

Translation of https://www.csg.cn/xwzx/2019/yxcz/201912/t20191213_306684.html

Translated by Brian Eyler, Stimson Center Southeast Asia Program Director

Initial points of reference:

- 1) *Electricity production units: China uses Chinese language units of 10,000 (万) and 100,000,000 (亿) for large numbers. The charts below are listed using these numerical conventions. The most common unit displayed is 亿 kilowatt-hours to denote electricity production. 1 亿 kilowatt hour equals 100,000,000 kilowatt hours which is converted to more commonly used terms as .1 terawatt hour (.1TWH). By extension, 100 亿 kwh = 10 TWH.*

In the text translation below, I have made this conversion from 亿 kwh to TWH for the reader's convenience. The charts below use the original graphic interface from the Chinese language CSG article and as such numbers remain in 亿 kwh. As a quick fix, move the decimal on unit to the left in the charts below to read TWH.

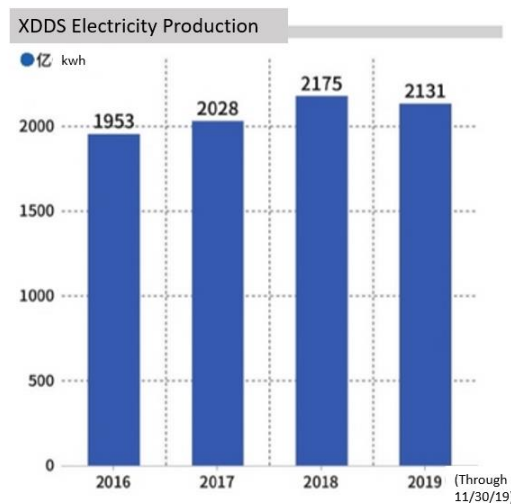
- 2) *西电东送 (Xidian dongsong) hereafter called XDDS refers to the "Western Power Send to the East" poverty alleviation and economic development plan initiated in the 1990s to develop hydropower assets on Southwest China's rivers and transmit generated power to provinces on China's east coast. Like the Belt and Road Initiative, it is unclear which assets fall within the framework of XDDS. We can assume all 11 dams on China's Lancang fit within the framework of XDDS, but other SW Chinese rivers such as the Jinsha and other Yangtze tributaries, the Red River, and the Pearl have been rapidly developed for hydropower production. [See this link](#) and [this link](#) for more information in Chinese language.*

Title: Incoming water at a 13 year high, how to resolve the pressure?

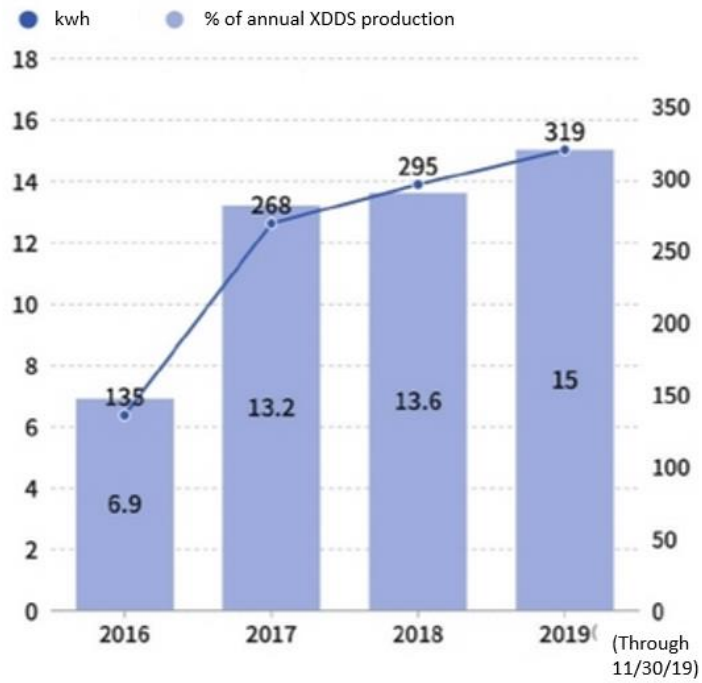
Tag: A reporter goes down the Lancang to find a comparative increase of 22.2 TWH in electricity production and the story behind an increase of 6.2% water use efficiency

