



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



## SSTIC Impact Stories

# Emergency response assistance to the outbreak of the coronavirus disease (COVID-19) in the Islamic Republic of Iran

### SUMMARY

The COVID-19 outbreak has led to a surge in medical waste production in Iran, where the existing disposal capacity is insufficient. Hospitals are facing a shortage of equipment, and the intense use of the limited available equipment has resulted in quick malfunction and reduced service life.

The Iranian government has requested assistance from the United Nations Industrial Development Organization (UNIDO) to develop an emergency project to provide medical waste treatment equipment and training. The project, supported by the Chinese government and Iran, aims to improve medical waste disposal capacity and management knowledge in Iran through the provision of equipment and training.



Installation and commissioning of autoclave in Iran

### WORKING TOWARDS THE SDGs



### SOUTH SOUTH COUNTRIES:

China, Islamic Republic of Iran

### IDENTIFIED COUNTRIES:



### SOUTH SOUTH PARTNERS:

- Islamic Republic of Iran
- China

### DONORS & SUPPORTED BY:

- Islamic Republic of Iran
- China
- Trust Funds
- IDF - Special purpose convertible
- UNIDO

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# SSTIC Highlights

In only four months and under difficult conditions, two sets of autoclaves were successfully transported, installed, commissioned and in full operation in two recipient hospitals in Iran, Imam Khomeini Hospital and Firoozgar Hospital, enabling the effective and timely processing of four tons of medical waste per day, thus reducing not only the risks for waste operators but also the spread of the virus.

The project also focused on the development of a Guidebook and numerous training sessions of hospital staff, which laid the basis for replication of experiences gained in the two selected beneficiary hospitals throughout the rest of the country. The equipment and training package was highlighted through the project's recent terminal evaluation as an excellent example of how international aid projects should be.

A prominent feature of the project is that it provided an extensive package beyond merely the provision of equipment, namely training, equipment maintenance and guidebooks. This one-package model enhanced the overall effectiveness and performance of the project, and was praised as going above and beyond typical international aid projects.

The project was selected as best practice case study for the South-South Cooperation Assistance Fund (SSCAF) and was submitted to China International Center for Economic and Technical Exchanges (CICETE), affiliated to Ministry of Commerce of the People's Republic of China.

UNIDO developed a video as well as other promotional material to showcase the significant achievements of the project, which is regarded as an exemplary project of SSCAF, and embodies international cooperation and assistance by UNIDO and CIDCA, friendship between China and Iran, and plays a significant role in combating against the COVID-19 pandemic in Iran.

The total number of direct and indirect beneficiaries during the entire six-quarter project period (April 2021 – September 2022) is 2,749. The direct beneficiaries are the sum of all the participants of medical waste disposal and management training sessions. The indirect beneficiaries are calculated based on the 4-ton daily medical waste treatment capacity of the two sets of equipment under normal operation condition, and the average generation of 1.7 kg of medical waste for each bed in hospital. It is accordingly estimated that the medical waste produced by more than 2,300 beds can be effectively and safely treated with the installation of the two sets of equipment, contributing to a total of around 2,300 indirect beneficiaries.

A significant number of women either participated in or were benefited from this project. In particular, there was a significant number of female attendees for the training sessions. The highlight is the third training session where 99 women were present, accounting for 66% of the entire participants of the training session.



## WHAT IS SSTIC?

### South-South and Triangular Industrial Cooperation (SSTIC)

Is a process whereby two or more developing countries pursue their individual and/or shared national capacity development objectives through exchanges of knowledge, skills, resources and technical know-how, and through regional and interregional collective actions. UNIDO's SSTIC services are following the guiding principles for South-South cooperation set out in the Buenos Aires outcome document:

- 1 respect for national sovereignty
- 2 mutual benefit
- 3 national ownership and independence
- 4 equality
- 5 non-conditionality
- 6 non-interference in domestic affairs



Demonstration of the autoclave



Autoclave pressure gauge

## SSTIC Project Narrative

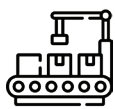
An assessment of the environmental and social impact of the equipment installation, trial run and operation has been undertaken by UNIDO at the project approval stage. According to the Environmental and Social Safeguards Policy and Procedures (ESSPP) AI/2017/04, the identified risks of the project are summarized below:

An additional autoclave decontamination facility will be installed in each hospital. Risks to technical staff could arise during the installation work if safety measures are not respected.

