year 2013	0	0	0	0
Total	1158	0	0	1158

11 Chongqing Wanzhou Tiande Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	569	0	0	569
Year 2012	1035	0	0	1035
Year 2013	406	0	0	406

Total	2010	0	0	2010
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12 Chongqing Wanzhou Puziling Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	321	0	0	321
Year 2012	820	0	0	820
Year 2013	304	0	0	304
Total	1445	0	0	1445

13 Chongqing Wanzhou Yanshan Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	1058	0	0	1058
Year 2012	1684	0	0	1684
Year 2013	394	0	0	394
Total	3136	0	0	3136

14 Chongqing Wanzhou Lianmeng Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	482	0	0	482
Year 2012	790	0	0	790
Year 2013	329	0	0	329
Total	1601	0	0	1601

15 Chongqing Wanzhou Wanlin Hydroelectric Plant

Year	Baseline emissions or removals	Project emissions or removals	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or
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	(tCO ₂ e)	(tCO ₂ e)		removals (tCO ₂ e)
Year 2011	537	0	0	537
Year 2012	1220	0	0	1220
Year 2013	525	0	0	525
Total	2282	0	0	2282

16 Chongqing Wanzhou Gaodongzi Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	86	0	0	86
Year 2012	645	0	0	645
Year 2013	322	0	0	322
Total	1053	0	0	1053

18 Chongqing Wanzhou Yanjingxi Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	679	0	0	679
Year 2012	1343	0	0	1343
Year 2013	494	0	0	494
Total	2516	0	0	2516

20 Chongqing Wanzhou Dibao Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	2461	0	0	2461
Year 2012	3831	0	0	3831
Year 2013	1450	0	0	1450

Total	7742	0	0	7742
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21 Chongqing Wanzhou Xianfeng Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	6180	0	0	6180
Year 2012	9544	0	0	9544
Year 2013	2649	0	0	2649
Total	18373	0	0	18373

22&31 Heba & Chengmending Hydroelectric Plants

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	911	0	0	911
Year 2012	2420	0	0	2420
Year 2013	694	0	0	694
Total	4025	0	0	4025

23 Sandaoguai Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

24 Beiya Hydroelectric Plant

Year	Baseline emissions or removals	Project emissions or removals	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or
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	(tCO ₂ e)	(tCO ₂ e)		removals (tCO ₂ e)
Year 2011	166	0	0	166
Year 2012	445	0	0	445
Year 2013	87	0	0	87
Total	698	0	0	698

25 Wulong Guanqiao Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	243	0	0	243
Year 2012	506	0	0	506
Year 2013	180	0	0	180
Total	929	0	0	929

26&40&48 Xiangyang Stage II & III & I Hydroelectric Plants

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	1286	0	0	1286
Year 2012	5656	0	0	5656
Year 2013	1483	0	0	1483
Total	8425	0	0	8425

27 Qingtongxi Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	381	0	0	381

Year 2012	792	0	0	792
Year 2013	328	0	0	328
Total	1501	0	0	1501

28 Heping Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	291	0	0	291
Year 2012	774	0	0	774
Year 2013	179	0	0	179
Total	1244	0	0	1244

29 Guanziya Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	231	0	0	231
Year 2012	538	0	0	538
Year 2013	0	0	0	0
Total	769	0	0	769

30 Baiyangping Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	177	0	0	177
Year 2012	793	0	0	793
Year 2013	339	0	0	339
Total	1309	0	0	1309

32 Shuanglong Hydroelectric Plant

Year	Baseline	Project	Leakage	Net GHG
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	emissions or removals (tCO ₂ e)	emissions or removals (tCO ₂ e)	emissions (tCO ₂ e)	emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

33 Chushuitang Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	1061	0	0	1061
Year 2012	2103	0	0	2103
Year 2013	949	0	0	949
Total	4113	0	0	4113

34 Shuangqiao Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	392	0	0	392
Year 2012	737	0	0	737
Year 2013	348	0	0	348
Total	1477	0	0	1477

35 Shiqiao Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	372	0	0	372
Year 2012	1103	0	0	1103

Year 2013	401	0	0	401
Total	1876	0	0	1876

36 Shuanglian Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	713	0	0	713
Year 2012	1207	0	0	1207
Year 2013	598	0	0	598
Total	2518	0	0	2518

37 Bajia Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	975	0	0	975
Year 2012	1749	0	0	1749
Year 2013	658	0	0	658
Total	3382	0	0	3382

38 Xinqiao Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	921	0	0	921
Year 2012	1741	0	0	1741
Year 2013	761	0	0	761
Total	3423	0	0	3423

39 Luchi Hydroelectric Plant

Year	Baseline emissions or	Project emissions or	Leakage emissions	Net GHG emission
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	removals (tCO ₂ e)	removals (tCO ₂ e)	(tCO ₂ e)	reductions or removals (tCO ₂ e)
Year 2011	136	0	0	136
Year 2012	906	0	0	906
Year 2013	244	0	0	244
Total	1266	0	0	1266

41 Xiangyun Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	493	0	0	493
Year 2012	1488	0	0	1488
Year 2013	586	0	0	586
Total	2567	0	0	2567

42 Hongshan Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	599	0	0	599
Year 2012	1405	0	0	1405
Year 2013	612	0	0	612
Total	2616	0	0	2616

43 Leyuan Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	787	0	0	787
Year 2012	1727	0	0	1727
Year 2013	985	0	0	985

Total	3499	0	0	3499
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44 Yong'an Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	595	0	0	595
Year 2012	1443	0	0	1443
Year 2013	662	0	0	662
Total	2700	0	0	2700

45 Suokousi Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

46 Xinli Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

47 Caijiagou Stage III Hydroelectric Plant

Year	Baseline emissions or removals	Project emissions or removals	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or
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	(tCO ₂ e)	(tCO ₂ e)		removals (tCO ₂ e)
Year 2011	881	0	0	881
Year 2012	2773	0	0	2773
Year 2013	1110	0	0	1110
Total	4764	0	0	4764

49 Cheqingyan Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	1244	0	0	1244
Year 2012	3106	0	0	3106
Year 2013	1349	0	0	1349
Total	5699	0	0	5699

50 Lianghekou Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	729	0	0	729
Year 2012	2348	0	0	2348
Year 2013	1266	0	0	1266
Total	4343	0	0	4343

51 Wuhe Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	403	0	0	403
Year 2012	1035	0	0	1035
Year 2013	500	0	0	500

Total	1938	0	0	1938
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52 Sihe Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	2039	0	0	2039
Year 2012	4997	0	0	4997
Year 2013	2024	0	0	2024
Total	9060	0	0	9060

53 Shilingyan Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	430	0	0	430
Year 2012	1122	0	0	1122
Year 2013	493	0	0	493
Total	2045	0	0	2045

54 Nanmu Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	1824	0	0	1824
Year 2012	3862	0	0	3862
Year 2013	1613	0	0	1613
Total	7299	0	0	7299

55 Canglong Hydroelectric Plant

Year	Baseline emissions or removals	Project emissions or removals	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or
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	(tCO ₂ e)	(tCO ₂ e)		removals (tCO ₂ e)
Year 2011	1175	0	0	1175
Year 2012	2812	0	0	2812
Year 2013	1324	0	0	1324
Total	5311	0	0	5311

56 Daheba Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	1670	0	0	1670
Year 2012	5673	0	0	5673
Year 2013	2471	0	0	2471
Total	9814	0	0	9814

57 Hexigou Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	3111	0	0	3111
Year 2012	5547	0	0	5547
Year 2013	2005	0	0	2005
Total	10663	0	0	10663

