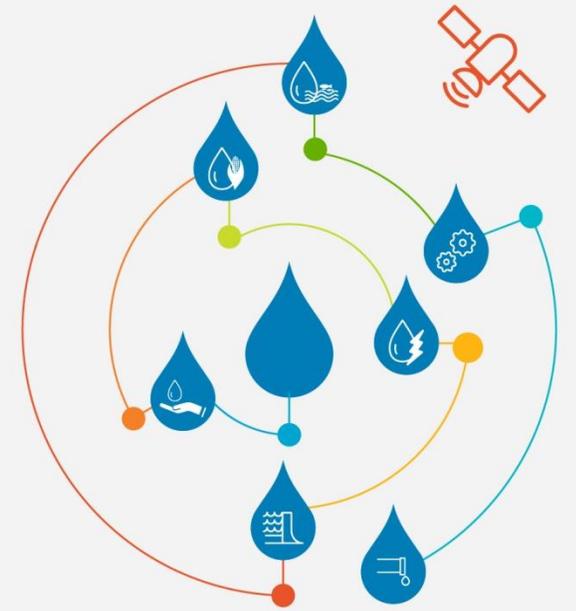


Greening Hydro: Upgrading of People's Republic of China Small Hydropower Capacity Project



Tonilyn Lim

UNIDO

3rd Oct. 2018

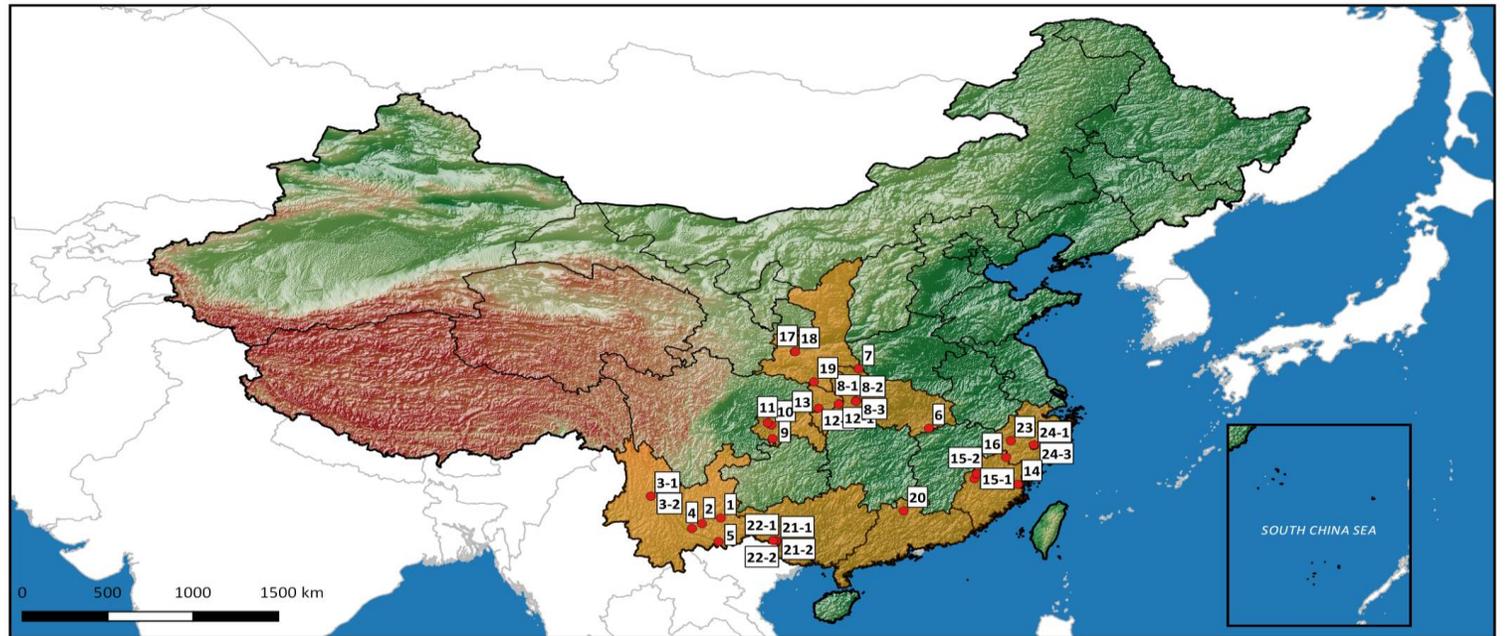
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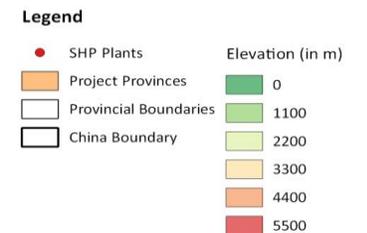
Introduction