Source: China Southern Grid Online Media Portal

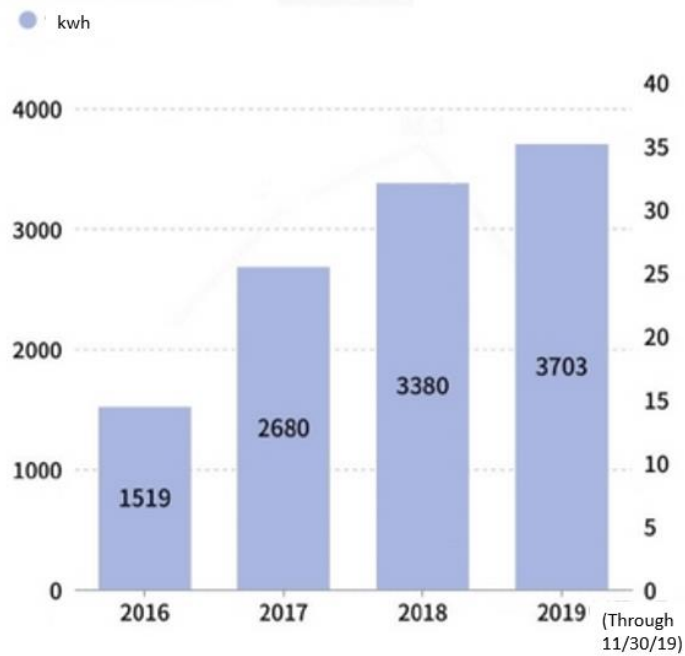
Date of Publication: December 13, 2019



CSG interprovincial electricity production exports

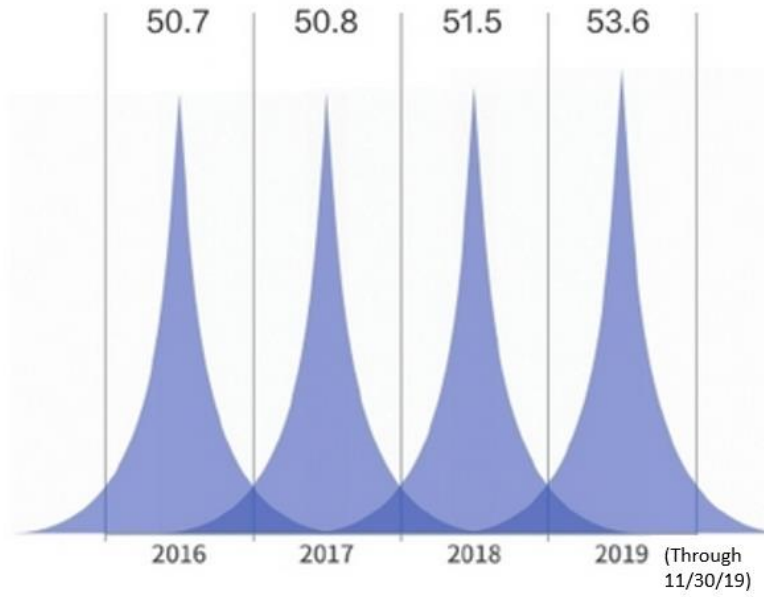


Provincial CSG Electricity Sales



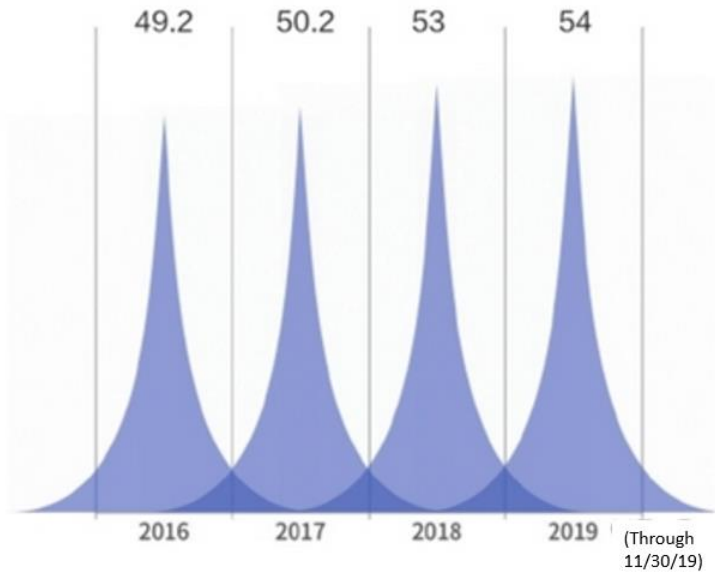
Percentage of CSG Non-fossil Fuel Electricity Production