58 Yanchanghe Stage III Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	1858	0	0	1858
Year 2012	3368	0	0	3368
Year 2013	1705	0	0	1705

Total	6931	0	0	6931
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59 Muzonghe Stage IV Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	3066	0	0	3066
Year 2012	5441	0	0	5441
Year 2013	2895	0	0	2895
Total	11402	0	0	11402

60 Dengta Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	705	0	0	705
Year 2012	412	0	0	412
Year 2013	1001	0	0	1001
Total	2118	0	0	2118

61 Banqiao Stage II Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	1204	0	0	1204
Year 2012	0	0	0	0
Year 2013	2613	0	0	2613
Total	3817	0	0	3817

62 Shuangchahe Hydroelectric Plant

Year	Baseline emissions or removals	Project emissions or removals	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or
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	(tCO ₂ e)	(tCO ₂ e)		removals (tCO ₂ e)
Year 2011	1889	0	0	1889
Year 2012	5913	0	0	5913
Year 2013	2874	0	0	2874
Total	10676	0	0	10676

63 Songshigou Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	156	0	0	156
Year 2012	3428	0	0	3428
Year 2013	1275	0	0	1275
Total	4859	0	0	4859

64 Banqiao Stage III Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	985	0	0	985
Year 2012	6970	0	0	6970
Year 2013	4494	0	0	4494
Total	12449	0	0	12449

65 Shujiage Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	1527	0	0	1527
Year 2012	3996	0	0	3996
Year 2013	919	0	0	919

Total	6442	0	0	6442
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66 Yangyan Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	578	0	0	578
Year 2012	3188	0	0	3188
Year 2013	605	0	0	605
Total	4371	0	0	4371

67 Baiguo Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	4042	0	0	4042
Year 2012	8899	0	0	8899
Year 2013	2069	0	0	2069
Total	15010	0	0	15010

68 Longqiao Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	5505	0	0	5505
Year 2012	17812	0	0	17812
Year 2013	7780	0	0	7780
Total	31097	0	0	31097

69 Baiyang Hydroelectric Plant

Year	Baseline emissions or removals	Project emissions or removals	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or
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	(tCO ₂ e)	(tCO ₂ e)		removals (tCO ₂ e)
Year 2011	3370	0	0	3370
Year 2012	14946	0	0	14946
Year 2013	1991	0	0	1991
Total	20307	0	0	20307

70 Xinmin Tailwater Stage II Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	1426	0	0	1426
Year 2012	4478	0	0	4478
Year 2013	1943	0	0	1943
Total	7847	0	0	7847

71 Dongliuhe Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	1814	0	0	1814
Year 2012	4930	0	0	4930
Year 2013	1900	0	0	1900
Total	8644	0	0	8644

72 Dahegou Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	2542	0	0	2542
Year 2012	8517	0	0	8517
Year 2013	3215	0	0	3215

Total	14274	0	0	14274
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73 Xinmin Stage II Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	7917	0	0	7917
Year 2012	23123	0	0	23123
Year 2013	9915	0	0	9915
Total	40955	0	0	40955

74 Guizhou Province Xingyi City Puti Hydropower Plant Technical Reform Project

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

75 Guizhou Province Xingyi City Puti 2nd Stage (Xiniutang) Hydropower Plant Technical Reform Project

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

76 Wumaxi Stage I Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

	removals (tCO ₂ e)	removals (tCO ₂ e)	(tCO ₂ e)	reductions or removals (tCO ₂ e)
Year 2011	1826	0	0	1826
Year 2012	3607	0	0	3607
Year 2013	1047	0	0	1047
Total	6480	0	0	6480

77 Mozigou Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	1661	0	0	1661
Year 2012	3878	0	0	3878
Year 2013	1161	0	0	1161
Total	6700	0	0	6700

78 Mayihe Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	3523	0	0	3523
Year 2012	7124	0	0	7124
Year 2013	2399	0	0	2399
Total	13055	0	0	13055

79 Jinyatan Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0

Total	0	0	0	0
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80 Toudaoshui Hydroelectric Station

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	3486	0	0	3486
Year 2012	8312	0	0	8312
Year 2013	3587	0	0	3587
Total	15385	0	0	15385

81 Sanhui Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

82 Yunwushan Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

83 Gongjiagou Hydroelectric Plant

Year	Baseline emissions or removals	Project emissions or removals	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or
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	(tCO ₂ e)	(tCO ₂ e)		removals (tCO ₂ e)
Year 2011	22448	0	0	22448
Year 2012	46481	0	0	46481
Year 2013	18405	0	0	18405
Total	87334	0	0	87334

84 Chahe Stage III Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	14355	0	0	14355
Year 2012	28286	0	0	28286
Year 2013	10512	0	0	10512
Total	53153	0	0	53153

85 Daihuanggou Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	14320	0	0	14320
Year 2012	33846	0	0	33846
Year 2013	11607	0	0	11607
Total	59773	0	0	59773

86 Gaoqiaohe Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	21559	0	0	21559
Year 2012	50742	0	0	50742
Year 2013	13793	0	0	13793

Total	86094	0	0	86094
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87 Zhuyeshan Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	5859	0	0	5859
Year 2012	21475	0	0	21475
Year 2013	7573	0	0	7573
Total	34943	0	0	34943

88 Lianghekou Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	28803	0	0	28803
Year 2012	55157	0	0	55157
Year 2013	21172	0	0	21172
Total	105132	0	0	105132

90 Dabaishu Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	9114	0	0	9114
Year 2012	13965	0	0	13965
Year 2013	4109	0	0	4109
Total	27188	0	0	27188

91 Dashi Stage III Hydroelectric Plant

Year	Baseline emissions or removals	Project emissions or removals	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or
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	(tCO ₂ e)	(tCO ₂ e)		removals (tCO ₂ e)
Year 2011	9438	0	0	9438
Year 2012	15674	0	0	15674
Year 2013	3888	0	0	3888
Total	29000	0	0	29000

92 Dashi Stage II Hydroelectric Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	12147	0	0	12147
Year 2012	18711	0	0	18711
Year 2013	4526	0	0	4526
Total	35384	0	0	35384

93 Yunnan Midu County Taishanhe Hydropower Station

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

94 Zhenyuan County Xiaojiehe Hydropower Station

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0

Total	0	0	0	0
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95 Jinghong City Chuangye Hydropower Station

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

96 Yingjiang Husa River 5th Stage Hydropower Plant

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

97 Yunnan Province Jinping County Mengqiao Village Datan Hydropower Station

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2011	0	0	0	0
Year 2012	0	0	0	0
Year 2013	0	0	0	0
Total	0	0	0	0

98 Fugong County Lishadi Hydropower Plant Project

Year	Baseline emissions or removals	Project emissions or removals	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or
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	(tCO ₂ e)	(tCO ₂ e)		removals (tCO ₂ e)
Year 2011	16348	0	0	16348
Year 2012	46521	0	0	46521
Year 2013	17120	0	0	17120
Total	79989	0	0	79989

Summary of net export electricity per year			
	CCPG EG (MWh)	SCPG EG (MWh)	Combined of both grids EG (MWh)
2011	193021.516	66815.524	259837.040
2012	449691.312	146246.638	595937.950
2013	165974.635	49824.054	215798.689
Total	808687.463	262886.216	1071573.679

Summary of emission reductions per year			
	CCPG ER (tCO ₂ e)	SCPG ER (tCO ₂ e)	Combined of both grids ER (tCO ₂ e)
2011	187861	58204	246065
2012	437714	127402	565116
2013	161533	43401	204934
Total	787108	229007	1016115

