

RENEWABLE ENERGY MARKETS ASIA 2023 PANEL DISCUSSION

# MARKET SPOTLIGHT: CHINA



**Yuhuan Shen**

Business Development Lead,  
South Pole



**Nicole Wu**

Senior Manager, Global Energy &  
Sustainability Management, Jabil

Thursday, 27 April 11:30 AM-12:00 PM



**Renewable Energy  
Markets™ Asia 2023**



JABIL ASIA ENERGY MANAGEMENT OFFICE

# JABIL – REM ASIA

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Jabil Asia Energy Management Office

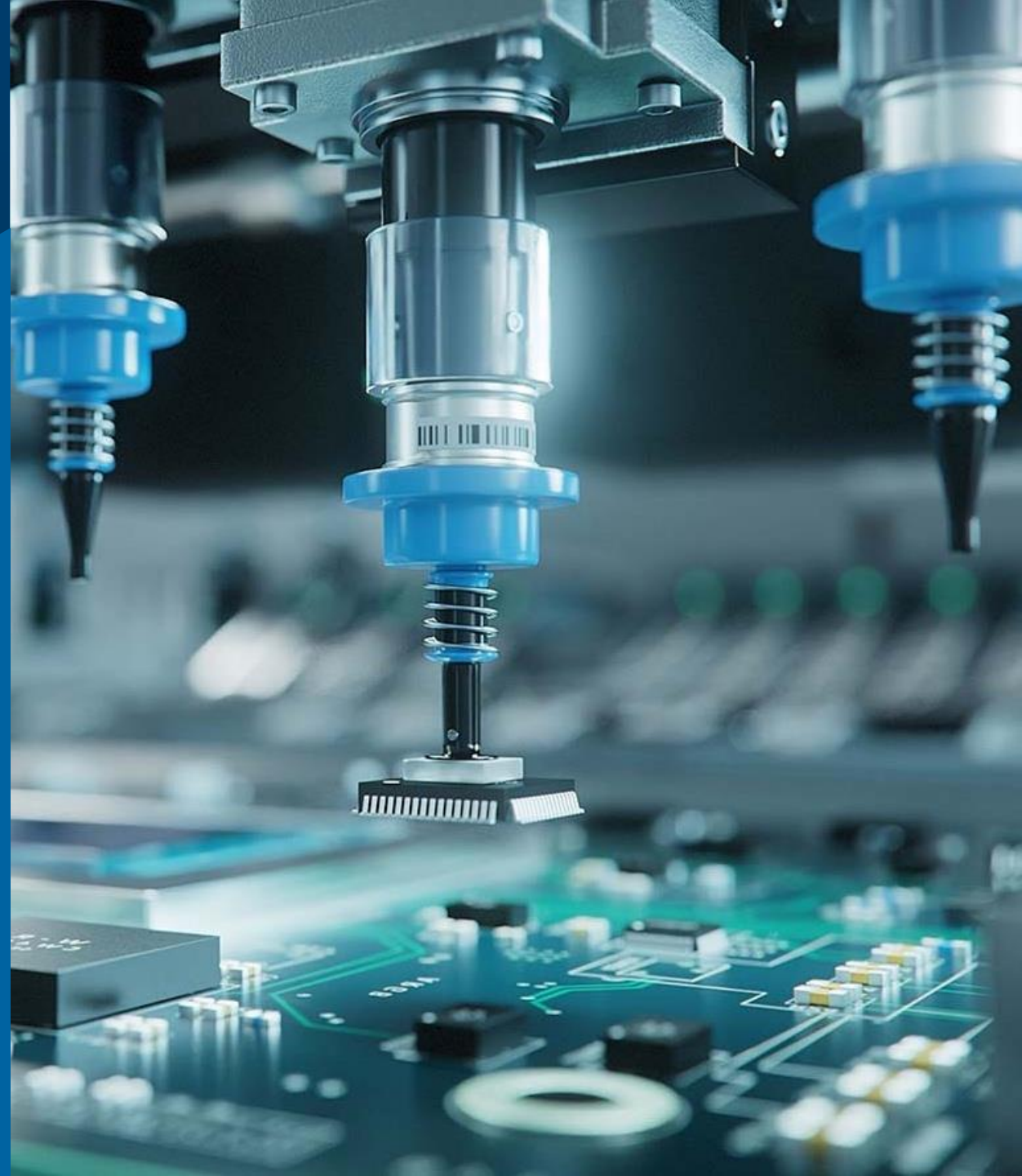
Nicole Meiwen Wu | 27 April 2023 | [Nicole\\_Wu@Jabil.com](mailto:Nicole_Wu@Jabil.com)