- **Genesis of the project**
- To reduce GHG and fossil fuels through upgrading existing SHP
- **Estimated Outcomes:**
- Additional of 23.7 MW, And 157,000 MWh
- Emissions reduction of 110,374 tCO₂eq

GEF/UNIDO Project - Upgrading of China SHP Capacity Project



No.	Name	Province	8-1	Yangdaohe SHP	Hubei	14	Tangban SHP	Fujian	21-2	Dongpai SHP	Guangxi
1	Maoyandong 2 SHP	Yunnan	8-2	Chaotianhou SHP	Hubei	15-1	Jiaosan SHP	Fujian	22-1	Aibu 2 SHP	Guangxi
2	Mabozi SHP	Yunnan	8-3	Shijiaaba SHP	Hubei	15-2	Tantou SHP	Fujian	22-2	Aibu 3 SHP	Guangxi
3-1	Quanqiaohe 1 SHP	Yunnan	9	Majing SHP	Chongqing	16	Gaofang 2 SHP	Fujian	23	Qingshuitan SHP	Zhejiang
3-2	Quanqiaohe 2 SHP	Yunnan	10	Xiaokeng SHP	Chongqing	17	Baiyunxia SHP	Shaanxi	24-1	Panxi 2 SHP	Zhejiang
4	Chahe SHP	Yunnan	11	Gaokeng SHP	Chongqing	18	Xiakou SHP	Shaanxi	24-2	Panxi 3 SHP	Zhejiang
5	Jiuqiyan SHP	Yunnan	12-1	Jingtanfeng SHP	Chongqing	19	Xinpingya SHP	Shaanxi	24-3	Panxi 4 SHP	Zhejiang
6	Jiugonghe SHP	Hubei	12-2	Huangyan SHP	Chongqing	20	Guanxi SHP	Guangdong			
7	Zhoujialiang SHP	Hubei	13	Taiping SHP	Chongqing	21-1	Sandieling SHP	Guangxi			



Greening of SHP's in China

- **Issues** (Old, Env. & Safety, economics)
- **Objective and goal setting**
- Upgrading of China SHP Capacity
- Developing policy and institutional framework
- Reducing environmental and social impact
- Improving the management and safety standard
- Knowledge and capacity building for green SHP

Environmental impact of SHP

- ❖ Hydrological changes
- ❖ Altering of natural river flow
- ❖ Dehydration
- ❖ water quality
- ❖ Irreversible destruction
- ❖ Reduction in biodiversity

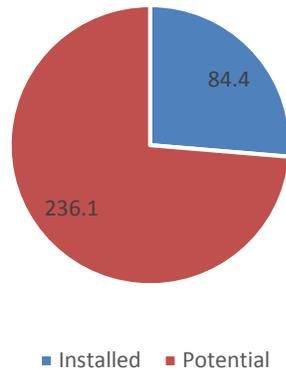
Green and safe SHP

- ❖ Ecological flow
- ❖ Landscaping of riverbanks
- ❖ Upgrade of equipment
- ❖ Training on management, operation, and maintenance
- ❖ Protection of aquatic life

