



# Y2020 SMIC Environmental Reporting

Semiconductor Manufacturing International Corporation

May 2021

## Assurance Statement

SMIC (Semiconductor Manufacturing International Corporation) has ensured all the data in the report is accurate and authentic; this data has also been certified by the following third parties, which have no conflict of interest in this matter. The data showed in the report involves SMIC Shanghai, Beijing, Tianjin and Shenzhen plants:

- Data on waste gas emissions was monitored by qualified testing institutes
- Data on hazardous waste was checked by treatment vendors and the government via bills
- Data on energy consumption was verified by the related energy management agencies
- Data on greenhouse gas emissions was verified by the 3<sup>rd</sup> party via ISO 14064 certification

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# 1 Environmental Footprint

Semiconductor Manufacturing International Corporation (“SMIC” SSE STAR MARKET: 688981; SEHK: 00981) and its subsidiaries constituting one of the leading foundries in the world, is Mainland China’s most advanced and largest foundry, broadest in technology coverage, and most comprehensive in semiconductor manufacturing services. SMIC Group provides integrated circuit (IC) foundry and technology services on process nodes from 0.35 micron to 14 nanometer. Headquartered in Shanghai, China, SMIC Group has an international manufacturing and service base. In China, SMIC has a 300mm wafer fabrication facility (fab) , a 200mm fab and an effectively controlled joint-venture 300mm fab for advanced nodes in Shanghai; a 300mm fab and a majority-owned 300mm fab in Beijing; two 200mm fabs in each Tianjin and Shenzhen. SMIC Group also has marketing and customer service offices in the U.S., Europe, Japan, and Taiwan China, and a representative office in Hong Kong China.

# 2 Environmental Protection Policy

In its early days, SMIC established the environmental protection and occupational health and safety policies based on ISO 14001 environmental management system and OHSAS 18001 (ISO 45001) occupational health and safety management system. Based on the continuously improved concept, by optimizing and revising the policy, SMIC gradually develops the following new management policies:

**SMIC Environmental Protection, Safety and Health Policy**

Established in 2000, SMIC provides high-quality wafer foundry services. In our daily operations, we focus on product innovation and quality control while putting emphases on preventing environmental pollution, using energy/natural resources effectively, protecting our human resources and forestalling accident loss. We believe this is vital to employee well-being as we raise environmental protection, safety, and health (ESH) standards for every employee at SMIC. We are striving to be environmentally responsible through continuous improvements. We aim to strengthen our operational risk management to ensure future growth of SMIC.

To achieve the above goals, SMIC is committed to:

1. Following ESH regulations and international protocols while fulfilling customer requirements.
2. Enhancing environmental quality and promoting employee safety and health as a primary responsibility for every SMIC manager.
3. Carrying out site ESH management through employee’s ownership and teamwork.
4. Establishing a green supply chain, implementing green manufacturing and providing customers green products.
5. Strengthening accident prevention measures, emergency response capabilities and recovering abilities.

Approved by:  Date: 2017/6/2

Haijun Zhao, CEO

To achieve environmental protection objectives in the management policy, the company takes the following environmental management measures:

- Planning and implementing environmental protection projects and driving energy saving and waste reduction efforts
- Sorting and recycling waste products
- Supervising and managing the transfer and safe handling of hazardous waste by qualified vendors
- Controlling hazardous substances in our products and processes
- Carrying out environmental protection monitoring, including carbon verification, and publicizing the results

### **3 Environmental Protection Management**

Under the guideline of environmental management systems, laws, regulations and standards, SMIC systematically and normatively integrates the environmental management project into the whole process of production and operation in the areas such as organizational structure, document control, operational control, supervision and management, improvement and enhancement, by planning, implementing and operating environmental management projects.

#### **3.1 Management Team and Capital Investment**

SMIC sets up a separate Environment, Safety and Hygiene (ESH) management sector consisting of members with professional environmental management knowledge and skills. The ESH sector works with other functional divisions to jointly implement environmental management projects with clear responsibilities, to ensure the realization of environmental objectives and make sure that ISO 14001, ISO 14064, QC 080000 and other environmental management systems run effectively. In 2020, the company invested more than USD 52.4 million on environmental protection, which including operation, retrofit and expansion of environmental protection facilities, treatment of solid wastes, monitoring of discharge of waste water and waste gas pollutants, the audit fee on environmental management systems, etc..

#### **3.2 Cleaner production**

In order to minimize and even eliminate the impact of the production process on humans and the environment, we implement cleaner production measures. These measures include reduction of pollution sources, increase of resource utilization, reduction and elimination of pollution in the links from production and maintenance to product use.

In accordance with regulatory requirements, SMIC regularly implements cleaner production audits and implements cleaner production improvement plan according to the suggestions from experts during the audit. In 2020, SMIC implemented 8 cleaner production improvement programs with an investment of more than USD 0.088 million.