**JABIL**

# Agenda

- JABIL INTRODUCTION
- JABIL'S SUSTAINABILITY COMMITMENT
- JABIL ASIA'S RENEWABLE ENERGY ACTIONS
- Q&A

**JABIL**



**JABIL**

**INTRODUCTION**

# Built on a Solid Foundation

1966

FOUNDED IN  
MICHIGAN, USA



TENURED  
MANAGEMENT TEAM

100+

SITES STRATEGICALLY LOCATED  
AROUND THE WORLD

TOP TIER

MANUFACTURING  
SERVICES PROVIDER

250K+

DEDICATED  
EMPLOYEES

50M+

SQUARE FEET OF  
MANUFACTURING SPACE

\$33.5B

REVENUE  
IN FY22

400+

CUSTOMERS ACROSS  
DIVERSE MARKETS

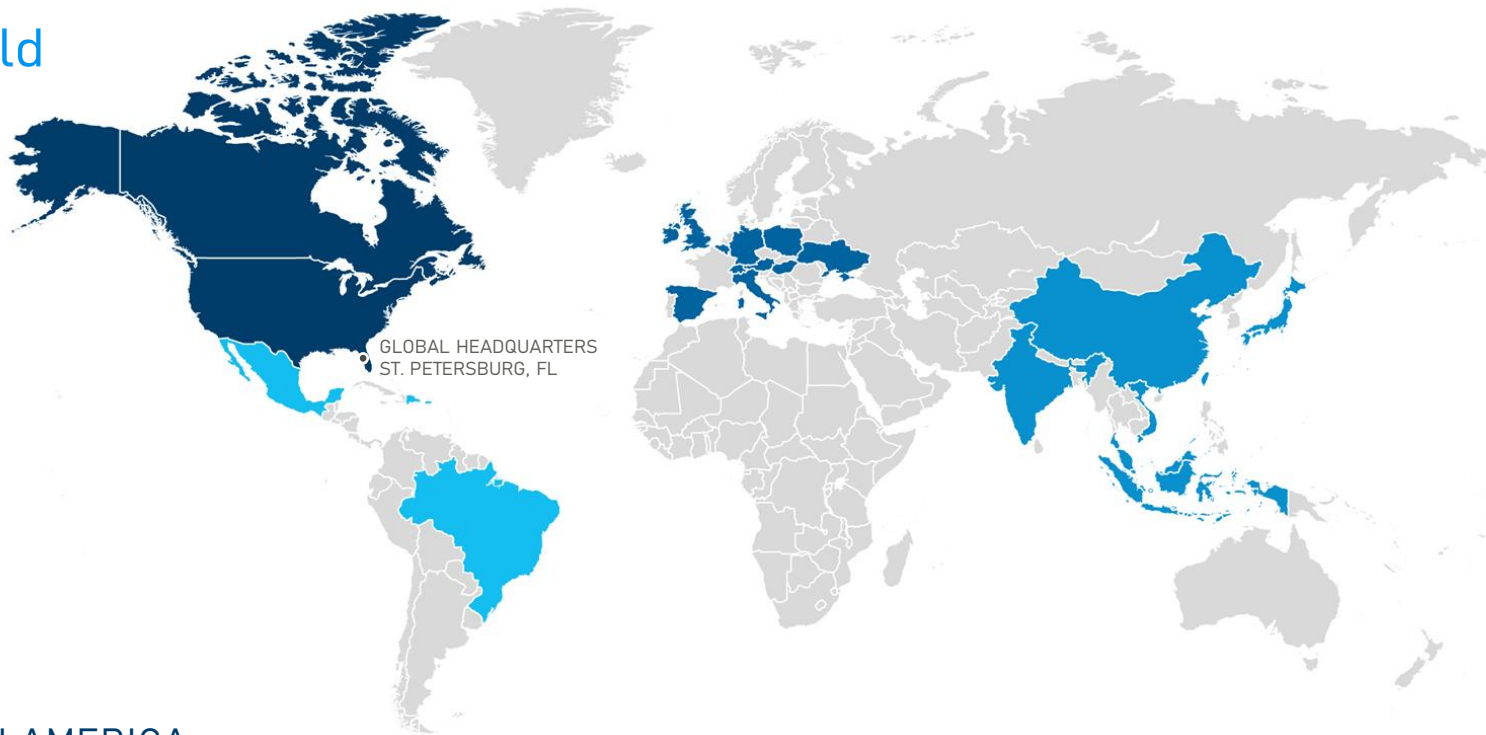
27K+

SUPPLY CHAIN  
PARTNERS

# Global Operations Enable Localized Manufacturing

## 100+ Sites

Strategically Located Around the World



### ASIA

Bandung	Gotemba	Kulim	Shanghai	Taichung
Batu Kawan	Hachioji	Neihu	Shenzhen	Tianjin
Beijing	Ho Chi Minh	Penang	Sungai Petani	Weihai
Changhua	Hsinchu	Pune	Suzhou	Wuhan
Chengdu	Huangpu	Sanchong	Singapore	Wuxi

### EUROPE & MIDDLE EAST

Balsthal	Hasselt	Livingston	Nagyigmand	Tuttlingen
Bettlach	Jena	Le Locle	Paris	Uzhgorod
Bray	Kharkiv	Marcianise	Raron	Umkirch
Grenchen	Knittlingen	Mezzovico	Tiszaújváros	Vienna
Hägendorf	Kwidzyn	Misgav	Tortosa	Waterford

### LATIN AMERICA

Belo Horizonte	Juarez	San Cristobal
Cayey	Manaus	Santo Domingo
Chihuahua	Monterrey	Tijuana
Guadalajara	Valinhos	Torres

### NORTH AMERICA

Albuquerque	Austin	Fremont	Livermore	Monument	San Jose
Anaheim	Benicia	Grand Junction	Maple Grove	Mount Pleasant	Seattle
Asheville	Burlington	Gurnee	McLean	Ottawa	St. Petersburg
Atlanta	Chaska	Hanover Park	Mebane	Pleasanton	West Chester
Auburn Hills	Clinton	Lexington	Memphis		

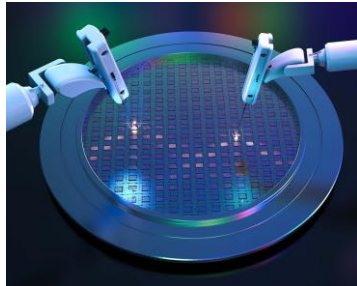
# Markets Served



Networking & Telecommunications



Cloud, Compute & Storage



Capital Equipment



Industrial & Energy



Building Technologies



Safety & Security



Digital Print & Retail



Smart Home & Appliances



Consumer Devices



Optics



Automotive & Transportation



Defense & Aerospace



Healthcare



Packaging

# Our Breadth of Manufacturing Capabilities

MECHANICS



ELECTRONICS



ASSEMBLY



TEST



PACK-OUT



A safe pair of hands for your manufacturing needs.



