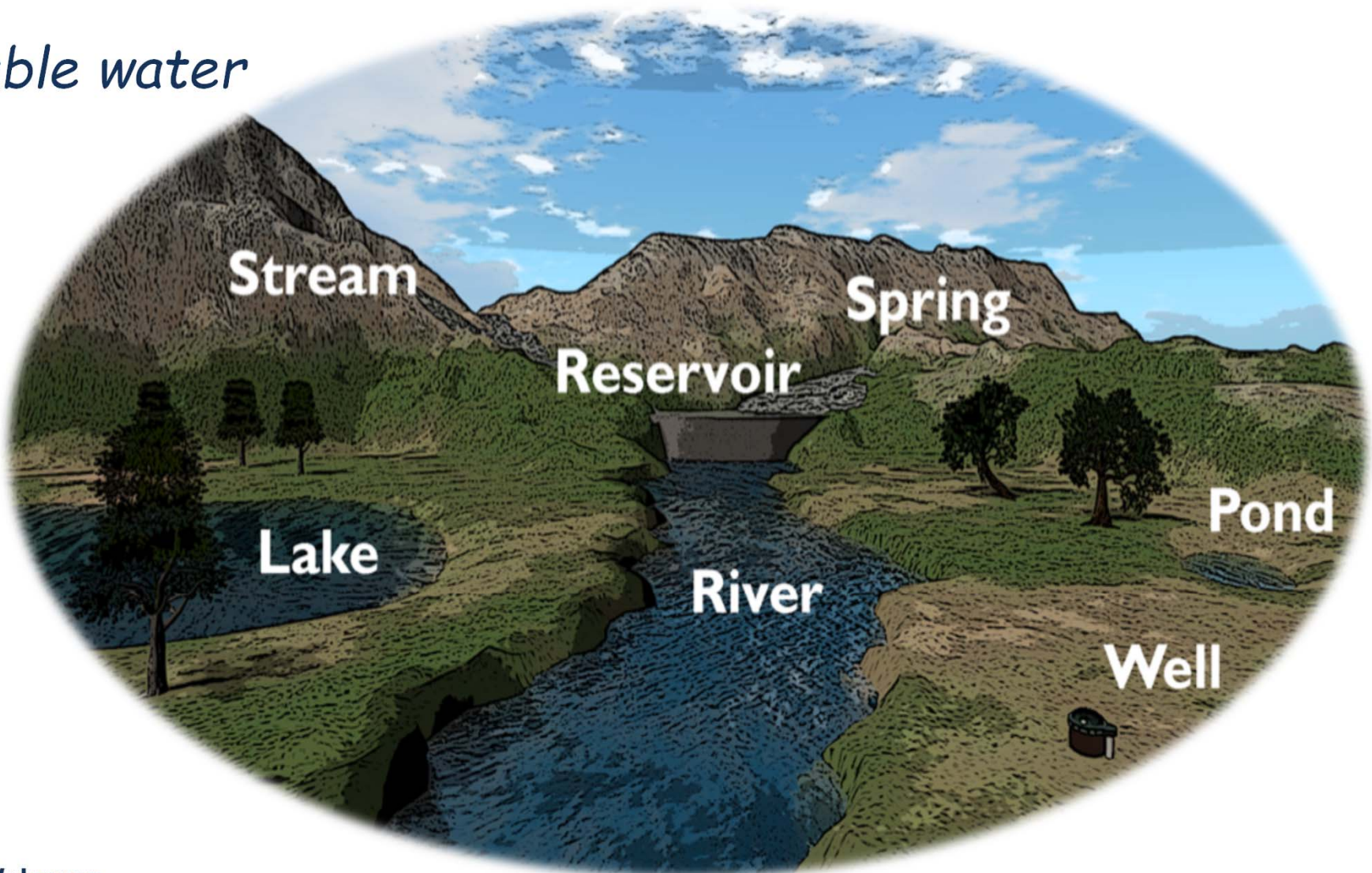




“We who drives,  
will never thirst again”

# Potable water



# Global water crisis



<https://dohadebates.com/definitions/how-definitions-drive-debates-what-we-mean-by-water-scarcity/>

## Facts:

- A third of big groundwater reservoirs are distressed.
- By 2025 two thirds of the worldwide population is expected to live in regions with water scarcity.