### **3.3 Product Hazardous Substances Control**

In accordance with QC 080000 Hazardous Substance Process Management System, the company controls hazardous substances risks in the whole production process, so that the products meet the 'Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products', 'Registration, Evaluation, Authorization and Restriction of Chemicals', Sony GP standards and other domestic and international hazardous substances control standards, to reach the green product level.

Source control ---- Conduct green supplier evaluation mechanism and control hazardous substances from the source, select the suppliers that meet the requirements for green supplier evaluation, conduct regular documentation and on-site audits of suppliers, request the raw material suppliers to provide a statement on control of hazardous substance, and require suppliers to provide periodic test reports of hazardous substances for high-risk raw materials.

Process control ---- Strictly implement production process control and put the equipment under isolation management; provide training for operators to prevent the production process from pollution by external hazardous substances.

Product test ---- Monitor the content of hazardous substances in the products, conduct hazardous substances test for the products each year, to verify and ensure the content of hazardous substances contained in the products is under control.

## **4 Greenhouse Gas Management**

The climate change caused by greenhouse gas emissions has a great impact on the global ecological environment, human life and health and economy, so it is an environment issue receiving great concern from the United Nations, governments, society and business circles.

### **4.1 Climate Change Policy**

SMIC is actively responsible for mitigating climate change, and it develops climate change policies and implements the measures to reduce greenhouse gas emissions.

## SMIC Climate Change Policy

SMIC conducts business with the wellbeing of our environment, our community and our next generation in mind. Concerned about global climate change, SMIC remains committed to save resources, reduce disaster losses caused by extreme weather, slow down and reverse the effect of climate change to achieve sustainable development and leave behind a cleaner and more stable environment. To achieve these objectives, SMIC commits to:

1. Decrease Greenhouse Gases emissions;
2. Reduce product energy consumption;
3. Lower product water consumption;
4. Pursue green production and energy saving products; and
5. Enhance the ability to prevent, respond, and recover during adverse weather conditions.

Approved by:



Date:

2017/6/1

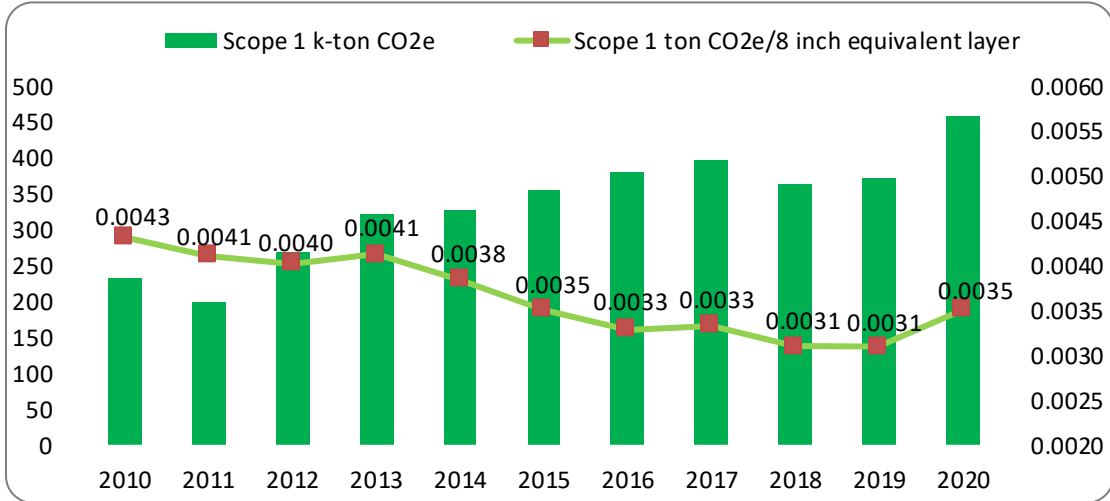
HaiJun Zhao, CEO

## 4.2 Verification of Greenhouse Gases

In accordance with international standard ISO 14064, SMIC establishes a greenhouse gas verification mechanism. It calculates the greenhouse gas emissions in the operating factory on a regular basis each year, to acquire the company's greenhouse gas emissions and implement emission reduction measures as planned. The total of greenhouse gas emissions increased by 19.7% to 1,607,460 tons in 2020, which is due to production expansion with many new tools and facilities were installed.