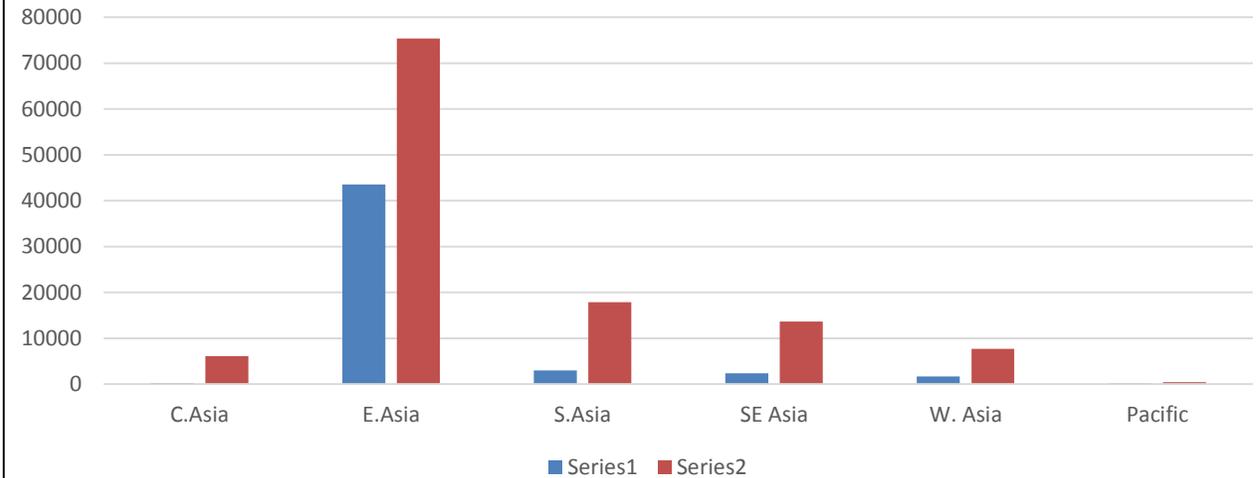


Global and Regional Scope for SHP

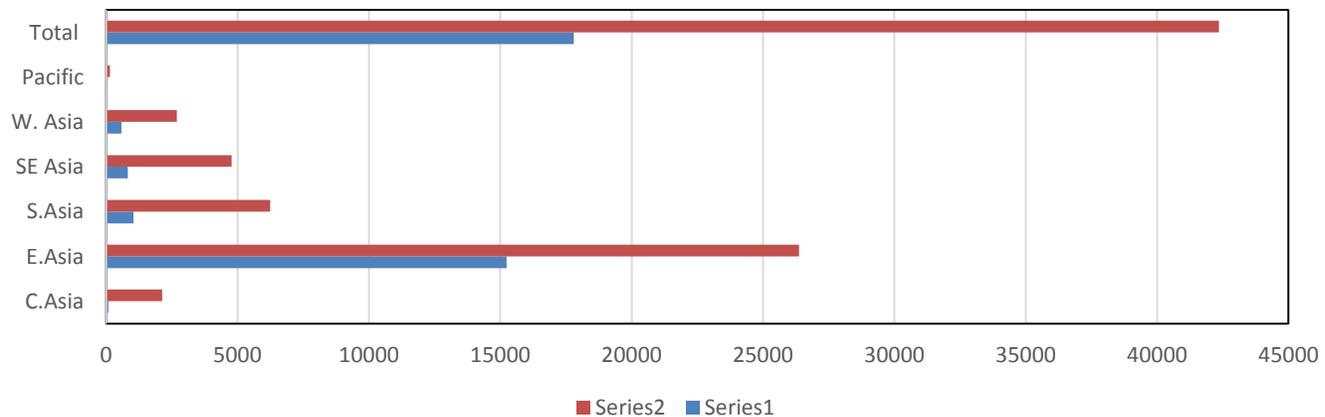
Global SHP Potential and Installed Capacity in GW