**JABIL**

**SUSTAINABILITY COMMITMENT**

# Making the World a Better Place Every Day

## OUR GOAL:

From the fiscal year 2019 baseline, we target to **reduce our carbon** output from operational greenhouse gas (GHG) emissions by:

**25%**  
FY 2025

**50%**  
FY 2030

## IN 2022, JABIL:

- **Reduced our greenhouse gas emissions by 23%** when compared to FY19
- **Avoided 1.17 million metric tons of emissions** through our use of renewable energy in FY22.
- **Reduced water acquired** in areas of high water stress by 18%
- Employees worldwide gave back more than **one million hours of service** in local communities



IBD's **100 Best ESG Companies of 2022 List**

Newsweek America's **2022 Most Responsible Companies**

**Ecovadis Gold Status**, positioning Jabil in the top 5% of companies assessed

Recognized as a **Best Place to Work for Disability Inclusion** by DISABILITY:IN

Signed **Commitment Letter** with the Science Based Target Initiative

2021 AmCham **Excellence in Corporate Social Responsibility Award**

Forbes' Annual List of **Best-in-State Employers**, for the State of Florida

CareerBuilder Vietnam's **Top Four Manufacturing Companies**



## OUR COMMITMENT: ONE MILLION SERVICE HOURS

We began our commitment in 2022 to give back one million volunteer service hours. We strive to do so every year moving forward.



## UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS | We contribute to the achievement of the following:



# Reduce, Produce and Procure

## Reduce, Produce and Procure to Cut Scope 1 and 2 Emissions



The reduction of Scope 1 and 2 greenhouse gas emissions is inextricably linked to an organization's ability to decrease its reliance on traditional, nonrenewable power sources. At Jabil, we have developed a three-phase strategy to save energy and shrink our carbon footprint: **reduce**, **produce** and **procure**.

### Reduce

Our first step is identifying places where energy consumption can be cut and efficiency can be increased. Approximately 35% to 50% of Jabil's energy usage of our sites, stems from high-intensity equipment like injection molding machines.

Chillers account for more than 20% of all the energy used in Jabil's manufacturing process, becoming more energy-intensive as they reach their 18–25-year life expectancy. Our site in Guadalajara, Mexico, has optimized energy use by installing misting systems in their 500-ton chiller, pre-cooling the chiller environment and reducing the electricity consumption of the machine.

Fogging systems that cool the air around the chiller before it begins working allow the machine to draw less energy for its processes or combined cycle air-cooled condensers. Pre-cooling can also increase process throughput or decrease pressure on steam turbines, producing a significant power boost and improving efficiency. These spray systems deliver maximum air cooling without wasting water. They also decrease demand for refrigerant gas, making our chillers run colder and with less pressure.

The system's high-pressure water is atomized through fog nozzles, creating a mist containing billions of ultra-

fine droplets of pure water. This fog is injected into the air and evaporates to reduce the temperature and increase the humidity of the air. Unlike wetted-media evaporative cooling systems, the fog nozzle approach can be operated in stages to precisely control the amount of cooling.

### Produce

In addition to reducing our energy consumption overall, Jabil is also making strides to use renewable energy wherever possible. We are adding additional green energy generation, namely solar, at a number of our sites for our own use.



#### GUADALAJARA, MEXICO



Installed misting systems in 500-ton chiller, pre-cooling the environment and reducing electricity consumption.

#### CLINTON, MASSACHUSETTS



Began rooftop solar panel project that will offset some of the site's greenhouse gas emissions.

# Reduce, Produce and Procure – con't

## Reduce, Produce and Procure to Cut Scope 1 and 2 Emissions – CONTINUED



Installing renewable energy at sites is an important part of our strategy. In fiscal year 2022 (FY22), our Clinton, Massachusetts, site began a rooftop solar panel project. We are also building solar at sites in China, India, Mexico and across our European facilities.

Due to space limitations, it's not possible to install enough solar panels to support all the energy needs. In those cases, we turn to the third step of our strategy: procure.

### Procure

Across the world, we are entering direct power purchase agreements (PPAs) with local utilities providers to receive power at Jabil facilities that has been guaranteed to be produced through renewable energy. By using this strategy, we can get electricity where and when we need it for our manufacturing, but we are also assured it was created locally and sustainably.

At Jabil's site in Knittlingen, Germany, manufacturing and most daily functions of the facility are powered by 100% renewable energy. In FY22, the Knittlingen team investigated the air quality equipment used at their site and created a heat recovery plan that would help them reuse energy more efficiently.

Together with external suppliers, they upgraded the site's waste heat recovery system from a 1,500-liter tank to a 4,000-liter tank and added screw-type compressors to the air system, both for increased efficiency. With these simple changes, the Knittlingen team can reduce heating costs by approximately 100,000€ per year and both oil



consumption and greenhouse gas emissions by 70% annually. Eventually, the team aims to deactivate the heating system completely.

By reducing our energy consumption and taking steps to leverage renewable power, we are on our way to meeting

our enterprise emissions reductions goals. At the end of FY22, Jabil's FY22 GHG emissions were 23% lower than our 2019 baseline, putting us well ahead of schedule for achieving our goal of a 25% reduction – and on our way to our target of a 50% reduction by 2030.

#### KNITTLINGEN, GERMANY



Upgraded waste heat recovery system to 4,000-liter tank, which can increase efficiency, reduce heating costs by €100K and cut greenhouse gas emissions 70%.