APPENDIX 1: IMPLEMENTATION DATES FOR EACH INDIVIDUAL PROJECT PLANT

Serial No.	Project Title	Date of Commissioning	Continued operation period (Years)
1	Zengfuyoujiang Hydroelectric Plant	2007-12	25
2	Jianshitian Hydroelectric Plant	2003-10	25
3	Jinxing Hydroelectric Plant	2004-11	25
4	Huzhong Hydroelectric Plant	2005-07	25
5	Chongqing Wanzhou Fengmu Hydroelectric Plant	2006-09	20
6	Chongqing Wanzhou Longdong Hydroelectric Plant	2005-10	20
7	Chongqing Wanzhou Dengta Hydroelectric Plant	2006-04	20
8	Chongqing Wanzhou Mayuexi Hydroelectric Plant	2008-01	20
9	Chongqing Wanzhou Xiaolong Hydroelectric Plant	2006-10	20
10	Chongqing Wanzhou Yihe Hydroelectric Plant	2007-11	20
11	Chongqing Wanzhou Tiande Hydroelectric Plant	2003-10	20
12	Chongqing Wanzhou Puziling Hydroelectric Plant	2007-06	20
13	Chongqing Wanzhou Yanshan Hydroelectric Plant	2006-08	20
14	Chongqing Wanzhou Lianmeng Hydroelectric Plant	2006-12	20
15	Chongqing Wanzhou Wanlin Hydroelectric Plant	2007-09	20
16	Chongqing Wanzhou Gaodongzi Hydroelectric Plant	2009-01	20
18	Chongqing Wanzhou Yanjingxi Hydroelectric Plant	2007-04	20
20	Chongqing Wanzhou Dibao Hydroelectric Plant	2007-08	20

21	Chongqing Wanzhou Xianfeng Hydroelectric Plant	2007-04	20
22	Heba Hydroelectric Plant	2004-09	25
23	Sandaoguai Hydroelectric Plant	2008-01	25
24	Beiya Hydroelectric Plant	2006-06	25
25	Wulong Guanqiao Hydroelectric Plant	2003-06	25
26	Xiangyang Stage II Hydroelectric Plant	2008-03	25
27	Qingtongxi Hydroelectric Plant	2002-03	25
28	Heping Hydroelectric Plant	2005-09	25
29	Guanziya Hydroelectric Plant	2004-01	25
30	Baiyangping Hydroelectric Plant	2003-06	25
31	Chengmendong Hydroelectric Plant	2002-11	25
32	Shuanglong Hydroelectric Plant	2003-04	25
33	Chushuitang Hydroelectric Plant	2005-12	25
34	Shuangqiao Hydroelectric Plant	2007-01	25
35	Shiqiao Hydroelectric Plant	2005-05	25
36	Shuanglian Hydroelectric Plant	2003-11	25
37	Baijia Hydroelectric Plant	2002-11	25
38	Xinqiao Hydroelectric Plant	2002-07	25
39	Luchi Hydroelectric Plant	2004-12	25
40	Xiangyang Stage III Hydroelectric Plant	2006-08	25
41	Xiangyun Hydroelectric Plant	2005-05	25
42	Hongshan Hydroelectric Plant	2006-01	25

43	Leyuan Hydroelectric Plant	2008-11	25
44	Yong'an Hydroelectric Plant	2007-04	25
45	Suokousi Hydroelectric Plant	2005-01	25
46	Xinli Hydroelectric Plant	2004-07	25
47	Caijiagou Stage III Hydroelectric Plant	2007-07	25
48	Xiangyang Stage I Hydroelectric Plant	2005-04	25
49	Cheqingyan Hydroelectric Plant	2002-04	25
50	Lianghekou Hydroelectric Plant	2005-11	25
51	Wuhe Hydroelectric Plant	2006-08	25
52	Sihe Hydroelectric Plant	2006-01	25
53	Shilingyan Hydroelectric Plant	2003-01	25
54	Nanmu Hydroelectric Plant	2005-01	25
55	Canglong Hydroelectric Plant	2004-12	20
56	Daheba Hydroelectric Plant	2005-11	25
57	Heixigou Hydroelectric Plant	2002-11	20
58	Yanchanghe Stage III Hydroelectric Plant	2006-01	25
59	Muzonghe Stage IV Hydroelectric Plant	2007-11	25
60	Dengta Hydroelectric Plant	2005-10	25
61	Banqiao Stage II Hydroelectric Plant	2004-09	25
62	Shuangchahe Hydroelectric Plant	2007-06	25
63	Songshigou Hydroelectric Plant	2003-07	25
64	Banqiao Stage III Hydroelectric Plant	2008-11	25

65	Shujiahe Hydroelectric Plant	2004-09	25
66	Yangyan Hydroelectric Plant	2003-11	25
67	Baiguo Hydroelectric Plant	2002-08	20
68	Longqiao Hydroelectric Plant	2003-12	25
69	Baiyang Hydroelectric Plant	2002-08	20
70	Xinmin Tailwater Stage II Hydroelectric Plant	2004-03	25
71	Dongliuhe Hydroelectric Plant	2004-02	25
72	Dahegou Hydroelectric Plant	2007-03	20
73	Xinmin Stage II Hydroelectric Plant	2002-03	25
74	Guizhou Province Xingyi City Puti Hydropower Plant Technical Reform Project	2004-10	20
75	Guizhou Province Xingyi City Puti 2nd Stage (Xiniutang) Hydropower Plant Technical Reform Project	2006-09	20
76	Wumaxi Stage I Hydroelectric Plant	2005-01	20
77	Mozigou Hydroelectric Plant	2004-12	20
78	Mayihe Hydroelectric Plant	2005-01	20
79	Jinyatan Hydroelectric Plant	2004-05	20
80	Toudaoshui Hydroelectric Station	2004-06	20
81	Sanhui Hydroelectric Plant	2006-01	20
82	Qingshuihe Stage I Hydroelectric Plant	2006-12	20
83	Gongjiagou Hydroelectric Plant	2005-07	20
84	Chahe Stage III Hydroelectric Plant	2006-01	20
85	Daihuanggou Hydroelectric Plant	2005-08	20

86	Gaoqiaohe Hydroelectric Plant	2003-06	20
87	Zhuyeshan Hydroelectric Plant	2004-04	30
88	Lianghekou Hydroelectric Plant	2004-04	20
90	Dabaishu Hydroelectric Plant	2004-10	20
91	Dashi Stage III Hydroelectric Plant	2005-09	20
92	Dashi Stage II Hydroelectric Plant	2004-06	20
93	Yunnan Midu County Taishanhe Hydropower Station	2008-08	20
94	Zhenyuan County Xiaojiehe Hydropower Station	2008-03	30
95	Jinghong City Chuangye Hydropower Station	2006-08	20
96	Yingjiang Husa River 5th Stage Hydropower Plant	2006-04	20
97	Yunnan Province Jinping County Mengqiao Village Datan Hydropower Station	2007-06	30
98	Fugong County Lishadi Hydropower Plant Project	2006-10	20