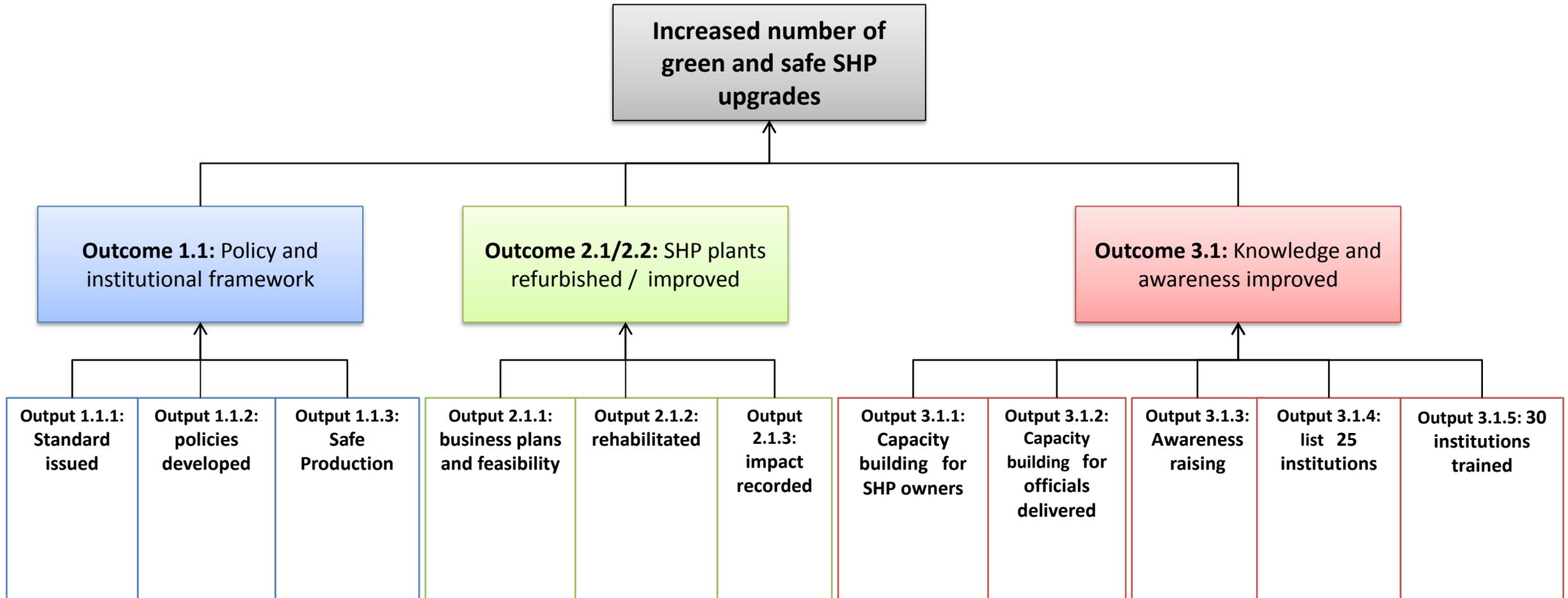
Asia and Pacific SHP Installed Vs Potential based 2016 (in MW)



Asia and Pacific Greening SHP market scenario in US\$ million



The GEF Project



Beginning with the Consultations



Site Assessment (Zhejiang)