● Percentage %

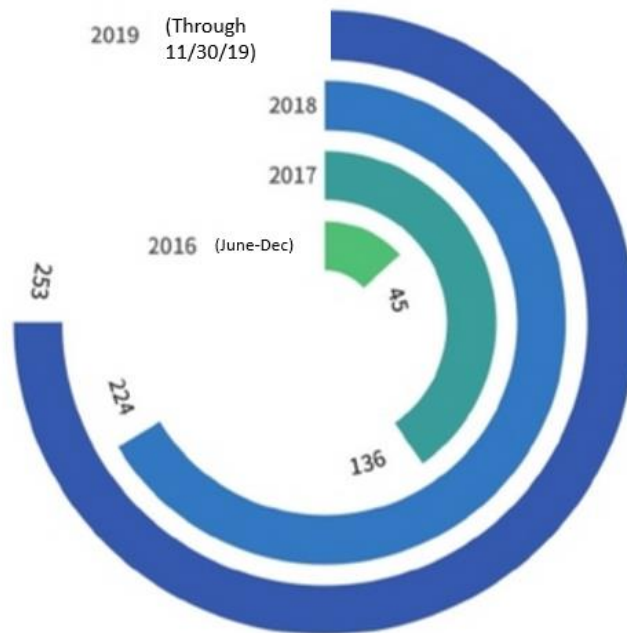


Percentage of CSG Non-fossil Fuel Installed Capacity

● Percentage %

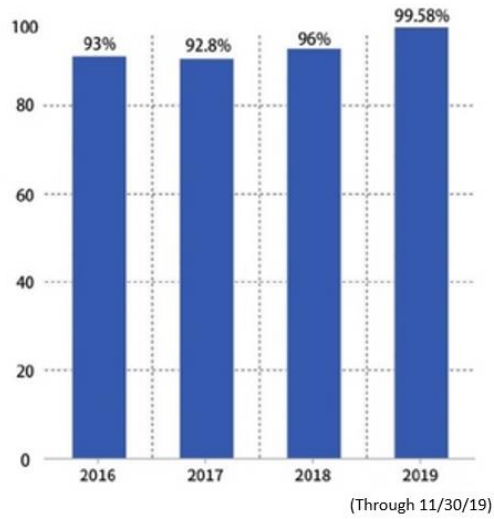


Electricity Substitution (亿kwh)



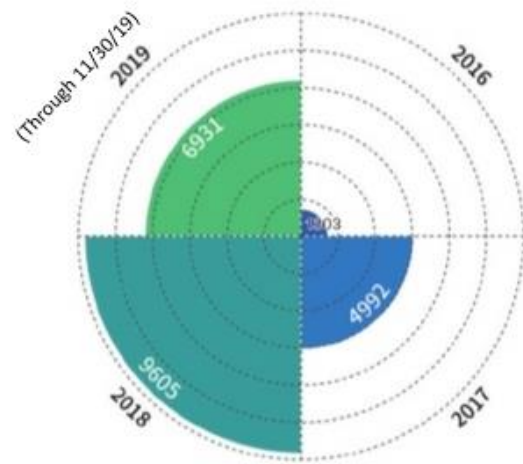
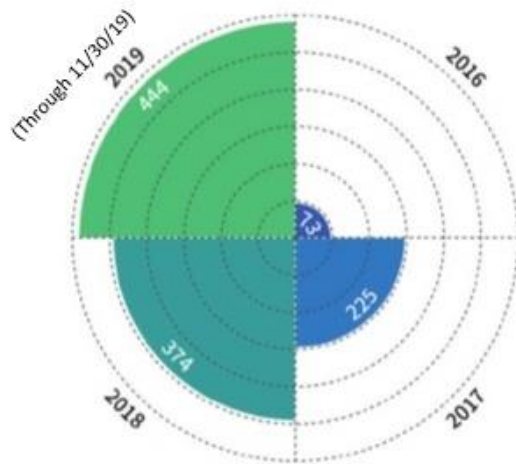
Note: Electricity substitution work began in June 2016 (June-Dec)