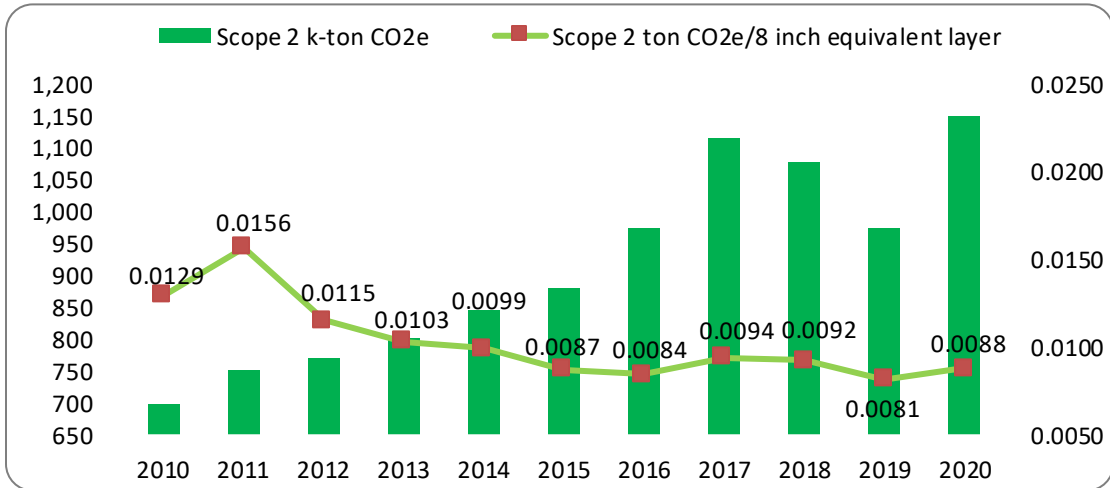
### 4.2.1 Direct Emissions of Greenhouse Gas

Direct greenhouse gas (Scope1) sources: combustion of gasoline, diesel, natural gas and other fossil fuels, perfluorinated compounds gas in the process of chemical vapor deposition and dry etching, organic exhaust combustion, refrigerant fugitive emissions, wastewater treatment system emissions and pure water system fugitive emissions, etc.



#### 4.2.2 Indirect Emissions of Greenhouse Gas

Indirect greenhouse gas (Scope2) sources: greenhouse gas emissions of outsourced power, steam, heat and other energies.

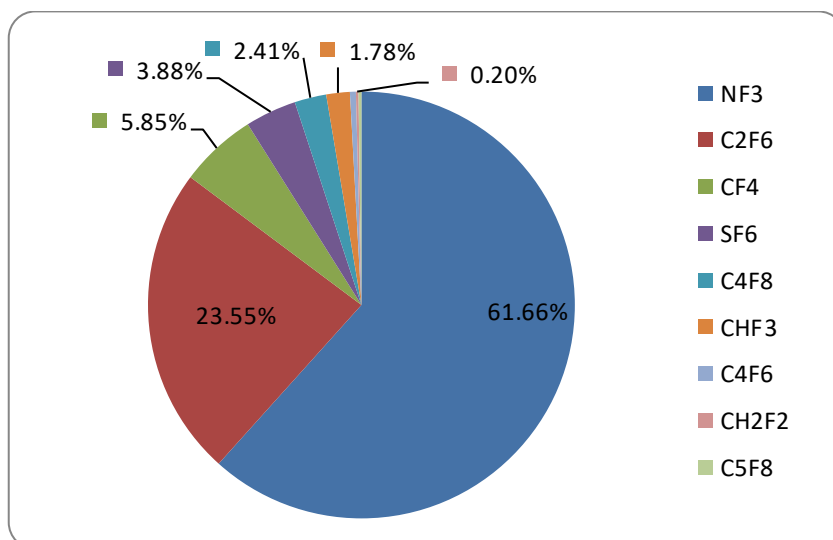


#### 4.2.3 Perfluorinated Compounds Greenhouse Gas Emissions

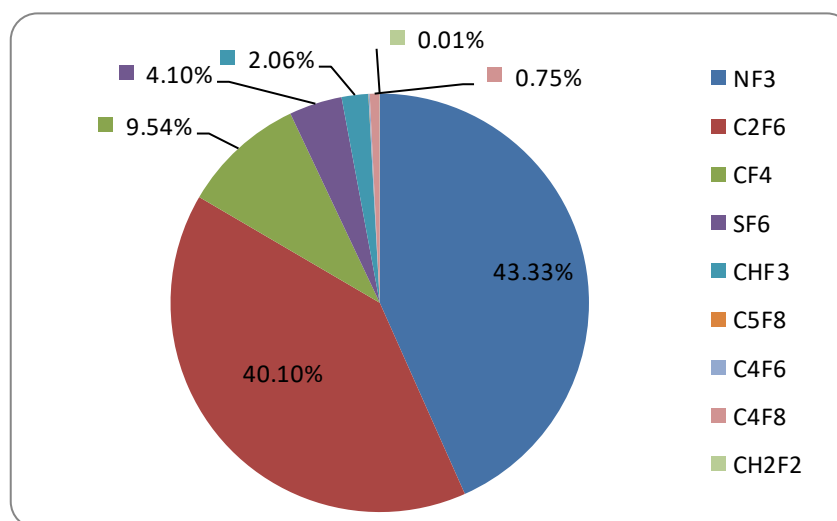
As an important member of China Semiconductor Industry Association, SMIC provides annual perfluorinated compounds greenhouse gas emission information to the Association, which then report it to the World Semiconductor Council (WSC). SMIC is actively implementing the agreement developed by WSC on voluntary greenhouse gas emission reduction of perfluorinated compounds (PFC), trying to implement the best practice emission reduction technology advocated by WSC and reduce the emission of PFC greenhouse gas.