APPENDIX 2: COMPARISON TABLE FOR INDIVIDUAL PROJECT PLANT AND ITS PROJECT OWNER NAME

No.	Individual Project Title	Individual Project Owner Name
1	Zengfuyoujiang Hydroelectric Plant	Chongqing Fuling Zengfuyoujiang Hydroelectric Plant
2	Jianshitan Hydroelectric Plant	Chongqing Fuling Huanglong Hydroelectric Plant
3	Jinxing Hydroelectric Plant	Pengshui Runxi Jinxing Hydroelectric Plant of Fuling Chuandong Hydropower
4	Huzhong Hydroelectric Plant	Pengshui Shengda Hydropower Co., Ltd.
5	Chongqing Wanzhou Fengmu Hydroelectric Plant	Wanzhou Yongfa Water Conservancy Development Co., Ltd.
6	Chongqing Wanzhou Longdong Hydroelectric Plant	Wanzhou Yongfa Water Conservancy Development Co., Ltd.
7	Chongqing Wanzhou Dengta Hydroelectric Plant	Wanzhou Huiyin Hydropower Development Co., Ltd.
8	Chongqing Wanzhou Mayuexi Hydroelectric Plant	Wanzhou Ertunhe Hydropower Development Co., Ltd.
9	Chongqing Wanzhou Xiaolong Hydroelectric Plant	Wanzhou Xiaolong Hydropower Development Co., Ltd.
10	Chongqing Wanzhou Yihe Hydroelectric Plant	Wanzhou Fengyu Hydropower Development Co., Ltd.
11	Chongqing Wanzhou Tiande Hydroelectric Plant	Chongqing Wanzhou Electric Development Co., Ltd.
12	Chongqing Wanzhou Puziling Hydroelectric Plant	Wanzhou Zhende Hydropower Development Co., Ltd.
13	Chongqing Wanzhou Yanshan Hydroelectric Plant	Wanzhou Yanshan Hydropower Development Co., Ltd.
14	Chongqing Wanzhou Lianmeng Hydroelectric Plant	Wanzhou Lianmeng Hydropower Equipments Co., Ltd.
15	Chongqing Wanzhou Wanlin Hydroelectric Plant	Wanzhou Wanlin Hydroelectric Plant
16	Chongqing Wanzhou Gaodongzi Hydroelectric Plant	Wanzhou Rongchuan Hydropower Development Co., Ltd.
18	Chongqing Wanzhou Yanjingxi Hydroelectric Plant	Wanzhou Zhende Hydropower Development Co., Ltd.
20	Chongqing Wanzhou Dibao Hydroelectric Plant	Wanzhou Runfeng Hydropower Development Co., Ltd.
21	Chongqing Wanzhou Xianfeng Hydroelectric Plant	Chongqing Wanzhou Xianfeng Hydroelectric Plant

22	Heba Hydroelectric Plant	Wulong Chepanchengmendong Hydroelectric Plant
23	Sandaoguai Hydroelectric Plant	Wulong Yajiang Longbao Hydroelectric Plant
24	Beiya Hydroelectric Plant	Wulong Runlong Maintenance Company
25	Wulong Guanqiao Hydroelectric Plant	Wulong Guanqiao Hydroelectric Plant
26	Xiangyang Stage II Hydroelectric Plant	Wulong Runlong Maintenance Company
27	Qingtongxi Hydroelectric Plant	Wulong Qingtongxi Hydroelectric Plant
28	Heping Hydroelectric Plant	Wulong Heping Hydroelectric Plant
29	Guanziya Hydroelectric Plant	Wulong Guanziya Hydroelectric Plant
30	Baiyangping Hydroelectric Plant	Wulong Hongchao Hydropower Development Co., Ltd.
31	Chengmendong Hydroelectric Plant	Wulong Chepanchengmendong Hydroelectric Plant
32	Shuanglong Hydroelectric Plant	Wulong Tukan Shuanglong Hydroelectric Plant
33	Chushuitang Hydroelectric Plant	Wulong Chushuitang Hydroelectric Plant
34	Shuangqiao Hydroelectric Plant	Wulong Shuangqiao Hydroelectric Plant
35	Shiqiao Hydroelectric Plant	Wulong Longyuan Science & Technology Development Co., Ltd.
36	Shuanglian Hydroelectric Plant	Wulong Boneng Electric Power Co., Ltd.
37	Baijia Hydroelectric Plant	Wulong Boneng Electric Power Co., Ltd.
38	Xinqiao Hydroelectric Plant	Wulong Boneng Electric Power Co., Ltd.
39	Luchi Hydroelectric Plant	Wulong Luchi Hydroelectric Plant
40	Xiangyang Stage III Hydroelectric Plant	Wulong Runlong Maintenance Company
41	Xiangyun Hydroelectric Plant	Wulong Xiangyun Hydroelectric Plant
42	Hongshan Hydroelectric Plant	Wulong Houping Hongshan Hydroelectric Plant
43	Leyuan Hydroelectric Plant	Wulong Leyuan Hydropower Co., Ltd.

44	Yong'an Hydroelectric Plant	Wulong Haiheng Agriculture Co., Ltd.
45	Suokousi Hydroelectric Plant	Wulong Suokousi Hydroelectric Plant
46	Xinli Hydroelectric Plant	Wulong Canggou Xinli Hydropower Plant
47	Caijiagou Stage III Hydroelectric Plant	Chongqing Wulong Jiangliu Hydroelectric Plant
48	Xiangyang Stage I Hydroelectric Plant	Wulong Runlong Maintenance Company
49	Cheqingyan Hydroelectric Plant	Wulong Yuanquan Hydropower Co., Ltd.
50	Lianghekou Hydroelectric Plant	Wulong Lianghekou Hydroelectric Plant
51	Wuhe Hydroelectric Plant	Wulong Wuhe Hydroelectric Plant
52	Sihe Hydroelectric Plant	Wulong Sihe Hydroelectric Plant
53	Shilingyan Hydroelectric Plant	Wulong Pingqiaoshilingyan Hydroelectric Plant
54	Nanmu Hydroelectric Plant	Wulong Nanmu Hydroelectric Plant
55	Canglong Hydroelectric Plant	Wulong Canglong Hydropower Co., Ltd.
56	Daheba Hydroelectric Plant	Wulong Dexin Hydropower Development Co., Ltd.
57	Heixigou Hydroelectric Plant	Wulong Landi Hydropower Co., Ltd.
58	Yanchanghe Stage III Hydroelectric Plant	Wulong Longfeng Hydropower Co., Ltd.
59	Muzonghe Stage IV Hydroelectric Plant	Wulong Landi Hydropower Co., Ltd.
60	Dengta Hydroelectric Plant	Wulong Jiayuan Hydropower Development Co., Ltd.
61	Banqiao Stage II Hydroelectric Plant	Wulong Haolong Hydropower Plant
62	Shuangchahe Hydroelectric Plant	Wulong Shuangchahe Hydroelectric Plant
63	Songshigou Hydroelectric Plant	Wulong Tukan Songshigou Hydroelectric Plant
64	Banqiao Stage III Hydroelectric Plant	Wulong Haoyun Hydropower Co., Ltd.
65	Shujiahe Hydroelectric Plant	Wulong Zili Electric Power Co., Ltd.