CSG Clean Energy Production Utilization Rate (includes Wind, Solar, Nuclear, and Hydropower)

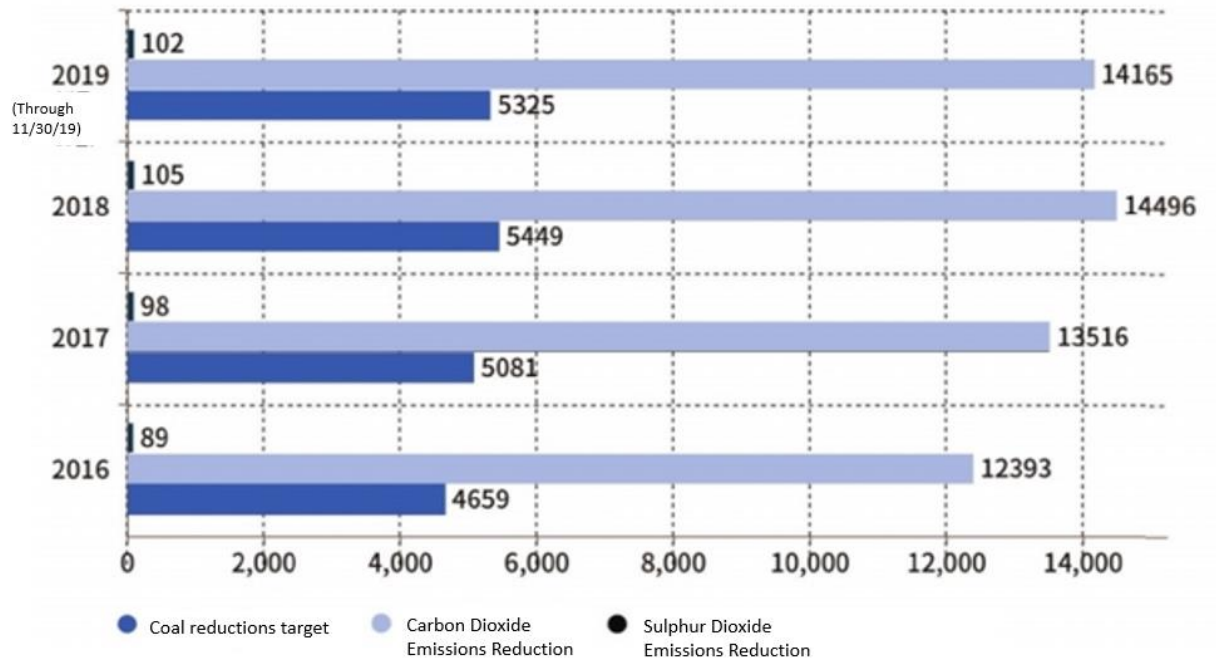


Newly Added Electric Vehicle Charging Stations

Newly Added Electric Vehicle Charging Sets



XDDS Carbon Emissions Reduction Status (10,000 tons; move decimal two units to left for million tons)



In the middle of the Wuliang Mountains on the Lancang River a dam spans the width of the river, drawing in the high gorges and deep valleys. The river surges collecting into a gigantic force of hydropower which is then transformed into a powerful and unending flow of electricity transmitted to Guangdong. This is Huaneng's Xiaowan Dam. For hydropower development, XDDS, and the mainstream

of the Lancang River, the Xiaowan Dam is the “faucet”.¹ 2019 through 11/25 the Xiaowan “faucet” produced 17.85 TWH of electricity and had a hydropower utilization of 100%.