#### CARBON DATA DISCLOSURES

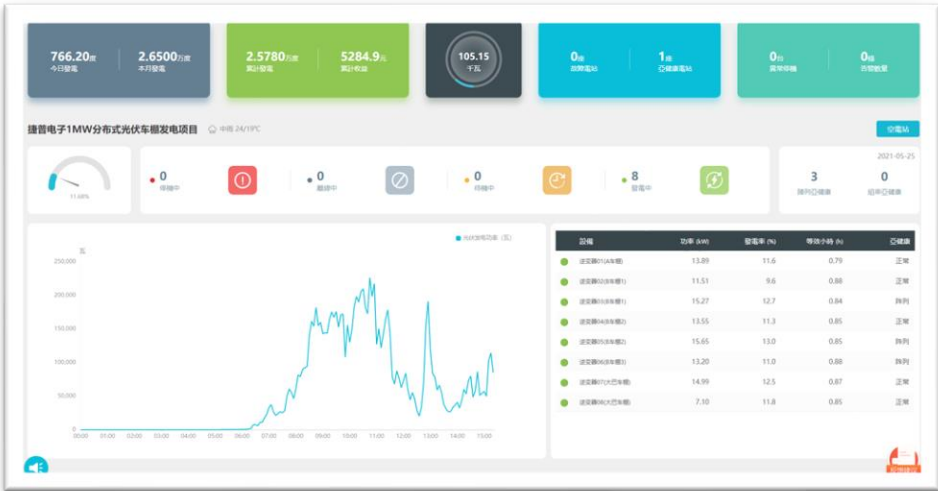
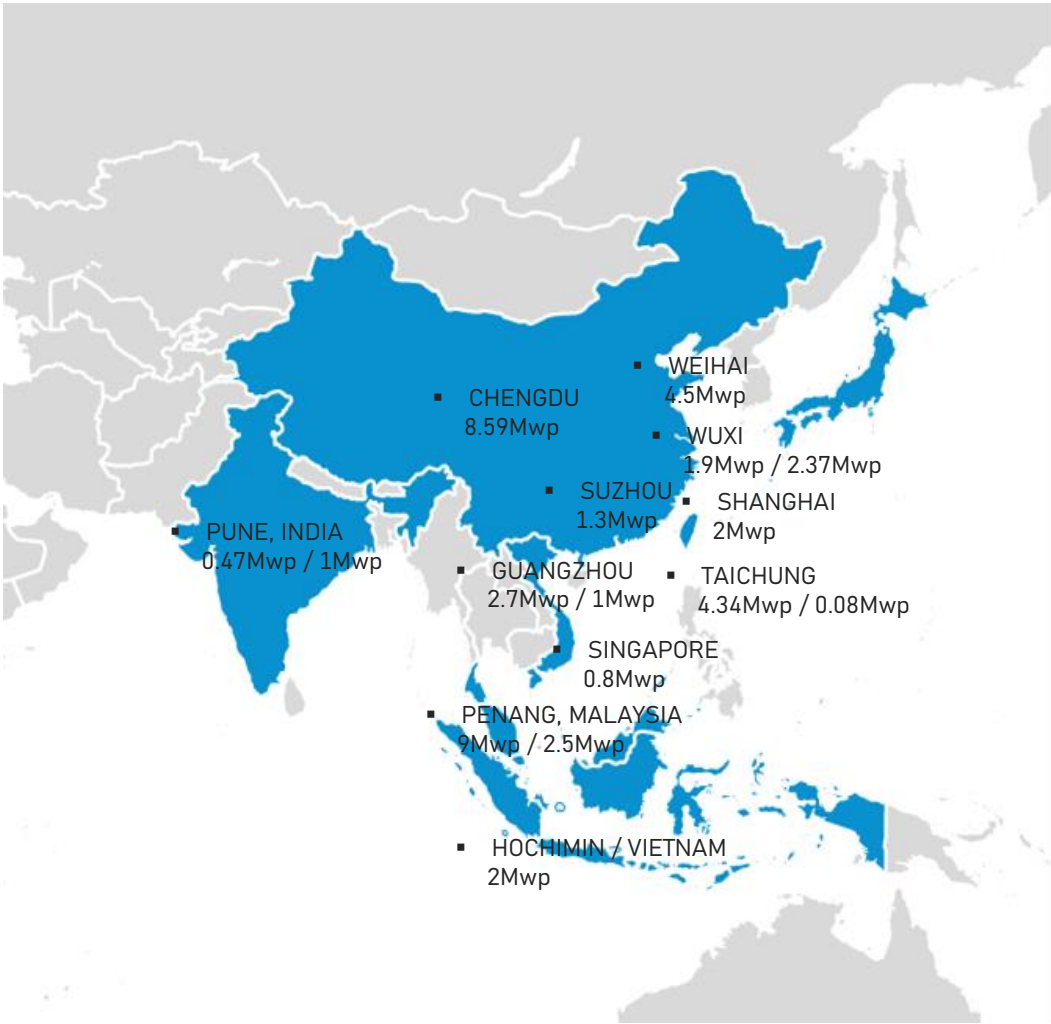
Jabil publicly discloses its carbon data to the CDP, Ecovadis and other rating platforms. Through the successful deployment of our Reduce, Produce and Procure strategy, our growing supply chain engagements and customer collaborations, and commitment to the Science Based Targets initiative, we strive to be recognized for these improvements, through our external ratings.

**JABIL**

**ASIA'S RENEWABLE ENERGY  
ACTIONS**

# Onsite – Solar Panel

## JABIL Asia's Rooftop Solar Deployment



# Offsite – Renewable Energy Purchase

## Renewable Energy Certificates

3、 证书样本（例）



# Offsite – Hydro Environmental Attributes

## To Perform Our Social Responsibility

The present report is an assessment of 7 small hydropower stations with total capacity of 73.2 MW by applying adapted Low Impact Hydropower Institute Standard (hereinafter referred as LIHI) within the Chinese context. The goal is to assess the hydropower stations' compliance with regulatory environmental requirements considering applicable and adapted Chinese and international regulations and standards.

In total 9 hydropower stations were reviewed and assessed, among which 7 (see Table 1 below) met the adapted LIHI standards.