66	Yangyan Hydroelectric Plant	Wulong Sanyuan Hydroelectric Power Development Co., Ltd.
67	Baiguo Hydroelectric Plant	Chongqing Wulong Yuxiang Water Resource Development Co., Ltd.
68	Longqiao Hydroelectric Plant	Wulong Yongxin Hydropower Development Co., Ltd.
69	Baiyang Hydroelectric Plant	Chongqing Wulong Yuxiang Water Resource Development Co., Ltd.
70	Xinmin Tailwater Stage II Hydroelectric Plant	Daozhenxianghe Hydropower Development Co., Ltd.
71	Dongliuhe Hydroelectric Plant	Wulong Boneng Electric Power Co., Ltd.
72	Dahegou Hydroelectric Plant	Chongqing Fengyuanjinhui Hydropower Development Co., Ltd.
73	Xinmin Stage II Hydroelectric Plant	Wulong Yuqian Comprehensive Development Co., Ltd.
74	Guizhou Province Xingyi City Puti Hydropower Plant Technical Reform Project	Xingyi City Puti Power Co. Ltd
75	Guizhou Province Xingyi City Puti 2nd Stage (Xiniutang) Hydropower Plant Technical Reform Project	Xingyi City Puti Power Co. Ltd.
76	Wumaxi Stage I Hydroelectric Plant	Yingjing County Sanhe Township Wumaxi Stage I Hydroelectric Station
77	Mozigou Hydroelectric Plant	Yingjing Sanhe Mozigou Hydroelectric Plant
78	Mayihe Hydroelectric Plant	Yingjing Mayihe Hydropower Station
79	Jinyatan Hydroelectric Plant	Yingjing Jinyatan Hydroelectric Plant
80	Toudaoshui Hydroelectric Station	Yingjing County Toudaoshui Hydroelectric Station
81	Sanhui Hydroelectric Plant	Sichuan Yingjing Sanhui Electric Power Co., Ltd.
82	Qingshuihe Stage I Hydroelectric Plant	Sichuan Yingjing Yunwushan Hydropower Co., Ltd.
83	Gongjiagou Hydroelectric Plant	Shimian Zhongxin Electric Power Development Co., Ltd.
84	Chahe Stage III Hydroelectric Plant	Sichuan Yingjing Hengyuan Electric Power Co., Ltd.
85	Daihuanggou Hydroelectric Plant	Yingjing County Sanhe Daihuanggou Hydroelectric Plant
86	Gaoqiaohe Hydroelectric Plant	Sichuan Yingjing Gaoqiaohe Electric Power Co., Ltd.
87	Zhuyeshan Hydroelectric Plant	Sichuan E'bian Heizhugou Hydropower Co. Ltd

88	Lianghekou Hydroelectric Plant	E'bian Longxin Electric Power Co., Ltd.
90	Dabaishu Hydroelectric Plant	Lingcang Runda Hydropower Co., Ltd.
91	Dashi Stage III Hydroelectric Plant	Lingcang Runda Hydropower Co., Ltd.
92	Dashi Stage II Hydroelectric Plant	Lingcang Runda Hydropower Co., Ltd.
93	Yunnan Midu County Taishanhe Hydropower Station	Midu County Taishan Power Co., Ltd.
94	Zhenyuan County Xiaojiehe Hydropower Station	Zhenyuan Yi, Hani and Lahu Autonomous County Xiaojiehe
95	Jinghong City Chuangye Hydropower Station	Xishuangbanna Chuangye Hydropower Development Co., Ltd.
96	Yingjiang Husa River 5th Stage Hydropower Plant	Yingjiang County Tianchao Hydropower Co. Ltd.
97	Yunnan Province Jinping County Mengqiao Village Datan Hydropower Station	Jinping Mengqiao Datan Electricity Co. Ltd.
98	Fugong County Lishadi Hydropower Plant Project	Yunnan Fugong Huatai Electricity Development Co. Ltd

APPENDIX 3: GEODETIC COORDINATES FOR EACH INDIVIDUAL PROJECT PLANT

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"
8	Chongqing Wanzhou Mayuexi Hydroelectric Plant	E 108°15'56" N 30°37'51"
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"
14	Chongqing Wanzhou Lianmeng Hydroelectric Plant	E 108°04'35" N 30°41'27"
15	Chongqing Wanzhou Wanlin Hydroelectric Plant	E 107°59'41" N 30°46'62"
16	Chongqing Wanzhou Gaodongzi Hydroelectric Plant	E 108°25'49" N 30°45'19"
18	Chongqing Wanzhou Yanjingxi Hydroelectric Plant	E 108°51'08" N 30°38'11"
20	Chongqing Wanzhou Dibao Hydroelectric Plant	E 108°54'00" N 30°41'27"
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"
26	Xiangyang Stage II Hydroelectric Plant	N: 29°24'52.67" E: 107°53'36.16"
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	Chengmendong 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"
43	Leyuan Hydroelectric Plant	N 29°20'50.95" E 107°35'34.32"
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"
64	Banqiao Stage III Hydroelectric Plant	N 29° 5'57.09" E 107°40'40.56"
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"

APPENDIX 4: INFORMATION OF MONITORING METERS FOR ALL INDIVIDUAL PROJECTS

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 the hydropower plant	10kV-Nanchuan Chengjiao 35kv substation-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.
8	Chongqing Wanzhou Mayuexi Hydroelectric Plant	0.5s	The third electricity pole outside the plant	The electricity round voltage is 0.4kv,the voltage step-up into 10kv and then transmitted to Ganning 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.
14	Chongqing Wanzhou Lianmeng Hydroelectric Plant	0.5s	Lianmeng Bridge	The electricity round voltage is 0.4kv,the voltage is stepped-up into 10kV and then transmitted to Sanyuan 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.
16	Chongqing Wanzhou Gaodongzi 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 Wuqiao 110kv substation, finally the electricity fed into CCPG via Chongqing power grid.
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.
20	Chongqing Wanzhou Dibao Hydroelectric Plant	0.5s	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.
21	Chongqing Wanzhou Xianfeng Hydroelectric Plant	0.5S	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 35kv 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
26	Xiangyang Stage II Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Huolu 35kv substation-Wulong grid-grid,400V-10KV
27	Qingtongxi Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Baima 35kv 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	0.5S	Substation	10kV-MUzonghe stage 3 substation-Wulong grid-grid,400V-10KV
38	Xinqiao Hydroelectric	0.5	Substation	10kV-Tongzi substation-Wulong

	Plant			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 35kv substation-Wulong grid-grid,400V-10KV
41	Xiangyun Hydroelectric Plant	0.5	Telegraph pole outside of the Booster station	10kV-Yangjiao 35kv substation-Wulong grid-grid,400V-10KV
42	Hongshan Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Tongzi 35kv substation-Wulong grid-grid,400V-10KV
43	Leyuan Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Baima substation-35kv-grid,400V-10KV
44	Yong'an Hydroelectric Plant	0.5	On the main transformer in the hydropower plant	10kV-Yangjiao 35kv substation-Wulong grid-grid,400V-10KV
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 110kv substation-Wulong grid-grid,400V-10KV
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	0.2	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	1	On the main transformer in the hydropower plant	10kV- 35kV Huangyingxiang substation
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	6.3KV-Muzonghe stage 3-110KV-grid

