

# Millions of People in India Consume Toxic Arsenic in Drinking Water

## Here Is an Innovative Solution to Change That



Credit: Bartosz Hadyniak/Getty Images

Arsenic in groundwater threatens the lives and health of more than 200 million people worldwide. In India, a sustainable and effective technology called electrochemical arsenic remediation (ECAR) holds promise to improve the lives of up to 100 million people by making arsenic-free, safe drinking water accessible and affordable. Operational since April 2016, the ECAR demonstration site in Dhapdhapi, West Bengal, offers a blueprint for meeting an essential community need through a profitable business venture.

### Toxic Arsenic Can Be Found Naturally in Groundwater

Arsenic occurs naturally throughout the earth's crust. In some regions, including large parts of north and eastern India, arsenic is widespread in soil and rock, which can contaminate groundwater.

Arsenic is tasteless, colorless, odorless, and toxic when consumed. Chronic arsenic poisoning, even in small amounts, can cause severe health problems, including skin ulcers, gangrene, cancer, and death. Arsenic can also negatively impact children's growth and development.<sup>1</sup>

Between 70 and 100 million people face arsenic poisoning from their drinking water in India alone. In regions where contamination is pervasive and at concentrations higher than the permitted level of 10 ppb, research suggests that up to 20 percent of adult deaths are attributable to chronic arsenic exposure.<sup>2</sup>

### Water Is Life

Access to safe drinking water is a human right. Globally, 2.2 billion people lack access to safe drinking water.<sup>3</sup> In India, more than 660 million people have no access to a safe drinking water source.<sup>4</sup> To rectify this injustice, the global community, working through the United Nations, has set a **Sustainable Development Goal of universal and equitable access to safe and affordable drinking water for all people by 2030**. In India, the Ministry of Jal Shakti is working to provide a safe water supply to every household by 2024. **Arsenic remediation is necessary to achieve these goals.**

### ECAR Technology: A Practical, Sustainable, and Profitable Way to Reduce Arsenic in Drinking Water

A team of scientists led by Dr. Ashok Gadgil invented ECAR technology in 2006 to remove arsenic from drinking water. The technology has been operating in real-world conditions in the rural town of Dhapdhapi, near Kolkata, since 2016.

In 2017, the ECAR site was handed over to a local company, Livpure. Since then, Livpure has been operating the plant with local workers and serving a community of 6,000 people with safe drinking water—all while generating a consistent profit.

### ECAR Is Practical

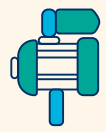
ECAR uses a small amount of electricity to remove arsenic from groundwater. It is a highly effective system that relies on low-cost, readily available materials and can be operated by semi-skilled technicians.

An ECAR facility serving up to 6,000 people requires less than 100 square meters of space and uses only 10kW of single-phase grid power.

Scan or click below for a video explaining ECAR technology



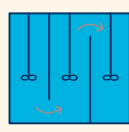
## ECAR Process



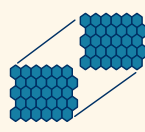
Groundwater pump



ECAR reactors



Flocculation chamber



Tube settler



Rapid sand filter



Micron filters



Ultraviolet light



Water distribution

## ECAR Is Sustainable

ECAR has improved over time in real-world conditions, shaping the technology to be functional and sustainable in the rural environments where it is most needed.<sup>5</sup>

- ECAR facilities can operate in variable climates, including hot and humid weather, with intermittent grid-power supply.
- ECAR facilities generate zero liquid discharge, thereby conserving water and limiting possible environmental contamination. The small amount of toxic byproduct from ECAR is captured in dry sludge and can be sent to hazardous waste disposals or safely contained in concrete bricks for above-ground construction projects (for example, boundary walls).

Scan or click below for information on licensing ECAR technology



## ECAR Is Profitable

Water treated through ECAR is affordable for rural communities, selling for INR 6 per 10 liters of water in 2019. After the start of water sales, ECAR can reach a profit margin of 33 percent within 12 months of start, if supported by marketing and public outreach.<sup>6</sup>

ECAR technology is registered with and approved by India's Ministry of Drinking Water and Sanitation. Individual state public health engineering departments (PHEDs) do not need to independently test and verify the technology. This means that new ECAR facilities can bypass time-consuming approvals and move toward commercial operations quickly.

The patent for ECAR, held by the University of California, Berkeley, is available for non-exclusive, commercial licensing.

New ECAR treatment facilities qualify for reimbursement of capital costs through Government of India NITI Aayog development funds after three years of operation.

ECAR is a sustainable development solution that generates profitable local business while addressing inequities in access to safe drinking water. Private-sector companies and nongovernmental organizations that invest in ECAR facilities can meet their corporate social responsibility spending requirement while advancing Indian development priorities and the United Nations' Sustainable Development Goal of universal and equitable access to safe and affordable drinking water for all by 2030.

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