Best Practice - River System Zhejiang

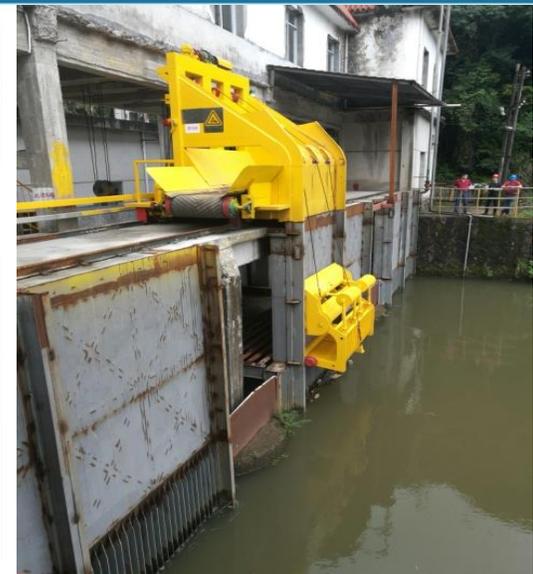
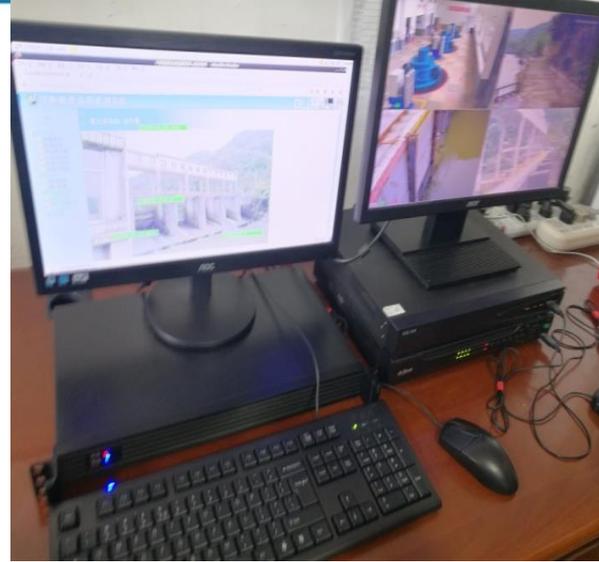
- Improvement of river management and ecological conditions of rivers with the River Chief System introduced in December 2016.
- On 13 December 2016, MWR and MEP appoints “River Chiefs” at 4 levels
- An information disclosure platform introduced for public supervision.
- In April 2017, Zhejiang province, introduced China’s first provincial law to empower river chiefs.
- In December 2017, more than 900,000 River Chiefs had been appointed nationwide and is expected to be fully implemented by the end of 2018.
- Indicated that this has caused a positive impact on the river ecology



Immediate Impacts (Hubei)



Green Measures (Fujian)



Fujian Province Incentive Policy for Green SHP

- “ecological electricity price system” to meet ecological flow requirements
- 200 SHP out of 6,000 in province have installed ecological flow facilities
- Expected all SHP subject to the policy of ecological electricity price by 2020
- Power stations that are not discharging ecological flow will be stopped.
- Two ways to meet ecological flow requirements- Renovation (either lacking or old facilities) and Restriction (switch to different mode of operation)

	$P \geq 90\%$	$80\% \leq P < 90\%$	$60\% \leq P < 80\%$	$50\% \leq P < 60\%$	$P < 50\%$
Renovation	+2 cent/kWh	+1 cent/kWh	0 cent/kWh	-1 cent/kWh	-2 cent/kWh
Restriction	+3 cent/kWh	+1.5 cent/kWh	0 cent/kWh	-1.5 cent/kWh	-3 cent/kWh



Achievements and Lessons Learned

- Holistic Approach to Green SHP– Economic- Social - environmental
- Strong policy and strict compliance
- Huge global, regional, and local potential for Green SHP
- Scaling up further in Asia and Pacific – strategic planning
- Greening Hydro can demonstrate immediate positive impacts



Recommendations for Development Partners

- Provide Pilot demonstrations projects to serve as reference
- Arrange exposure events and site visits for decision makers
- Establish knowledge platforms for Green Hydro



Thank you for your attention!

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INCLUSIVE AND SUSTAINABLE INDUSTRIAL DEVELOPMENT