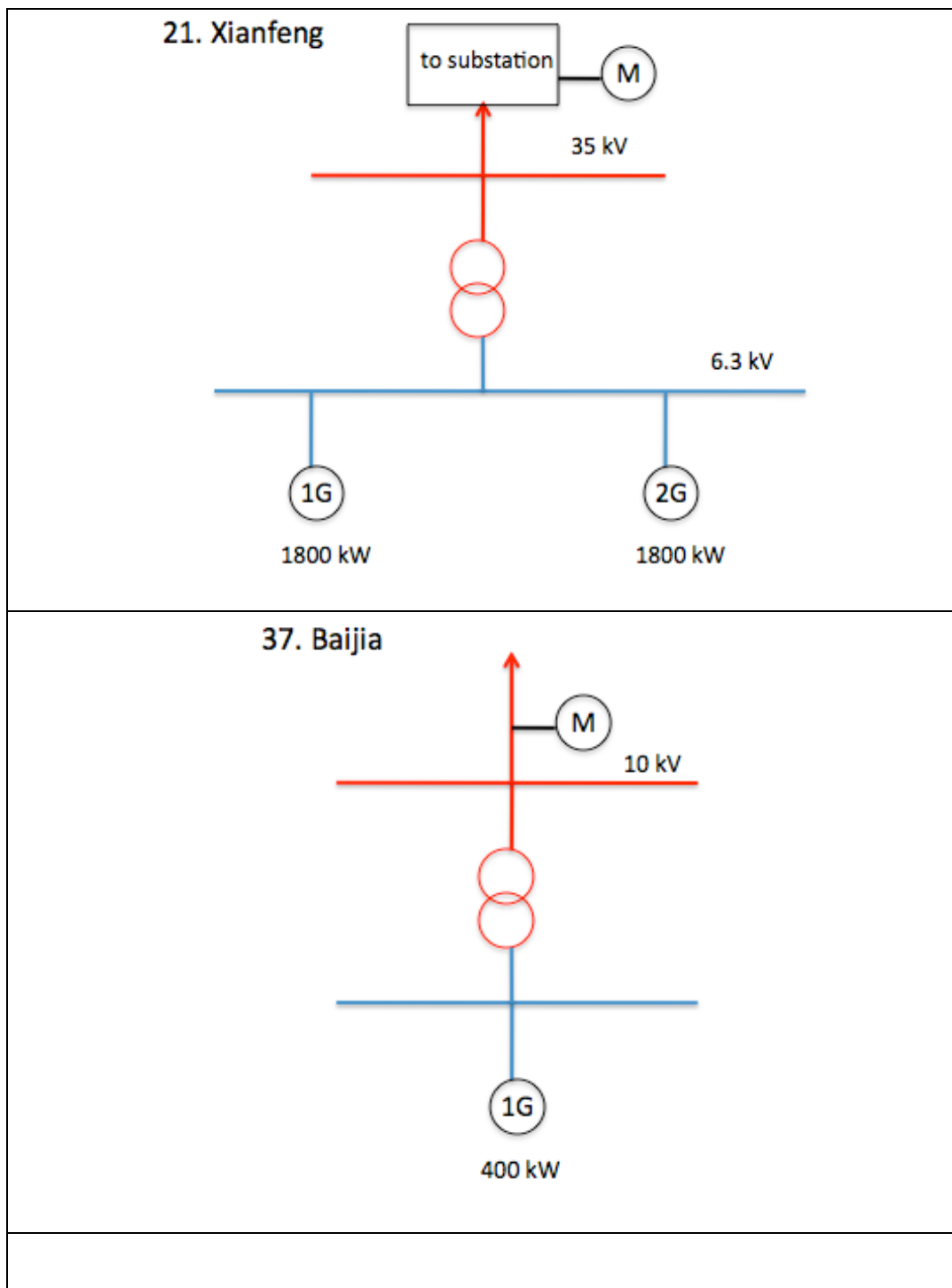
			hydropower plant	
58	Yanchanghe Stage III Hydroelectric Plant	0.2	On the main transformer in the hydropower plant	10kV-Tongzi substation-Wulong grid-grid 400V-10KV
59	Muzonghe Stage IV Hydroelectric Plant	0.5S	On the main transformer in the hydropower plant	400v-10KV
60	Dengta Hydroelectric Plant	0.2	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	0.5S	Substation	10kV-Zhongbaowan substation-Fuling grid-grid 400V-10KV
63	Songshigou Hydroelectric Plant	0.5S	On the main transformer in the hydropower plant	0.4KV-booster station-10KV-Tukan power station-Chuandong grid -grid
64	Banqiao Stage III Hydroelectric Plant	2	On the main transformer in the hydropower plant	0.4KV-booster station-10KV-35KV substation-grid
65	Shujiuhe Hydroelectric Plant	0.5S	Substation	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	0.5S	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	0.5S	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 chage 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 to10KV
72	Dahegou Hydroelectric Plant	0.5S	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	0.5S	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	0.2s	On the transformer in substation	35KV-Wusha substation-city grid-southern grid, voltage is lowered down

	Stage (Xiniutang) Hydropower Plant Technical Reform Project			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 hydropower plant	The power is transmitted to Ya'an grid via Xingfu substation through 35kv line finally to the grid, and 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 Sanhuiwei 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	1	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	1	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	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	0.5S	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	0.5S	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	0.5S	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	0.5S	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.

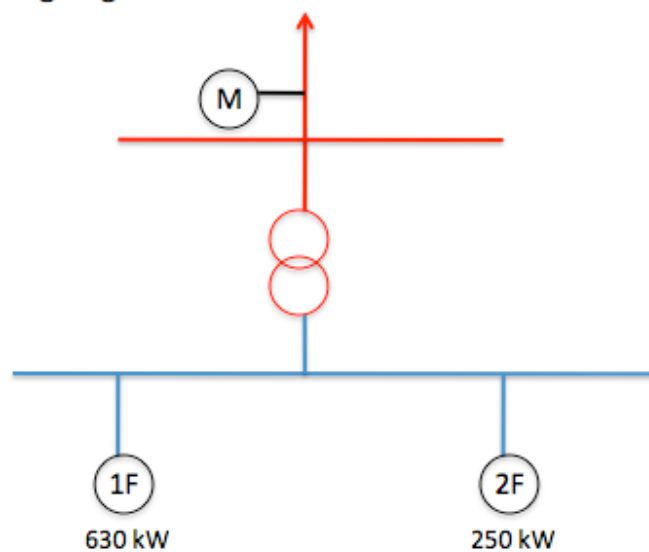
96	Yingjiang Husa River 5th Stage Hydropower Plant	0.5s	On high voltage side of main transformer in substation	The power is transmitted to Husa River stage 4 substation via Yang35KV and finally to the Hongzhou grid, and the voltage changes from 35KV into 110KV when pass the booster station
97	Yunnan 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