PFC gas consumption information in 2020 is shown in the following figure:





Information of carbon emission from PFCs in 2020 is shown in the following figure:



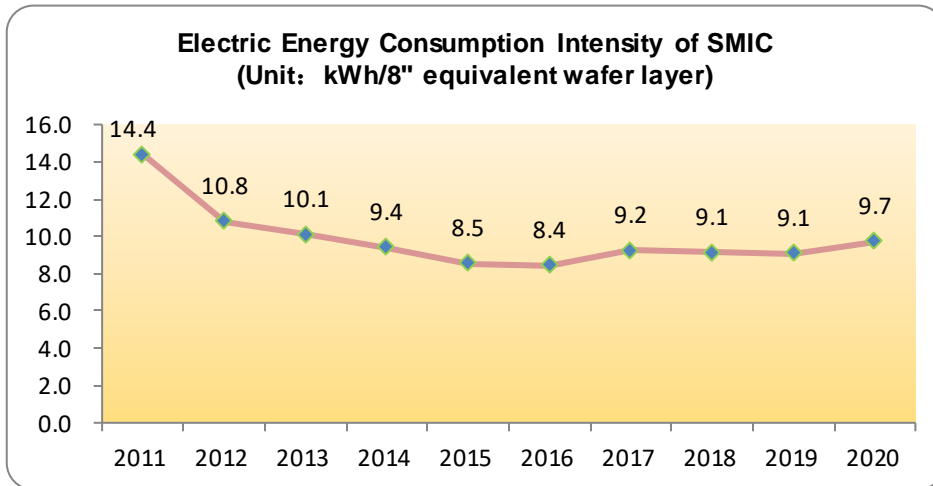
SMIC has been following WSC's PFC reduction goal which is equivalent to a 30% Normalized Emission Rate (NER) reduction from the 2010 aggregated baseline to 2020. The NER in 2020 is 0.610kg/cm<sup>2</sup> (CO<sub>2</sub>e emission per wafer size) which achieved 60% reduction from the 2010 baseline with 1.29 kg/cm<sup>2</sup>.

## 5 Energy Management

SMIC actively responds to national energy-saving and emission reduction calls, establishes energy management organizations and continues to implement energy-saving and emission reduction projects, achieving a win-win for economic and environmental benefits.

### 5.1 Consumption of Energy

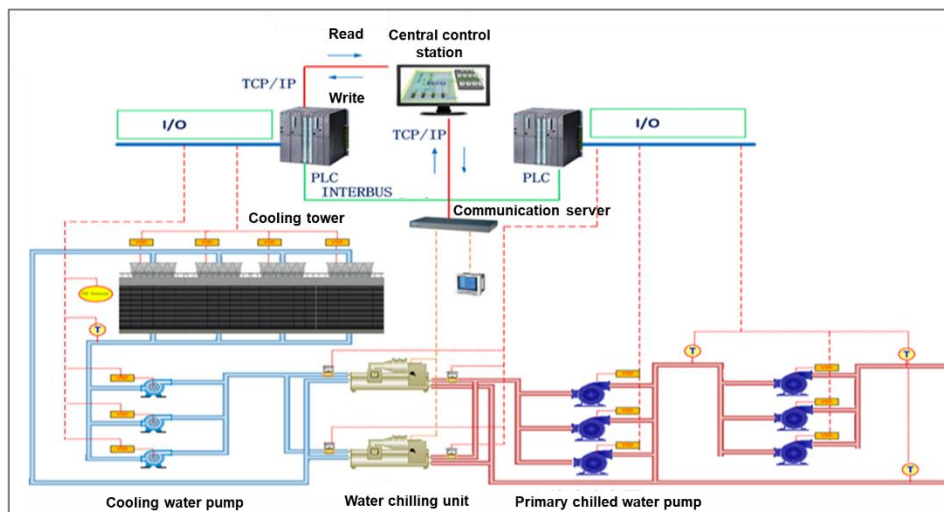
Compared with 2019, the energy consumption intensity per unit output presented an increasing trend in 2020, it is due to many tools and facilities were installed in Tianjin plant newly.