In 2019, the “incoming water”² in the Lancang system and other southern watersheds in the dry season was higher than normal, but “incoming water” in the 2019 wet season was lower than normal. Incoming water throughout the entire year had ups and downs throughout the year. In the face of increasing uncertainty of “incoming water” and related challenges, China Southern Grid (CSG) resolutely pledges to fight the “Battle for Pollution Prevention”³ and win the “War for Blue Sky Protection”⁴ policies as issued by the Central Communist Party and State Council and fully promote the consumption of clean energy.

From January to November 30, 2019, CSG XDDS produced 213.1 TWH of electricity; CSG hydropower produced a total of 378.9 TWH, a comparative (YOY) increase of 7.4%⁵. The hydropower utilization rate of CSG’s power system is 99.6%, and among this the hydropower utilization rate of Yunnan hydropower is 99.3%, an increase of 6.2% from 2018. Quotas for wind and photovoltaic generation are mostly consumed. And safely produced nuclear power is also consumed. 53.6% of CSG’s total electricity production comes from non-fossil fuels.

Today CSG media group takes a journey along the Lancang River to find the story behind these gradual increases in clean energy

A Grand Platform⁶: Use Resources to Configure a “Grand Platform” and Resolve the Challenges of More Water in the Dry Season and Less Water in the Wet Season.

The melting snow and ice from the Tanggula Mountains⁷ melts and trickles into streams, winding and twisting into rivers to form the world’s 9th largest river, the Lancang-Mekong. China’s portion of this river is called the Lancang River.

¹ The word “faucet” or “tap” in Chinese is literally translated as “dragon’s head”

² I have translated the Chinese word 来水 literally as “incoming water”; my interpretation of this term is that it captures all of the water coming into the system including snowmelt, precipitation, groundwater, etc. It is certainly not a word with a meaning restricted to just precipitation and is most likely associated with the term river flow.

³ 污染防治攻坚战

⁴ 蓝天保卫战

⁵ The author does not clarify which increased by 7.4%, CSG hydropower production or XDDS hydropower production (XDDS comprises a portion of total CSG hydropower production); translators guess is the increase applies to total CSG hydropower production.

⁶ The official CSG English language summary of the original Chinese language article used the term “Grand Strategic Platform” – In China the word “platform” can denote a large space for comprehensive operations or activities; similar to a media platform or an arena for discourse and interaction among numerous moving parts. Here I believe the author is using the words “grand platform” to describe the operational scope of the 11 dams on China’s upstream and how the “platform” of an 11 dam cascade provides opportunities for operational optimization and comprehensive, strategic actions.

⁷ In the Qinghai Tibetan Plateau at the headwaters of the Lancang-Mekong

Representatives of Huaneng HydroLancang Ltd, (hereafter called Huaneng HydroLancang) say there are now 10 dams completed on the Lancang.⁸ The total installed capacity of this 10 dam cascade is more than 20000 MW, making it the core source of power of the Yunnan's XDDS.

The Lancang River is rich in hydro resources, but the patterns of “incoming water” are difficult to predict. During the dry season months of April and May 2019 “incoming water” in the Lancang watershed was approximately 40% more than a normal multi-year baseline, but after the wet season began “incoming water” was 30% less than a normal multi-year baseline. For the first half of the year, “incoming water” in the Lancang River and the Jinsha⁹ River hit a thirteen-year high. Yunnan’s hydropower production increased 22.2 TWH, but Yunnan provincial consumption only increased 5.3 TWH, causing a surge in pressure to consume hydropower.

On 11/26 while conducting interviews at the Xiaowan Dam, this reporter¹⁰ observed the reservoir level was 15-meters lower than its full level. A manager at Xiaowan said, “On January 1 of this year, the reservoir level could reach 1239.2 meters (above sea level) well within reach of a full reservoir.