APPENDIX 5: MONITORING FLOW DIAGRAMS FOR SAMPLING PROJECTS



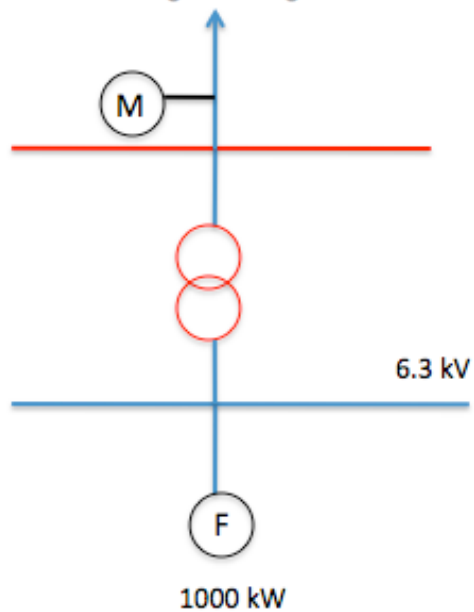
55. Canglong

to booster station

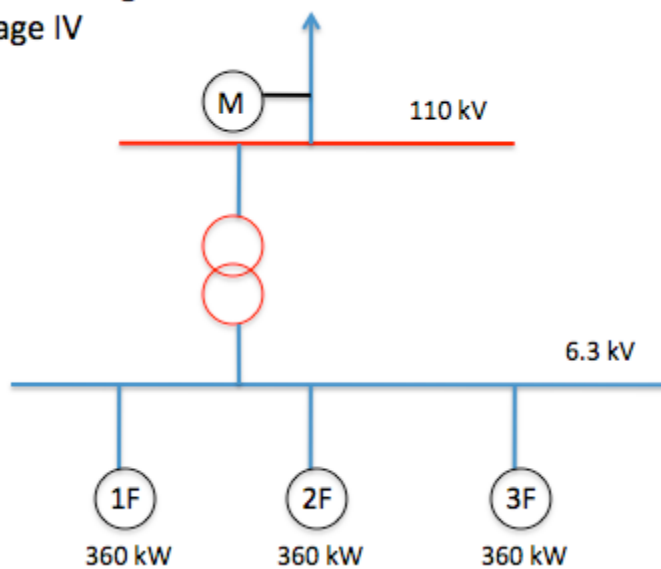


57. Heixigou

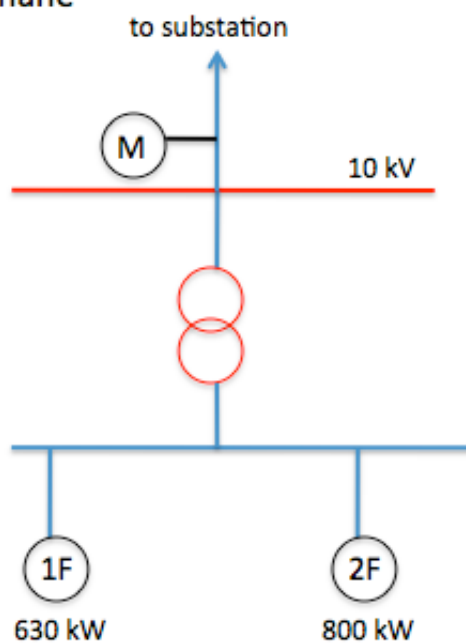
to Muzonghe III Stage 6.3 kV bus



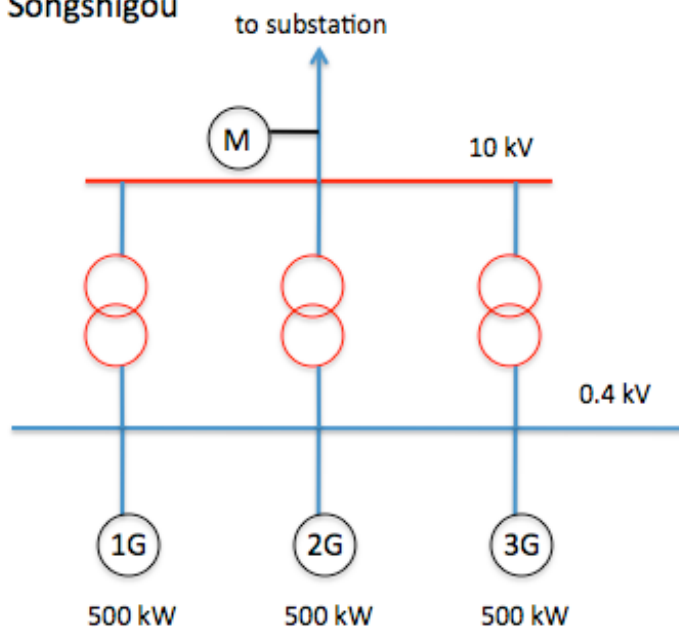
**59. Muzonghe
Stage IV**



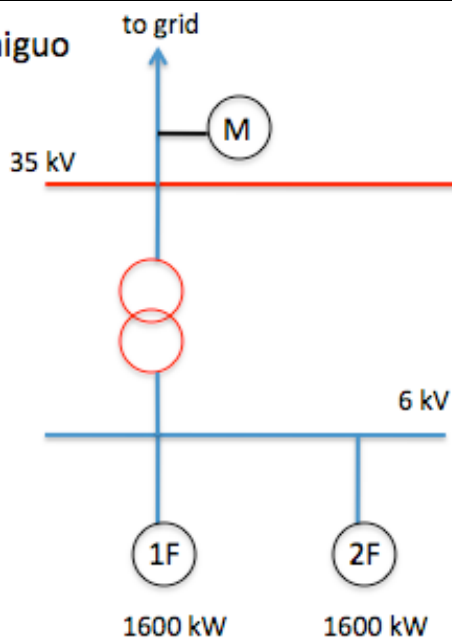
62. Shuangchahe

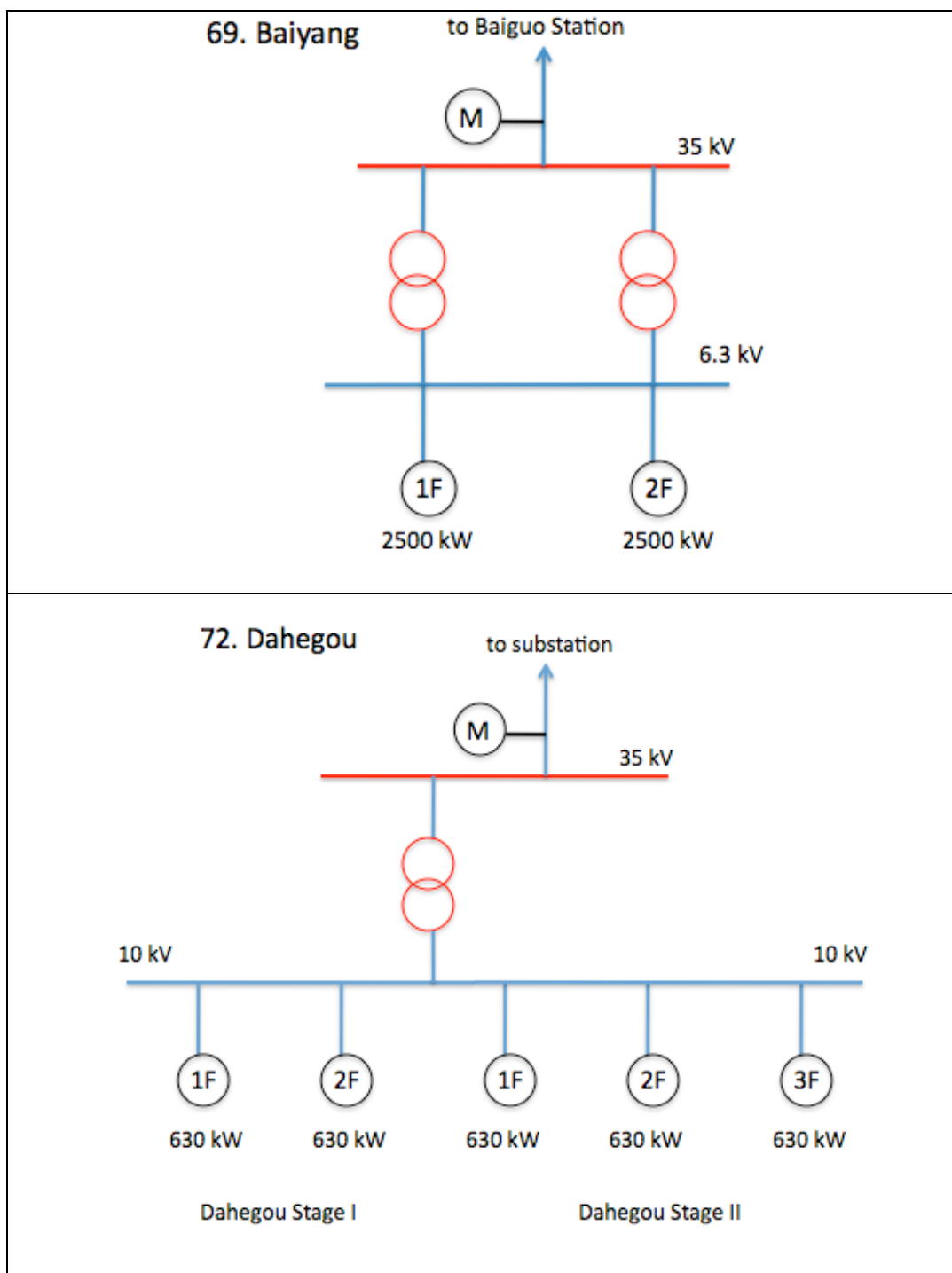


63. Songshigou