## 5.2 Main Energy Saving Projects in 2020

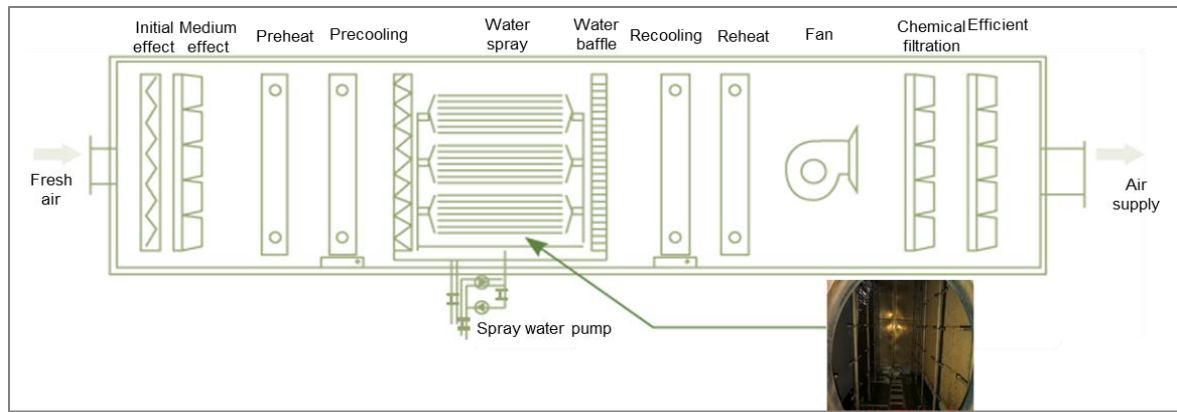
### 5.2.1 Energy-saving Renovation Project of Chiller in Chilled Water System in Shenzhen Plant

The Shenzhen plant optimized the chilled water system's operation efficiency and working condition of the system by installing an energy conservation control system, frequency converter, sensors and other control components, monitored terminal consumption, tool load and other parameters in real-time, so as to achieve the purpose of energy conservation. After the renovation, the annual electricity consumption was reduced by 8.5~10.2%, saving about 4.7 million kWh.

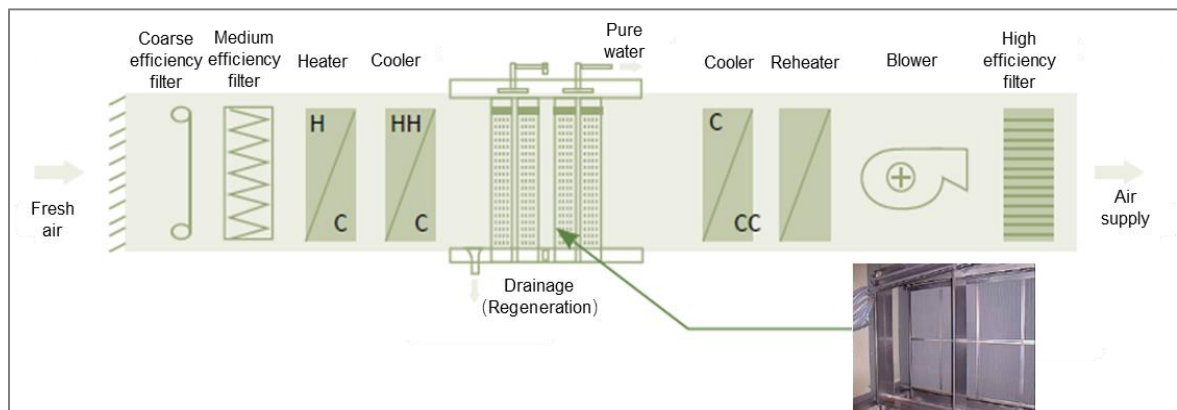


### 5.2.2 Energy-saving Renovation Project of Fresh Air System in Shanghai Plant

Originally, the fresh air system of clean room adopted an air washer, which generated spray and humidify the air with sprinklers and 15 KW water spray pumps.



After the renovation, the humidification method was changed from air washer to the wet film, saving 131,400 kWh for running of spray pump.