Table 1 List of the 7 hydropower stations meeting adapted LIHI standards

Facility Name	Chinese Name	Total installed Capacity (MW)	Location
Xiaohaili I	小海里 I	8.2	Jinchuan County
Xiaohaili II	小海里 II	4.8	Jinchuan County
Jiema	结马	20	Xiaojin County
Laowangshan	老旺山	6.4	Huidong County
Hushan	花山	8	Huidong County
Songxin	松新	20	Puge County
Damidi	大麻地	5.8	Puge County
<b>Total</b>		<b>73.2</b>	

## LIHI STANDARDS

Criterion	Integration with Chinese standards
A: Ecological Flow Regimes	<i>One-Station-One-Strategy Approval</i>
B: Water Quality Protection	Chinese regulatory requirements
C: Upstream Fish Passage	<i>Evaluation of green small hydropower stations (SL/T 752-2020) standard</i>
D: Downstream Fish Passage and protection	<i>Evaluation of green small hydropower stations (SL/T 752-2020) standard</i>
E: Watershed and Shoreline Protection	<i>Evaluation of green small hydropower stations (SL/T 752-2020) standard</i>
F: Threatened and Endangered Species Protection	Chinese regulatory requirements
G: Cultural and Historic Resource Protection	Chinese regulatory requirements
H: Recreational Resources	<i>Evaluation of green small hydropower stations (SL/T 752-2020) standard</i>

The review was conducted by site investigation accompanied by Jabil, Sichuan Energy company and the facility managers, followed by desk literature research and follow-up interviews.

This report is structured with a summary of LIHI review results, followed with chapters of detailed assessments of the 7 hydropower stations.



# LIHI – Low Impact Hydro Institute

## Onsite Audit

Low Impact Hydropower Review / CTU Jabil 2021



Figure 6 Location of Jiema Station in River System

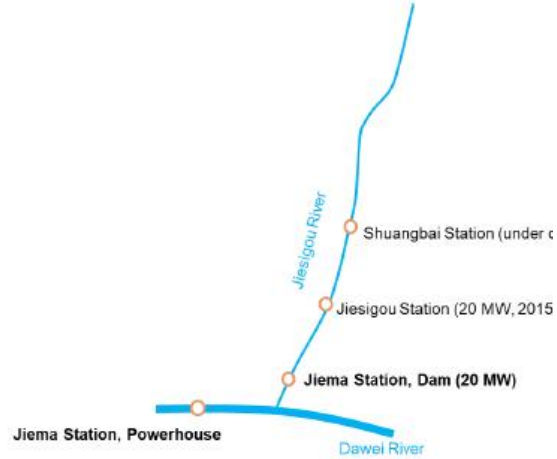


Figure 7 River system and cascade of hydropower stations within the watershed of Jiema Station

Low Impact Hydropower Review / CTU Jabil 2021



Figure 8 Jiema river at the dam of Jiema station (upstream)



Figure 9 Jiema river at the dam of Jiema station (downstream)

Low Impact Hydropower Review / CTU Jabil 2021

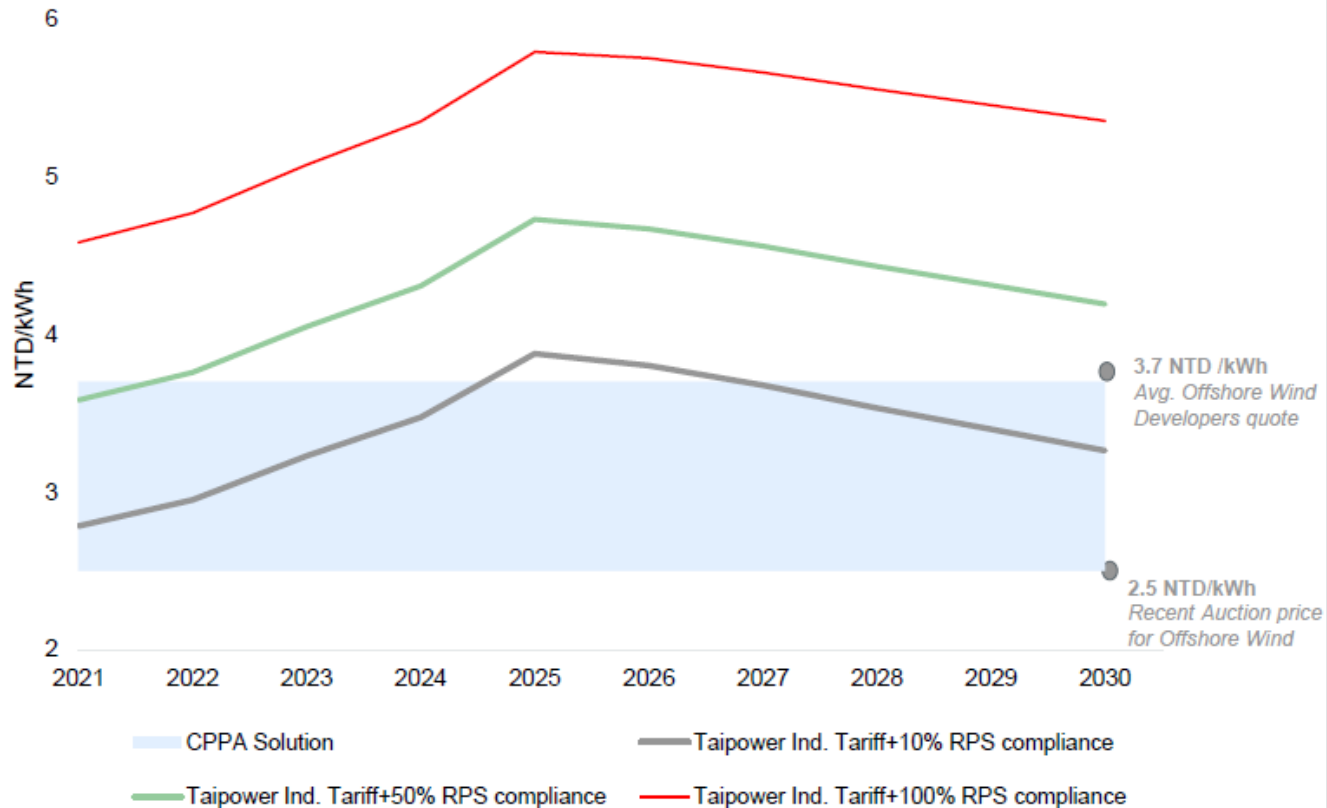


Figure 10 Site pictures on eco-flow release monitoring and operation

# Offsite – CPPA Solution

## Be ahead of the game

**CPPA is expected to deliver a cost competitive solution with no price uncertainty :**



### Key Assumptions:

- Power curve (Taipower industrial tariff) forecasted by an external market consultant for 2021 – 2030.
- Green Compliance achieved by T-REC purchase , under different scenario : 10%, 50%, 100% "green electricity supply".