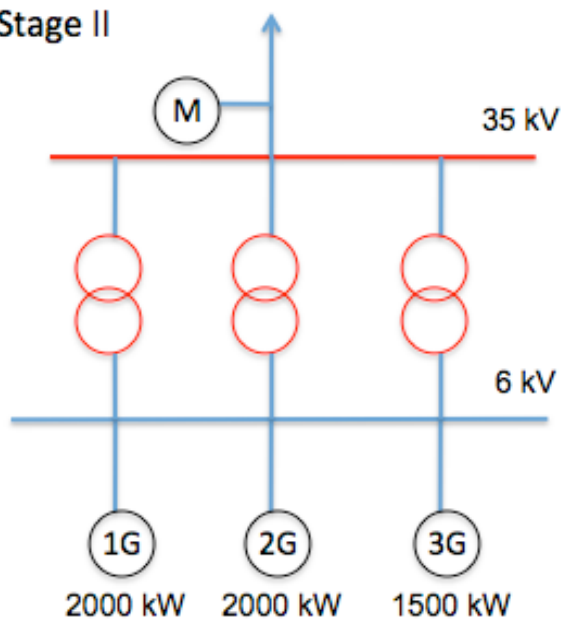


67. Baiguo

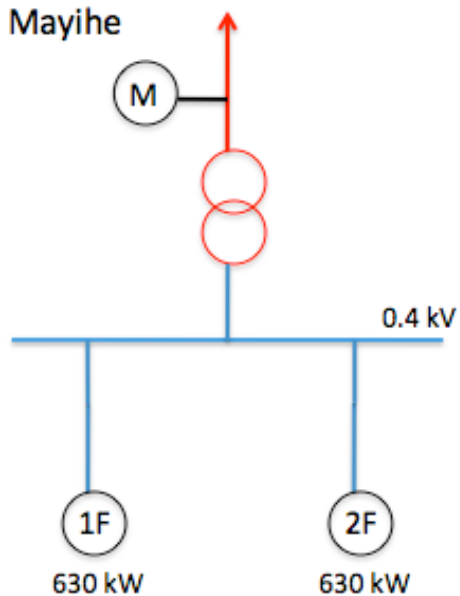




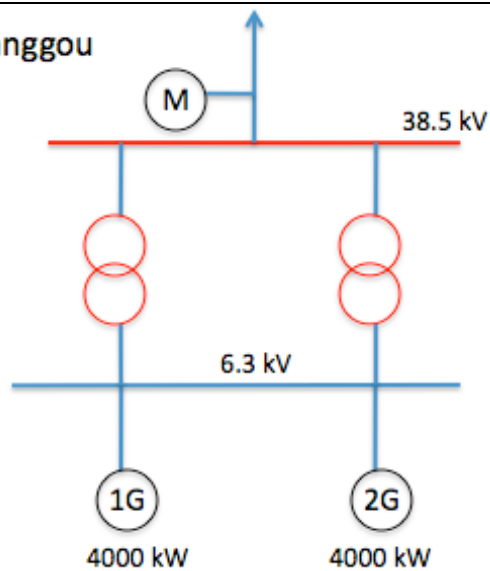
73. Xinmin Stage II



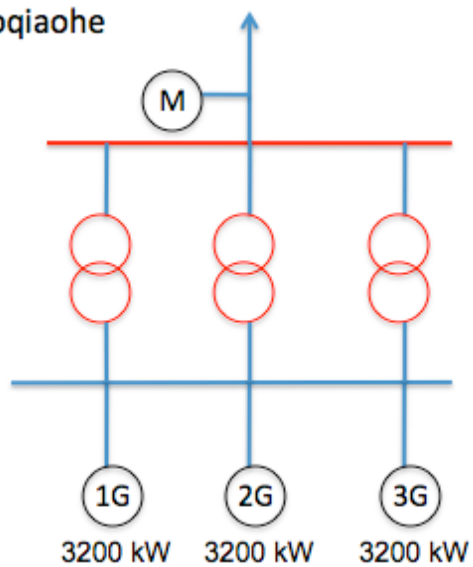
78. Mayihe



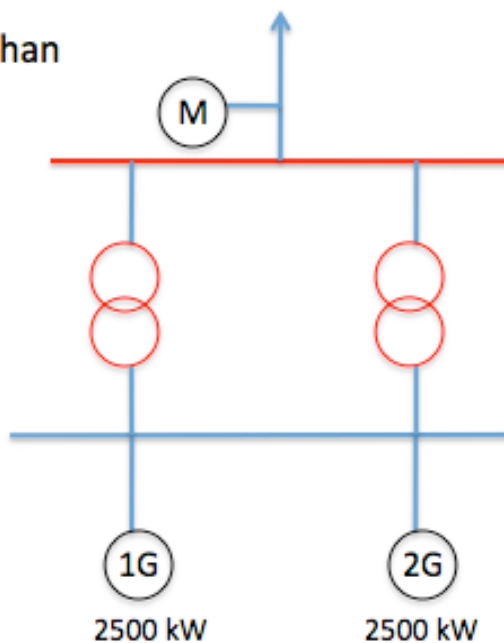
85. Daihuanggou



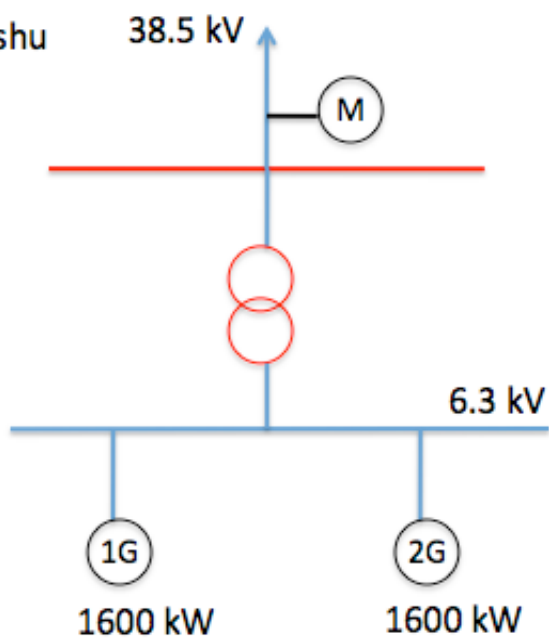
86. Gaoqiaohe



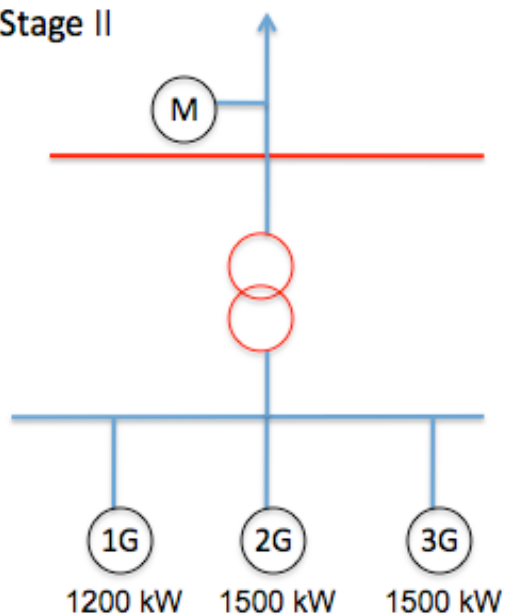
87. Zhuyeshan



90. Dabaishu



92. Dashi Stage II



98. Lishadi