In addition to Xiaowan, on January 1, 2019, the water level at Nuozhadu reached 809.68 meters above sea level. At a monthly meeting in January of 2019, a manager from Huaneng HydroLancang’s Operations Center said, “If we can make progress toward producing more electricity during from XDDS prior to the wet season, then the two reservoir levels could fall to 1170 meters (Xiaowan) and 770 meters (Nuozhadu), contributing 20 TWH of river regulation space,¹¹ significantly helping to control the scale of curtailed water¹² throughout the year.”

After understanding the situation, CSG rapidly organized its relevant offices and work units to conduct research and analysis on the patterns of pre-wet season flows and produced a monthly decomposition on how to create targets for reducing reservoir levels at Xiaowan and Nuozhadu in a way that corresponds to market behaviors. At the same time, relevant offices created an optimal pathway and made arrangements to overhaul generation units. These offices then implemented a plan for generate more power from XDDS more power on a monthly basis and made great efforts to increase power transmission from Yunnan to Guangdong through prioritizing the operations of the Xiaowan and Nuozhadu dams.

CSG proudly took advantage of its ability to mobilize resources and configure a “grand platform” and during the pre-wet season months of January to May Yunnan XDDS cumulatively transmitted more than 20 TWH. Xiaowan and Nuozhadu’s reservoirs fell to levels of 1170 meters and 765 meters respectively, laying a positive foundation for a full year of hydropower production.

“This year was the first year the Huaneng HydroLancang’s upper cascade of dams¹³ was fully put into operation¹⁴. The power generated from these dams was mostly consumed. At the end of the third

⁸ An 11th dam, the Lidi Dam was completed in 2018 and is owned and operated by PowerChina, not Huaneng HydroLancang.

⁹ The major, headwater tributary of the Yangtze River.

¹⁰ A common way that a writer refers to themselves in the third person in Chinese journalism

¹¹ 调蓄空间

¹² 弃水

¹³ Need clarification on which specific dams comprise the upper cascade

¹⁴ The Dahuaqiao, Lidi, and Wunonglong Dams were all completed in 2018.

quarter (of 2019) dams on the upper cascade had produced 21.4 TWH, comprising 90.7% of planned yearly average for power production,” said a relevant employee at Huaneng HydroLancang Ltd.

This year, the supply and demand structure for Yunnan electricity experienced a traditional “surplus and deficit¹⁵” challenge which created a surplus in electricity production. Hydropower consumption patterns were severely affected.

“Since 2017, CSG has for three years continuously carried out specific activities for clean energy consumption, relying on the major operations of the XDDS. CSG is fully executing the province’s electricity coordination through the functionality of market controls. It is optimizing dispatch/arrangement of hydropower, thermal power, and nuclear power, continuously increasing the consumption level of clean energy, and powerfully promoting the development of hydropower, wind power, solar power, and other sources of clean energy,” said Li Yanjie, Vice manager of CSG System Department Water Regulation Office.

Grand Pathway: 18 pathways of XDDS, sending more than 500 TWH (to the east)

At the Xiaowan dam, water is transformed drip by drip into electricity and sent through the highway of XDDS, over mountains toward the east.

11/27 this journalist left the Xiaowan dam and traveled by car to the village of Xinsong in Jianchuan county, Dali prefecture. In the middle of mountains are high transmission towers which lead one after another leading to the the Xinsong Converter Station a portion of the Northwest Yunnan-Guangdong 800kv ultra-high-voltage (UVH) transmission project (hereafter called New East DC project).

Today the converter station staff are working on adjusting ice melting devices on the AC and DC lines. Lei Pengdong, the head of the Xinsong Converter Station told me, “The Xinsong Converter Station mainly sends clean power produced from the Lancang’s upper cascade to a load center in Shenzhen (Guangdong). After the ice melting devices are put into production, they fully protect the safety and stability of the New East DC project.

According to his introduction, from March to October of 2019, the New East DC project continuously maintained a high load, and 2019 energy utilization reached 100%. “As long as we don’t exceed the highest limits of transmission, these converter stations can transmit as much power as power stations can produce.”