### Notes

- T-REC conservatively assumed at NTD 2 / kWh + inflation and is expected to increase.
- If 10% regulatory green requirement is not met, the fine is understood to be 4 NTD / kWh.

Note: these illustrations are based on information from external sources and any recipient of this document must make its own assessment as to what is a reasonable tariff.

# Offsite – Long Term Investment Pipeline

## Be ahead of the game

According to the latest data released by China Electricity Council (CEC), China’s power generation by above-scale power plants in 2022 reached 8,388.6TWh, up to 2.2% y/y.

Renewable generation (hydro, wind & solar) reached 2,117.7TWh, accounting for 25.2% of total power generation.

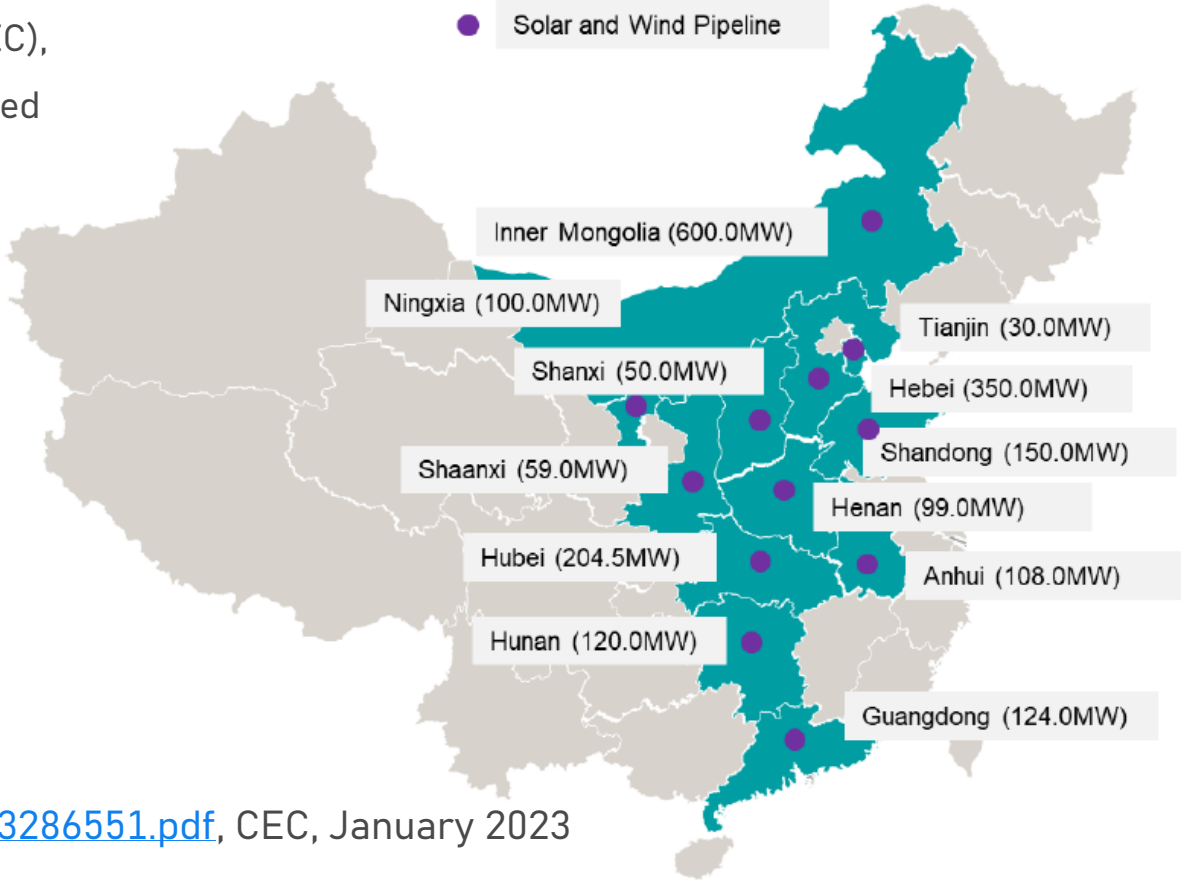
Power consumption in 2022 stood at 8,637.2TWh, up by 3.6% y/y, among which power used by households grew by 13.8% y/y,

the primary industry grew by 10.4% y/y,

the secondary industry grew by 1.2% y/y, and

The tertiary industry increased by 4.4% y/y.

