

# SIEMENS

*Ingenuity for life*

Energy and utilities

## Chengdu Xihui Water Environmental

Major wastewater treatment plant uses MindSphere to digitalize operations

### Product

MindSphere

### Business challenges

Inconsistent and unstable water quality due to manual processes

Delays in the monitoring, maintenance and repair of critical assets

Difficulties in operational cost control

Inability to track energy usage of critical assets

### Keys to success

Ability to easily connect assets and processes to the IoT for operational transparency

Leverage IoT data insights to optimize operations

Enable remote asset monitoring and alerts

Leverage advanced IoT data analytics and machine learning to achieve smart maintenance

### Results

Reduced chemical usage by 10 percent while remaining fully compliant with water output indicators

Optimized health of critical assets, such as blowers and water pumps

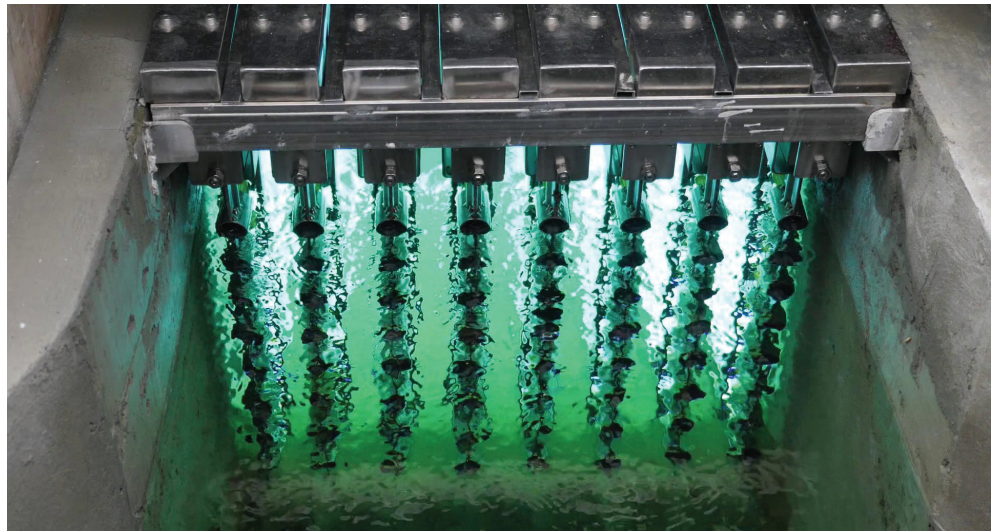
### Siemens industrial Internet of Things solution enables Chengdu Xihui Water Environmental to leverage data insights

Founded in 2016 in Chengdu, China, Chengdu Xihui Water Environmental Co., Ltd. (Chengdu Xihui) constructs and operates wastewater treatment plants (stations) and supply networks.

Chengdu Xihui manages seven plants, including the Ande Industrial Park industrial wastewater treatment plant in Pidu District, as well as the wastewater treatment plant in Tuanjie Town, which has a

daily treatment capacity of up to 190,000 tons. While Chengdu Xihui has been successful, operating a wastewater treatment plant comes with inherent difficulties.

The wastewater treatment process is long and consists of isolated equipment and segments. Most of the steps involve manual procedures, with very little automation. However, as government compliance regulations increase, manual processes are a disadvantage. To successfully compete, wastewater treatment plants must find a way to digitalize operations to comply with regulations as well as save time and money.



### Results (continued)

Increased asset availability by 15 percent and reduced maintenance costs by 12 percent

Decreased power costs by 10 percent



*“Thanks to MindSphere, critical assets are well managed now.”*

Li Wenjun  
Maintenance Manager  
Chengdu Xihui Water Environmental Co., Ltd

In 2019, Chengdu Xihui recognized the need for a digital transformation and sought an industrial Internet of Things (IoT) solution. They chose MindSphere®, the industrial IoT as a service solution from Siemens. This allowed Chengdu Xihui to extend their IoT capabilities and connect almost all critical assets and processes throughout their plants. They also optimized their operational transparency as well as operational costs – maintenance, energy and chemical – while ensuring water output quality.

There were three major challenges that Chengdu Xihui addressed with the implementation of MindSphere. First was water quality, which is Chengdu Xihui's top priority. In the past, Chengdu Xihui used a manual process to address water quality issues, such as the concentration of dissolved oxygen (DO), quantity of water intake, quantity of aeration, dosage of chemicals and the reflux ratio. The DO and oxidation reduction potential (ORP) sensors measured the concentration of dissolved oxygen and then uploaded the data to supervisory and data acquisition (SCADA) via the programmable logic controller (PLC). Only then were adjustments made. Due to these lengthy manual processes, it was very difficult to keep water quality at a stable level.

Another challenge for Chengdu Xihui was operational costs. The top three operational costs are machine and parts maintenance, energy consumption and chemicals. Without measurement and process transparency, plants are forced to overuse chemicals and excessive treat-





“With transparency and data-driven insights empowered by MindSphere, we found the most scientific and accurate way to keep stable water quality while achieving huge cost savings.”

Zhang Chenghui  
General Manager  
Chengdu Xihui Water  
Environmental Co., Ltd.

ments to ensure output water conforms to regulations. The overuse of chemicals, in turn, increases machine usage, machine maintenance and energy consumption.

Unplanned plant downtime was the third challenge. When running eight wastewater treatment plants simultaneously, the failure of one will not only affect the quality of water output, but also greatly impact operational costs due to downtime.