### 5.2.3 Other Energy-saving Projects

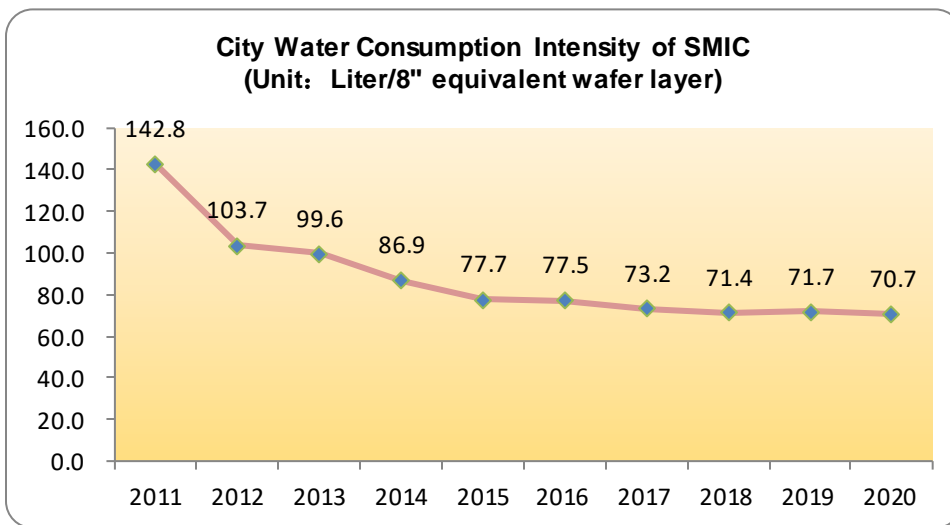
Plant	Project Name	Brief Description of Project	Energy-saving Performance
Shanghai	Energy-saving Renovation Project of Ice Machine	Connection of two Fabs' chilled water system, to improve the efficiency of the chiller. In winter, turn-off one Fab's chiller, and the chiller water are supplied by other FAB, so as to save energy	Power: 725,760 kWh
Beijing	Energy-saving Renovation Project of Installation of Variable-frequency Drive (VFD) in Air Conditioning System	VFD is installed in the air conditioning system for energy-saving, which can greatly reduce the power consumption and the operating cost of the air conditioning system	Power: 676,053 kWh
Tianjin	Energy-saving Renovation Project of Chiller	The original chiller has been running for 20 years with poor energy efficiency. Through the renovation, the efficiency of the chiller is increased by 12.6%, the output is increased by 1120 RT	Power: 12,852,000 kWh

## 6 Water Resource Management

SMIC's factories are located in different areas, where there are differences in the conditions of the available water resources. We measure local conditions and implement management measures to conserve water resources.

### 6.1 Water Consumption Status

SMIC manages water resources to save water consumption, increase water resources usage efficiency and reduce waste water discharge. See water consumption data of SMIC in 2020 in the following figure. Compared with 2019, the unit water consumption presented an steady trend in 2020.

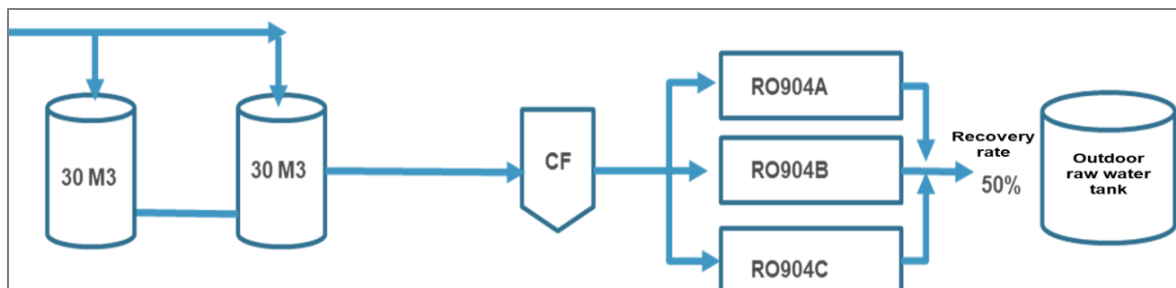


### 6.2 Main Water Saving Projects in 2020

#### 6.2.1 Optimization Project of Pure Water System in Shanghai Plant

During the start-up and shutdown process of RO of pure water system, it automatically flushed for 270s originally, which used a lot of water. Through observation and analysis, under the condition of not affecting the water quality, the flushing time is gradually reduced to 60s, which saves most of the flushing water and achieves the purpose of saving water.

Project achievement: In 2020, the project saved a total of 23,360 m<sup>3</sup> of city water.



## 6.2.2 Other Water-saving Projects

Plant	Project Name	Brief Description of Project	Water-saving Performance (m <sup>3</sup> )
Beijing	Optimization Project of Irrigation System	Using rainwater collection and well water instead of city water for irrigation	3,505
Tianjin	Acid Wastewater Recycling Project	DWWA wastewater and phosphorus-containing wastewater are recycled to the reuse water system, and the produced water is supplied to UPW raw water tank, so as to reduce the consumption of city water	219,000

## 6.3 Water Pollution Prevention and Control

According to the nature of production wastewater, SMIC had constructed a number of waste water treatment facilities to treat production wastewater and domestic sewage, so that discharged wastewater meet national or local standards. Besides, we strictly implement wastewater discharge monitoring requirements to conduct real-time or regular monitoring of the concentration of pollutants in wastewater to ensure that all wastewater meets discharge standards. For specific monitoring data, see the information published on: [http://www.smics.com/site/about ESH](http://www.smics.com/site/about_ESH)



Life Sewage Treatment Facilities      Waste Water Recycling Treatment Facilities

## 7 Air Pollution Prevention and Control

SMIC is concerned about the air quality in its business locations and attaches great importance to the treatment of the company's exhaust gas. All emitted gas are treated and meets national or local standards. Data on waste gas emissions are as following:

Data Name	Total
<b>Total Emission of Exhaust Gas (Million Cubic Meter)</b>	33,931
<b>Emissions of Nitrogen Oxides (ton)</b>	39.0
<b>Emissions of Sulfur Dioxide (ton)</b>	2.75
<b>Emissions of Volatile Organic Solvents (ton)</b>	20.8

The company employs two- levels waste gas treatment at the console end and the central processing end, respectively. In the production process, the waste gas emitted from the console end is first treated by the local waste gas treatment system to meet the stipulated standards and then sorted into the main pipes for exhaust gas collection. The main pipes for exhaust gas collection fall into acidic, alkaline, organic and general types, where acidic and alkaline waste gas enters the acid central washing tower via the main pipes and enters the alkaline central washing tower for retreatment, while organic waste gas enters the zeolite runner system for burning. The waste gas processed by the central system is discharged into the atmosphere by the exhaust pipe conforming to the requirements of the State. To verify emission compliance, we regularly entrust third party agencies to monitor emissions and all test results meet national requirements. For specific monitoring data, see the information published on: [http://www.smics.com/site/about\\_ESH](http://www.smics.com/site/about_ESH)



Acidic Exhaust Gases Treatment System



Alkaline Exhaust Gases Treatment System



VOC Treatment System

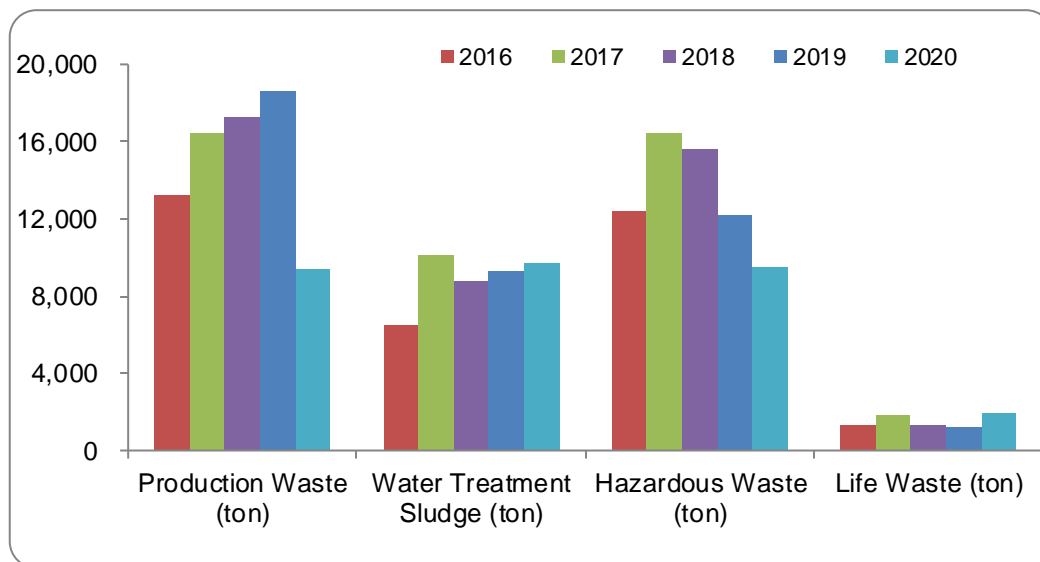


Air Emissions Outlets

## 8 Waste Management

SMIC establishes a sound waste management system and strictly complies with the national and local regulations in treatment of the produced waste. The waste produced in the workshop is subdivided into acidic, alkaline, toxic, oxidizing, natural, flammable and general substances, which are distinguished with the recycling buckets in different colors. The classified waste substances are collected on a regular basis and transported to the hazardous waste warehouse for temporary storage, before being delivered to the firms with hazardous waste treatment qualification. The waste liquid produced in the workshops is transported to the temporary waste tank by an independent pipeline, and then treated by the firms with the corresponding qualification. The waste treatment plants must be under

strict management and all waste treatment firms need to have a government-approved qualification and meet our company's waste management evaluation scores to sign the contract; during the cooperation, the Environmental, Safety and Health Division will conduct on-site or vehicle-following examination of the waste treatment firms; for hazardous waste, strict implementation of the waste transferring table system is required. Production of various types of waste in 2020 is as follows, which presented an steady trend in 2020:



## 9 Promotion of Environmental Awareness

In 2020, the company continued to hold environmental awareness advocacy activities to enhance employees' awareness of environmental protection in the form of posting posters, sending initiative mails to all employees, displaying promotional documents on the company's internal website, organizing special events such as second-hand market, garbage cleanup, tree planting, and species conservation activity and so on.