The project will install equipment which will turn hazardous waste in non-hazardous waste. However, there will be a waste emission and the end of the process (solid and liquid) which should be monitored.

A misuse or bad maintenance of the autoclave technology could lead to contamination. A facility based on the same technology already exists in the targeted hospitals, therefore the project would increase the existing risk since more facilities will be operating. A couple of workers will operate the two autoclaves at the same time, and thus be directly exposed to the risk.

### MEDICAL WASTE DISPOSAL PROCESS



#### Production

According to the actual situation of two hospitals in Iran, Imam Khomeini and Firouzgar, UNIDO customized two sets of medical waste disposal equipment with high-temperature steam technology, and helped the hospitals design process flow diagrams, layout plans and foundation drawings.

1



#### Transportation

With the coordination of the Ministry of Foreign Affairs of Iran (MFA) and the Ministry of Health and Medical Education of Iran (MoHME), two sets of equipment were delivered to the designated hospitals. Subsequently, 3 Chinese engineers went to Tehran to assist in the followup installation, commissioning and trial operation.

2



#### Installation & Commissioning

UNIDO Tehran office and MoHME collaborated to install two sets of equipment in designated hospitals despite challenges like pandemic traffic control. The equipment successfully passed sterilization validation tests in September and met Iranian national standards.

3



#### Stable operation

The launching ceremony was successfully held with the participation of the UNIDO Iran Office, MoHME and representatives of the 2 hospitals. As of December 2021, 63 tons of medical waste have been disposed of in a timely and effective manner.

4

1

## THE CHALLENGE

What the project aims to achieve.

The project aims to ensure the safe and environmentally sound management of disposal of medical waste in hospitals in Iran and prevent the spread of the novel Coronavirus in line with SDG 9 and SDG 3.

The specific goal of the project is to improve medical waste disposal capabilities through providing two sets of medical waste disposal equipment for the designated hospitals. At the same time, the project will improve the medical waste management capabilities of staff in hospitals and government agency through training during the epidemic and in the future.

2

## THE SOLUTION

The methodology used that led to successful outcomes, outcomes achieved.

The project procured two sets of medical waste disposal equipment: MWI-500 Integrated Autoclave with Shredder. The capacity of the MWI-500 is 1.9-2.4 tons/day, based on 16 hours operation, with an emergency capacity of 2.9-3.6 tons/day based on 24 hours operation. It is an ideal solution for medical waste treatment in small and medium size hospitals with 500-1000 beds. The equipment adopts built-in dual-shift crusher technology. The medical waste is firstly crushed, and then disinfected in the autoclave. The entire medical waste disposal process is automatic and in a fully enclosed container, thereby the whole process is safe and efficient. The working environment is also safe. The operator is not in contact with the medical waste during the process. The disposal temperature reaches 134 °C and the bacterial killing rate is more than 99.9999%. The equipment fully meets the requirements of medical waste management in Iran. After disinfection, the waste can be sent to landfill for final disposal.

The selected autoclave technology is one the most cost-effective and environmentally-friendly solutions to treat medical waste. Unlike incinerators, where the pollution caused by incineration (dioxin, furan and other harmful substances) is hardly controlled in a cost-effective manner, the selected autoclave with shredder system is not only safe for humans and for the environment, but has also a long service life with low maintenance cost. The medical waste is shredded into small pieces before or after sterilization.



Successful UNIDO-FECO-China Aid partnership

## 3

**SOUTH-SOUTH IMPACT**

How were South-South and Triangular cooperation utilized to achieve results?

UNIDO is the implementing agency of the project, with the responsibility of designing, implementing, monitoring and evaluating the project. The Ministry of Health and Medical Education of Iran (MOHME) is the executing agency, engaging all Iranian national stakeholders in implementation of the project. The Foreign Environmental Cooperation Center (FECO), affiliated to the Ministry of Ecology and Environment of China serves as technical supporting agency. Chongqing Gient Heating Industry Co., Ltd. (Gient) is manufacturer and supplier of the medical waste treatment equipment.

In April 2021, UNIDO and FECO signed project agreements, covering procurement of two sets of medical waste treatment equipment, 10-year equipment maintenance service in combined, and training materials and training sessions preparation. UNIDO, FECO and HOHME jointly selected Gient as the equipment supplier and maintenance service provider. With assistance of UNIDO, FECO and Iranian government, Gient delivered, installed, tested and commissioned the two sets of equipment at Imam Khomeini Hospital and Firouzgar Hospital respectively. UNIDO and FECO compiled materials for medical waste disposal and management training courses and organized online and in-person training sessions. FECO also shared the medical waste treatment experience gained during the COVID-19 pandemic in China. Gient contracted and partnered with a local agent to provide continuous after-sales service and maintenance to the equipment.