#### **Leverage IoT solutions for complete operational transparency**

Upon deploying MindSphere, Chengdu Xihui started to connect isolated critical assets and processes to break down barriers. The MindSphere MindConnect® 2040, the plug-and-play connectivity solution, easily connects assets and processes. Chengdu Xihui now uses the MindConnect 2040 to connect PLCs to critical equipment and processes and acquire real-time IoT data insights.

Chengdu Xihui also leveraged many of the MindSphere applications and IoT-based solutions to further propel their IoT implementation – many solutions which are possible due to being part of Xcelerator, the comprehensive and integrated portfolio of software and services from Siemens Digital Industries Software.

For example, with MindSphere Asset Manager, Chengdu Xihui established IoT data models so they can define IoT data collection points and manage equipment

assets. They use MindSphere Fleet Manager to view all plants, production lines and equipment on the cloud, and to realize remote monitoring across plants and production lines by self-defining alarm rules and response events. With Fleet Manager, Chengdu Xihui can also check the operating data of any asset and send the equipment operating information to the equipment provider in real time through key performance indicator (KPI) alerts, as defined in Fleet Manager, requesting the equipment provider to conduct equipment troubleshooting remotely.

“As a trusted partner in industrial automation, Siemens provides products with high quality and world class services,” says Zhang Chenghui, general manager, Chengdu Xihui. “Meanwhile, Siemens understands the wastewater industry and



**“We can schedule maintenance ahead of time and also work closely and efficiently with the equipment provider and service provider.”**

Li Wenjun  
Maintenance Manager  
Chengdu Xihui Water  
Environmental Co., Ltd.

our challenges. MindSphere provides us with the required transparency and data-driven insights needed to make the right decisions and strengthen our digitalization strategy.”

#### **Leveraging IoT to track and conserve energy consumption**

The energy consumption of critical assets, like a blower, in a wastewater treatment plant needs to be consistently monitored and evaluated. A blower’s energy consumption accounts for 50 percent of the total operation cost. Any way to reduce blower energy consumption significantly benefits Chengdu Xihui. Based on a comprehensive analysis of IoT data done with MindSphere, they can now associate the blast capacity of the blower with current electricity prices, take advantage of off-peak electricity prices, and as a result, control a blower’s output power while ensuring the quality of the water output. Doing this keeps the blast capacity at a lower level to minimize the electric power cost.

“Thanks to MindSphere, critical assets are well managed now,” says Li Junwen, maintenance manager, Chengdu Xihui. “We can schedule maintenance ahead of time and also work closely and efficiently with the equipment provider and service provider.”

According to a MindSphere analysis, Chengdu Xihui has successfully reduced its monthly electric costs by 10 percent and realized a 10 percent cost savings by refining and digitalizing the extensive chemical administering model.

“With MindSphere, we can measure, analyze and optimize our process and operation costs,” says Jiang YuLiang, digital transformation director, Chengdu Xihui. “We cannot only clearly map any bottleneck, but also figure out the relationship between failure operation and cost.”

#### **Enabling smart maintenance**

Based on real-time and historical data collected from the blowers, machine learning (ML) and advanced analytics can provide early warnings to maintenance personnel before the failure of a blower. Alerts can be escalated to the equipment provider for remote diagnostics or to reset the machine. Applications that merge real-time IoT data with historical performance data enables equipment providers do their job much more accurately and quickly.

With advanced analytics and ML, their plant maintenance shifted from a reactive or scheduled approach to a proactive approach. Now assets can be serviced based on operating data and actual health instead of prescheduled unnecessary maintenance or when an asset is already failing. This reduces downtime and enables assets to consistently run at high reliability and usability levels.

#### **Summary**

Through the company-wide deployment of MindSphere, Chengdu Xihui has not only realized digitalized monitoring and management of the whole wastewater treatment process, but found the most

***“With MindSphere, we can measure, analyze and optimize our process and operation costs.”***

Jiang Yuliang  
Digital Transformation Director  
Chengdu Xihui Water Environmental Co., Ltd

## Solutions/Services

MindSphere  
[siemens.com/mindsphere](http://siemens.com/mindsphere)

## Customer's primary business

Chengdu Xihui Water Environmental Co., Ltd. operates and manages seven plants with a daily wastewater treatment capacity of up to 190,000 tons.  
<http://en.cdxcrc.com>

## Customer location

Chengdu  
China

scientific, accurate equilibrium point between product quality and cost by diving deep into IoT data analysis, leading to significant cost savings.

Chengdu Xihui has solved their business challenges while also transforming their industrial knowledge and experience into MindSphere applications. With their industry knowledge worked into these applications, they are valuable and meaningful to the whole industry. In the future, Chengdu Xihui intends to release their newly developed applications to the MindSphere Store, thereby creating a new services-oriented business model. They not

only plan to provide IoT application services for mainstream equipment providers, but also for the same type of wastewater treatment plants. With MindSphere, Chengdu Xihui envisions offering a new business model to the entire industry: operations as a service.

"With transparency and data-driven insights empowered by MindSphere, we found the most scientific and accurate way to keep stable water quality while achieving huge cost savings," says Zhang. "We have built up our applications, which could benefit more companies in our industry."

## Siemens Digital Industries Software

Americas +1 314 264 8499  
Europe +44 (0) 1276 413200  
Asia-Pacific +852 2230 3333

© 2020 Siemens. A list of relevant Siemens trademarks can be found [here](#). Other trademarks belong to their respective owners.  
82294-C4 9/20 H

[siemens.com/software](http://siemens.com/software)