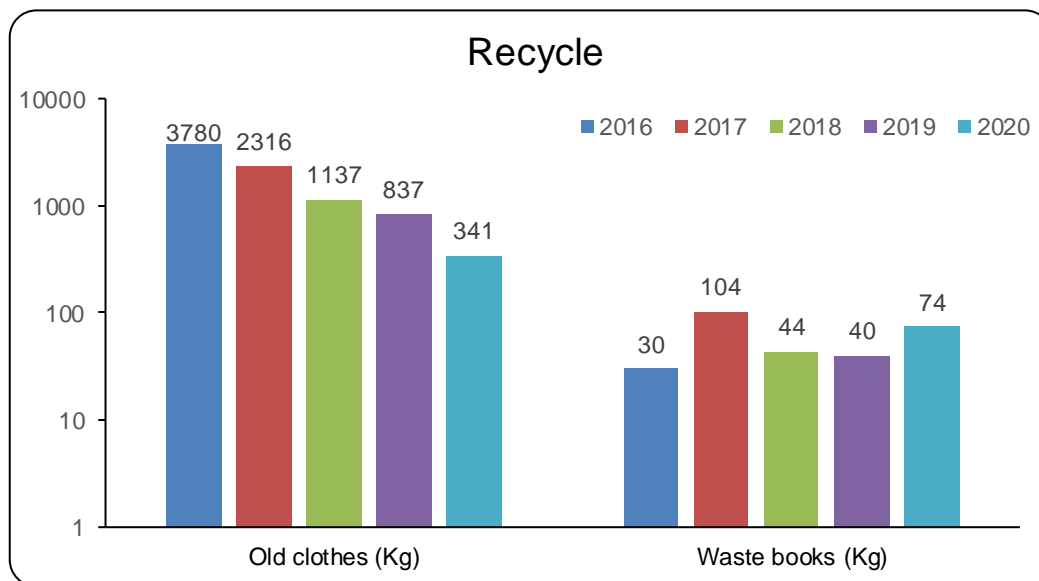
### 9.1 Theme Day Activities

- Publicized "World Water Day" on March 22, calls all employees to participate to save water.
- Publicized "World Environment Day" on June 5, calls all employees emission reduction and energy saving.

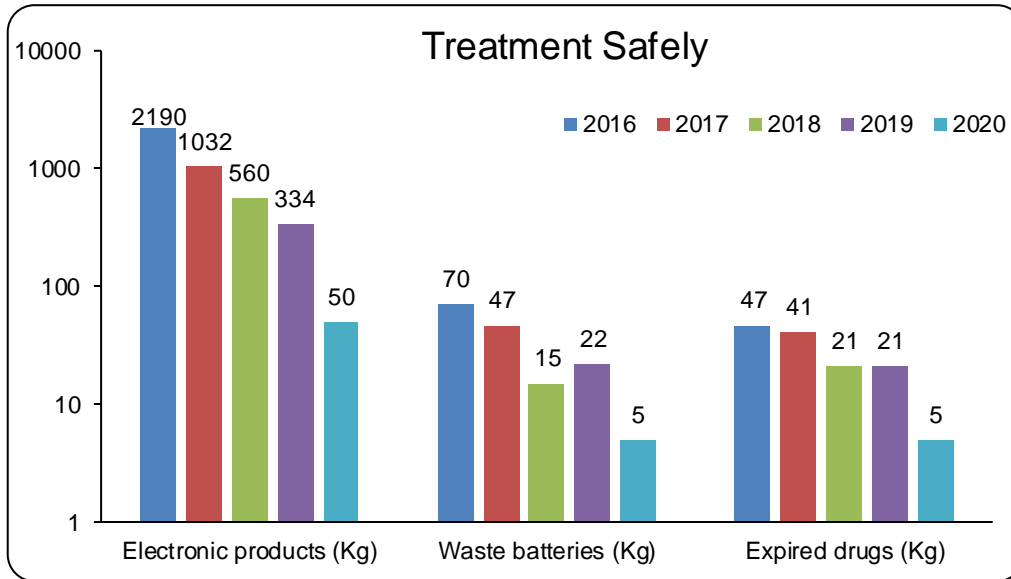


## 9.2 Second-hand Market

In 2020, our Shanghai Plant, Beijing Plant, Tianjin Plant and Shenzhen Plant held a number of special second-hand market activities to promote waste recycle and treatment safely.







### 9.3 Pay attention to ocean pollution – Environmental Protection Activity of Beach Cleanup

On October 31, 2020, SMIC worked with its business partners and organized the “Pay Attention to the Ocean in 2020” beach cleanup activity. 104 volunteers came to Nanhui East Bay and collaboratively got involved in protecting the marine ecological environment. By virtue of collaboration and joint efforts, about 1,708 pieces of garbage that weight more than 202 kg was collected and cleaned up. Through such concrete actions, we contributed our part of strength to maintaining the sound environment of the ocean .

### Material proportions