May 18, 2018, to make progress on Yunnan’s hydropower transmission, a new electricity superhighway was connected - the New East DC project. That year the project transmitted 18.3 TWH of electricity. From January 2019 to November 27, 2019, 25.8 TWH of electricity was transmitted an increase of 7.5 TWU over the previous year.

Since the 18th Party Congress, CSG’s XDDS southern line of the main grid has notably expanded and is currently composed of eight AC and ten DC 500kv lines. It has transmitted more than 500 TWH of electricity.

These new electricity superhighways are in the midst of intensive construction.

¹⁵ 丰余枯缺

On November 28, 2019, this journalist took a high speed rail and then changed to an automobile to Luquan County inside of the Kunming Municipality where the construction of the 800kv “Wudongde power station transmission Guangdong Guangxi” ultra-high-voltage DC model/pilot project (hereafter called the Kunliulong DC project) converter station.

On that morning the temperature was just seven degrees Celsius, but the construction site was hot and busy. A manager from the company overseeing the project told me that more equipment was continuously coming onto the project site and about 400 workers were employed here daily. The ground preparation for the project was 87% complete and the installation of electrical equipment had reached about 17%.

Grand Synergy: The West (of China) can become an “Energy Brand” so that the East (of China) can develop its Green Momentum

XDDS is not only a pathway for the West (of China) to expand its consumption of clean energy, stimulate local economic development, but moreover it is way to develop “Green Momentum Pathways” for the economic and social development of the five southern provinces.

On November 28, 2019, this journalist went to the National Green Economic Pilot City of Pu’er for an interview. Riding along the Simao River the water was clear and the riverbanks green, flowers fragrant and birds were singing. A picture of ecology unfolded before me.

“Pu’er City’s hydropower resources are abundant. The City Party Committee and City government are grabbing ahold of opportunities coming out of the Western Development Strategy. We are in the initial stages of building “special biology¹⁶”, clean energy, modern forestry sector, leisure activities into a “base of the four major green production sectors,” said Xu Hongbin, the director of Pu’er City’s Industry and Information Bureau.

From January to October of this year, Pu’er’s power sector comprises 55.1% of major industries. The power sector has already become the city’s top pillar industry. As Pu’er City expanded ways to export electricity out of Pu’er, it also greatly promoted ways to consume more clean energy. Electricity substitution (away from fossil fuel consumption) is promoting the fast development of green industries. Pu’er City has 978 tea industries, and 95% of them are using electricity to process tea. Among Nestle and other famous companies which provide coffee inputs, many are using fully automated production lines.

Ecological “face-value” is turning into an economic “production value” and green water and blue mountains are turning into “Golden Mountains and Silver Mountains”. Pu’er City is a microcosm of Yunnan’s transition and development trend toward clean energy. Currently electricity is powering the base of Yunnan’s number two pillar industry – tobacco, and moving forward, it will power the electric vehicle industry. Yunnan’s power sector is developing into an industry which promotes the leapfrogging of development.

As the XDDS electricity capacity has increased over the years, Guangdong’s skies have become bluer. China’s Ministry of Ecology and the Environment recently begun to display pollution indicators for cities

¹⁶ 特色生物 – could be a typo/perhaps refers to Green Biology?

throughout the country, Shenzhen, Huizhou, Zhuhai, Zhongshan all sit on the list of top 20 cities with relatively good air quality indicators.

This year Hainan Province is finally using clean energy from Yunnan. In June of this year, CSG has created a major line from its main grid to connect to Hainan and provide it with clean energy

Through November 28 of 2019, Yunnan has sent more than 1 TWH of electricity to Hainan and provided the free market zone (seaport) there with clean energy.

CSG is quickly working to negotiate a long-term plan for electricity transmission from Yunnan to Hainan to promote the consumption of clean energy all around Yunnan. It is estimated that in 2020, Yunnan will transmit more than 1.5 TWH to Hainan.

Authors: CSG media journalists Xu Huiping, Li Gang and information employees Duan Jieqin, Zhou Peng, Wan Wanxin, and Niu Yawen contributed to this report

Data Source: CSG media journalists Sun Weifeng, He Ningtong