Our joint Fund is in discussion with around 11 solar and/or Wind power project developers in relation to the acquisition of Equity interests



\* Data Source: <https://www.cer.org.cn/upload/1/editor/1674033286551.pdf>, CEC, January 2023

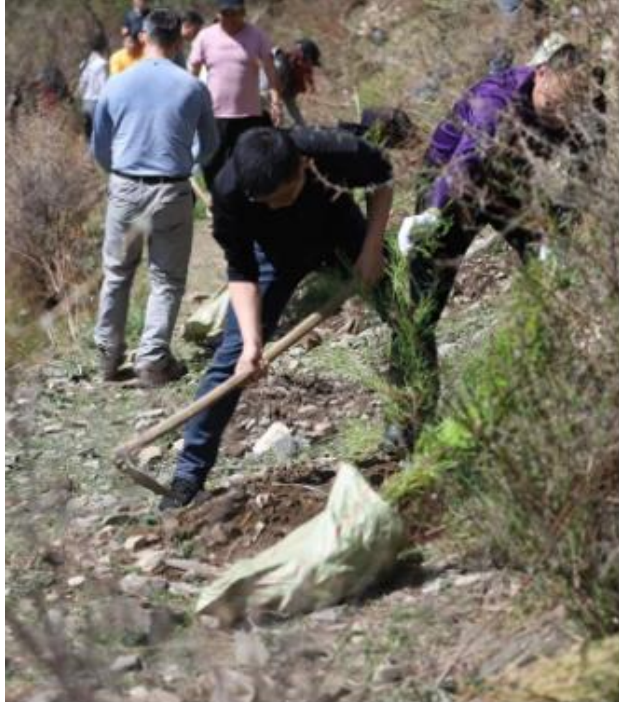
# Our Forest – JABIL NET ZERO FOREST

The Real Thing for Environment



**Afforestation species: Minjiang cypress (Chinese National secondary protected species)**

The Jabil Net Zero Forest Project is not only earned Carbon credit from the forest to offset our own emissions, but also offers employment opportunities to local Tibetans, prevent landslides and protect the villages with 13,200 Minjiang cypresses planted in Xiaojin County, Aba Tibetan in Sichuan Province.



# CARBON REMOVAL

On the *WORLD EARTH DAY 22 April 2023*, the first **JABIL NET ZERO FOREST** was unveiled with 13,200 Minjiang cypresses planted in Xiaojin County, Aba Tibetan and Qiang Autonomous Prefecture, Sichuan Province, and the carbon sink generated by the future growth of the trees planted in the project can reach at least 1,652 tons.

**JABIL**

**MADE POSSIBLE.  
MADE BETTER.**

# Thank You

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Nicole Meiwen Wu

**JABIL**

# Corporate RE Procurement in China

REM Asia  
27 April 2023



Confidential. Do not distribute.



# Your Speaker



**Yuhuan Shen**

**[y.shen@southpole.com](mailto:y.shen@southpole.com)**

**+86 15011362067**



# South Pole

A **profit-for-purpose** company founded in 2006 that enables corporates, capital markets, and the public sector to reduce their impact on **climate change**, while mitigating risk and creating value on their **sustainability journeys**.



## How we help project partners?

We partner with project developers who own carbon credit rights to develop and aggregate climate projects

### Innovative Solutions

An award winning, **16-year** history of providing sustainability solutions

### Experienced partner

With **1,000+ climate projects** in **50+ countries**, South Pole is the largest developer of climate action projects globally

### International & local expertise

Based in **35+ offices**, our **team of 1,200+** sustainability advisors, scientists, and engineers are leading experts in their fields

# Contents

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<b>0. Introduction</b>	<b>02</b>
<b>1. Where were we?</b>	<b>05</b>
<b>2. What's new?</b>	<b>08</b>
<b>3. Where we go next?</b>	<b>11</b>

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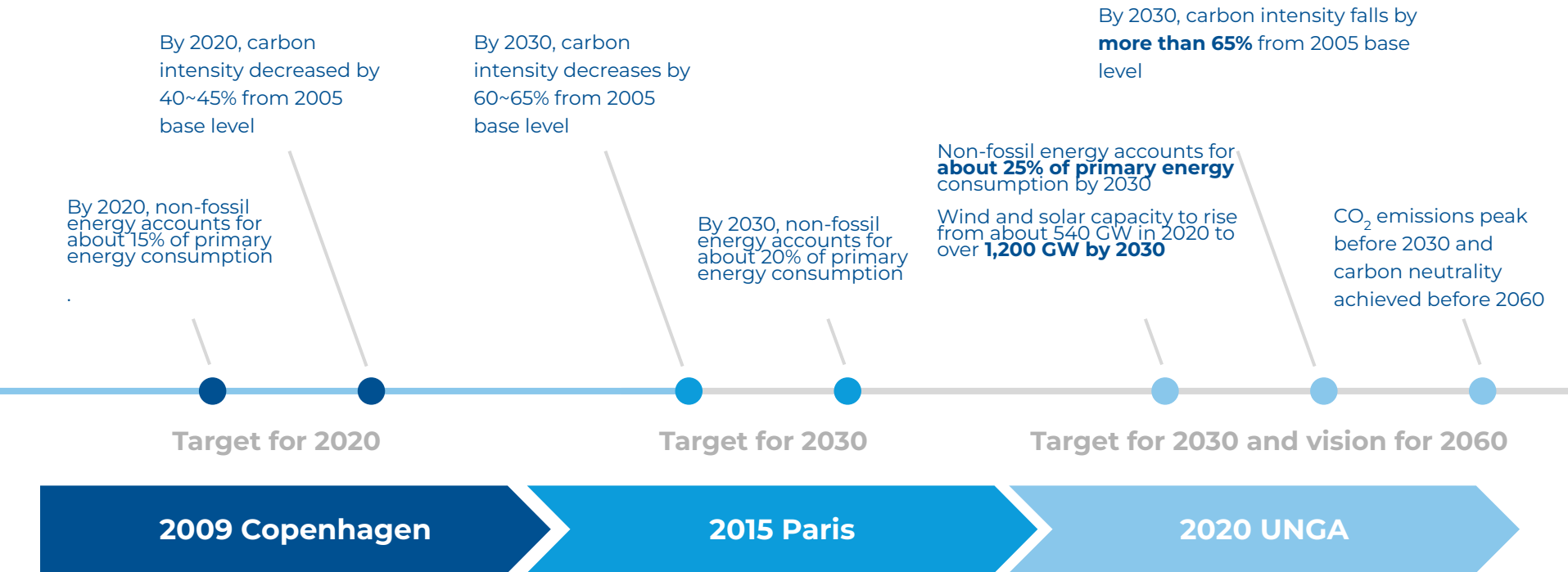
# Where were we?