The equipment has been operated in full capacity in the two hospitals in Iran since September 2021, and is capable of handling 4 tons of medical waste per day during the pandemic. The project is regarded as an exemplary project of SSCAF. UNIDO published commemorating and publicity posters and videos to demonstrate the achievement of the project. This project embodies international cooperation and assistance by UNIDO and CIDCA, friendship between China and Iran, and plays a significant role in combating against the COVID-19 pandemic in Iran.



Installed autoclave equipment

## 4

**SUSTAINABILITY AND REPLICABILITY**

How is it sustainable and replicable?

The project is sustainable and replicable for the following reasons:

Environmental and social impact assessment has been undertaken at the project approval stage to identify risks and ensure the project's compliance with the Environmental and Social Safeguards Policy and Procedures (ESSPP).

The selected autoclave technology is cost-effective, environmentally-friendly, and safe for humans. The equipment fully meets the requirements of medical waste management in Iran, and the waste can be sent to a landfill for final disposal.

The project provides training to staff on best practices in medical waste treatment, in particular for staff handling medical waste in hospitals. This will improve the medical waste management capabilities of staff in hospitals and government agencies in the long term, making the project replicable.

The project involves collaboration between UNIDO, the Ministry of Health and Medical Education (MoHME) of Iran, and recipient hospitals (Imam Khomeini Hospital and Firouzgar Hospital). This collaboration ensures that the project is aligned with the country's priorities to fight the COVID-19 outbreak and supports the country's health system.

**TRAINING AND SHARING PROCESS**

There are 3 processes are as follows:

**1 Experience sharing:**

Through the UNIDO South-South cooperation platform, the Foreign Environmental Cooperation Center of the Ministry of Ecology and Environment of China shared with the MoHME of Iran the best available technologies (BAT) and the best environmental practices (BEP) for the whole life cycle environmentally sound management and disposal of medical waste in China during COVID-19 pandemic.

**2 Develop a guidebook**

Elaborating BAT & BEP The Guideline for medical waste management during the COVID-19 pandemic in Iran (in Farsi and English) was compiled. The guideline is based on the best practices learned through medical waste disposal in China, especially during the pandemic, to explain BAT and BEP for medical waste disposal for staff in hospitals.

**3 Staff training**

Onsite and online training with the joint efforts of UNIDO and MoHME, the UNIDO National Technical Advisor Reza and MOHME officials organized 2 waste management onsite training sessions and 2 online meetings in the two hospitals. A total of 279 medical waste disposal-related staff was trained, of which 147 were female, accounting for 53%.

# SSTIC Executive Summary

The COVID-19 pandemic has led to a surge in medical waste generation in Iran, which has exceeded the capacity for proper management and disposal. As a result, Iran urgently requested assistance from the United Nations Industrial Development Organization (UNIDO) to provide medical waste treatment equipment and relevant training.

UNIDO, in partnership with the Foreign Environmental Cooperation Center (FECO) and the Ministry of Health and Medical Education of Iran (MOHME), developed a project called "Emergency Response Assistance to the Outbreak of the Coronavirus Disease in the Islamic Republic of Iran," which was officially approved in March 2021. The project aims to improve medical waste disposal capacity in Iran by providing two sets of medical waste treatment equipment to designated hospitals and training medical waste workers in best practices. Chongqing Gient Heating Industry Co., Ltd. was selected as the equipment supplier

and maintenance service provider. With assistance from UNIDO, FECO, and the Iranian government, the equipment was delivered, installed, and commissioned at Imam Khomeini Hospital and Firouzgar Hospital.

The project has strengthened Iran's emergency capacity for environmental sound management of medical waste and improved medical waste disposal and management knowledge and skills of staff in hospitals and relevant government agencies. The equipment has been successfully operating at full capacity in the two hospitals in Iran since September 2021, handling more than 4 tons of medical waste per day during the height of the pandemic. The project is considered an exemplary project of South-South and Triangular Cooperation Assistance Fund (SSCAF) and exemplifies international cooperation and assistance, friendship between China and Iran, and plays a significant role in combating the COVID-19 pandemic in Iran.

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Global development  
and South-South  
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