The Forbidden City, Beijing



# China's ambition for renewable energy



# Key messages of Last Year



Three key renewable solutions: Unbundled Energy Attribute Certificates, Onsite renewables, and PPAs can be sourced in China. **With PPAs emerging** first time due to China's National Green Power Trading Pilot that was kicked off in September 2021.



**Challenges remain**, i.e. Liquidity and Market boundary barrier, Complexity of regulatory framework, lack of financial drivers etc.



**China is in the process of opening up electricity markets. China's RE market and regulatory landscape evolving rapidly**, but towards a more favorable, market-led environment.

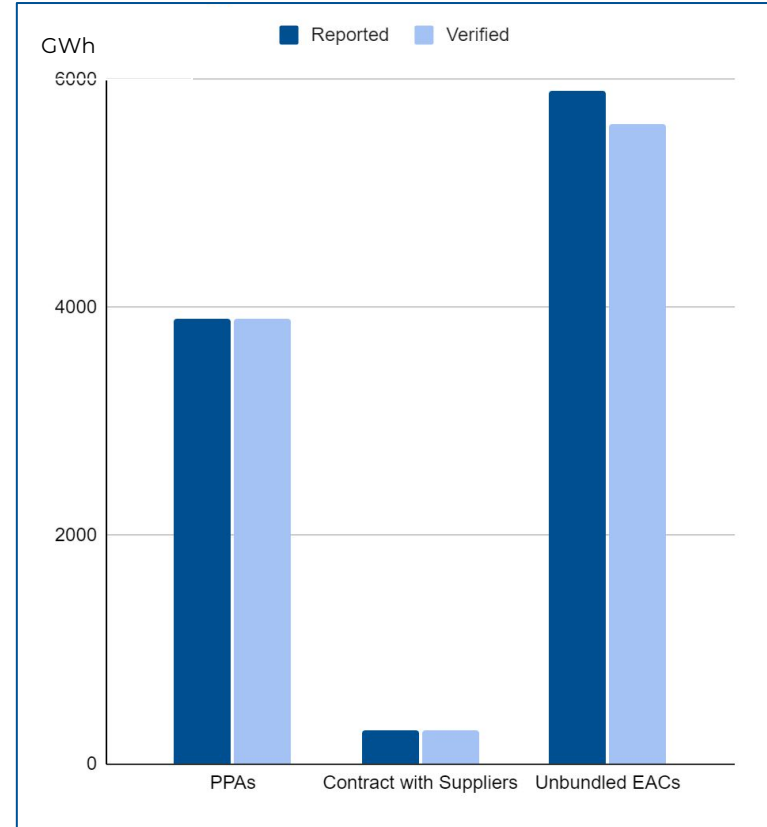
# What's NEW?



# Corporate RE Procurement updates





- China maintains its position as the **most challenging** markets for procuring renewable electricity. Along with Republic of Korea, Japan and Singapore.
- PPAs in China are still not widely accessible in China. Over **3 TWh** of the reported PPA volume was a PPA held by a single member. (In Guangdong Province)
- Unbundled Energy Attribute Certificate (EAC) is the primary option adopted by corporates that have consumption in China. **Still!!**
- Overall, members procure 32% renewable electricity in China.

Source: RE100 Annual Disclosure Report 2022 (January 2023)





# Options and Progress

	Definition	Availability	Main Considerations	Progress
<b>Direct Green Electricity trading</b> aka. PPA	Power purchase contract between user and power generator.		<ul style="list-style-type: none"> <li>• Large Scale potential</li> <li>• Green Premium to be paid</li> <li>• Shorter term contracts</li> </ul>	<ul style="list-style-type: none"> <li>• Implementation Clarity improved.</li> <li>• Tradings happened in 28 provinces in 2022.</li> <li>• Monthly tradings organized in ZJ, JS and GD provinces.</li> <li>• Interprovincial barrier remains.</li> </ul>
<b>Unbundled EACs</b>	Tracking instrument for each renewable electricity (MWh) from generation to the final consumer.		<ul style="list-style-type: none"> <li>• Detached from physical supply</li> <li>• Premium cost</li> <li>• Annual Sourcing</li> <li>• Low additionality</li> </ul>	<ul style="list-style-type: none"> <li>• Existing projects receiving subsidy will no longer able to issue I-RECs from 1 January 2023</li> <li>• A new China country issuer for I-REC</li> <li>• More trading platforms for GECs</li> <li>• Secondary trading for GECs opening up</li> </ul>
<b>Onsite distributed renewables</b>	RE produced on rooftop or adjacent land for consumption or export.		<ul style="list-style-type: none"> <li>• Mature Option</li> <li>• Potential for cost savings</li> <li>• Limited in size</li> <li>• Ownership clarity of RE attributes</li> </ul>	/
<b>Green Tariffs</b>	Utility product matched with RE.		/	/

# What's NEXT?

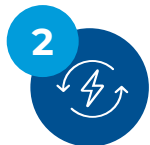
**Mamize Clean Cookstoves, China:** traditional cookstoves in rural China produce indoor smoke that is harmful, particularly for the young and elderly. By providing a clean, efficient alternative, this project improves community health and reduces land clearing for wood, protecting Giant Panda habitats.



# What's NEXT?



**Demand enhanced:** it is expected that RE consumption will maintain a high momentum.



**Increased Liquidity:** More grid-parity projects will come into pipeline from 2022; drive for a more liquid RE market.



**Clear Pricing mechanism:** find the 'green value' of renewable electricity.



**Supply chain** renewable initiatives are developing.

THE CLIMATE IS CHANGING

ARE YOU?