## Reasons:

Global warming, rapid urbanization, industrialization, agriculture growth and demographic changes.

**This crisis is likely to worsen!!!**

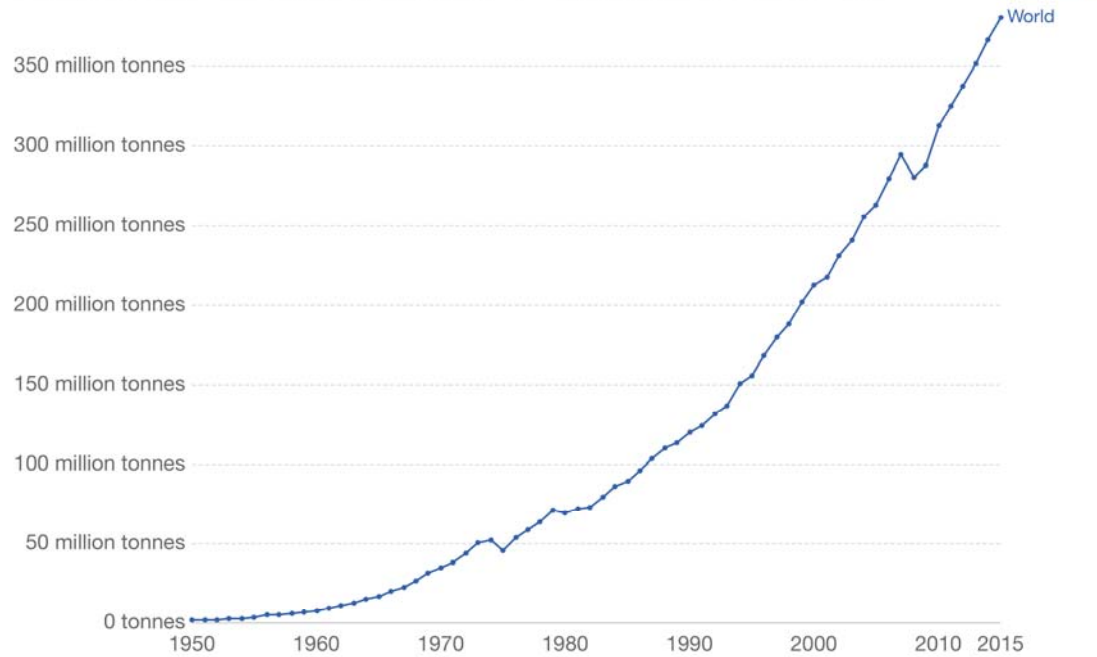


*“A million bottles a minute: world's plastic binge 'as dangerous as climate change' “ (Guardian)*



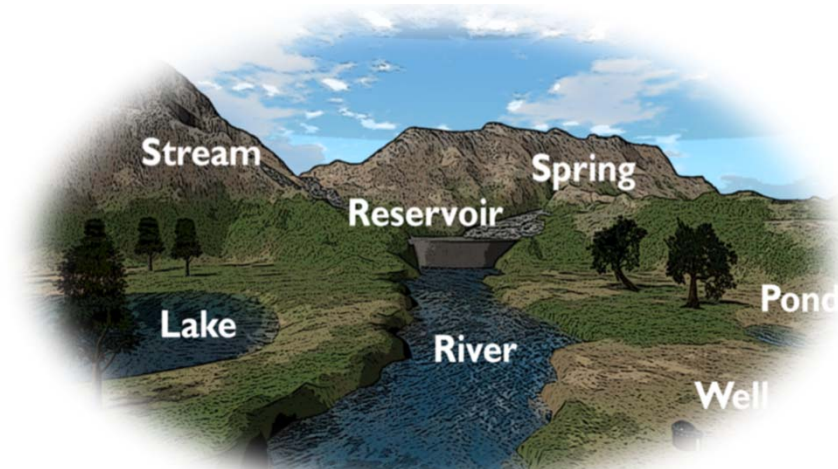
### Global plastics production

Annual global polymer resin and fiber production (plastic production), measured in metric tonnes per year.



Source: Geyer et al. (2017)

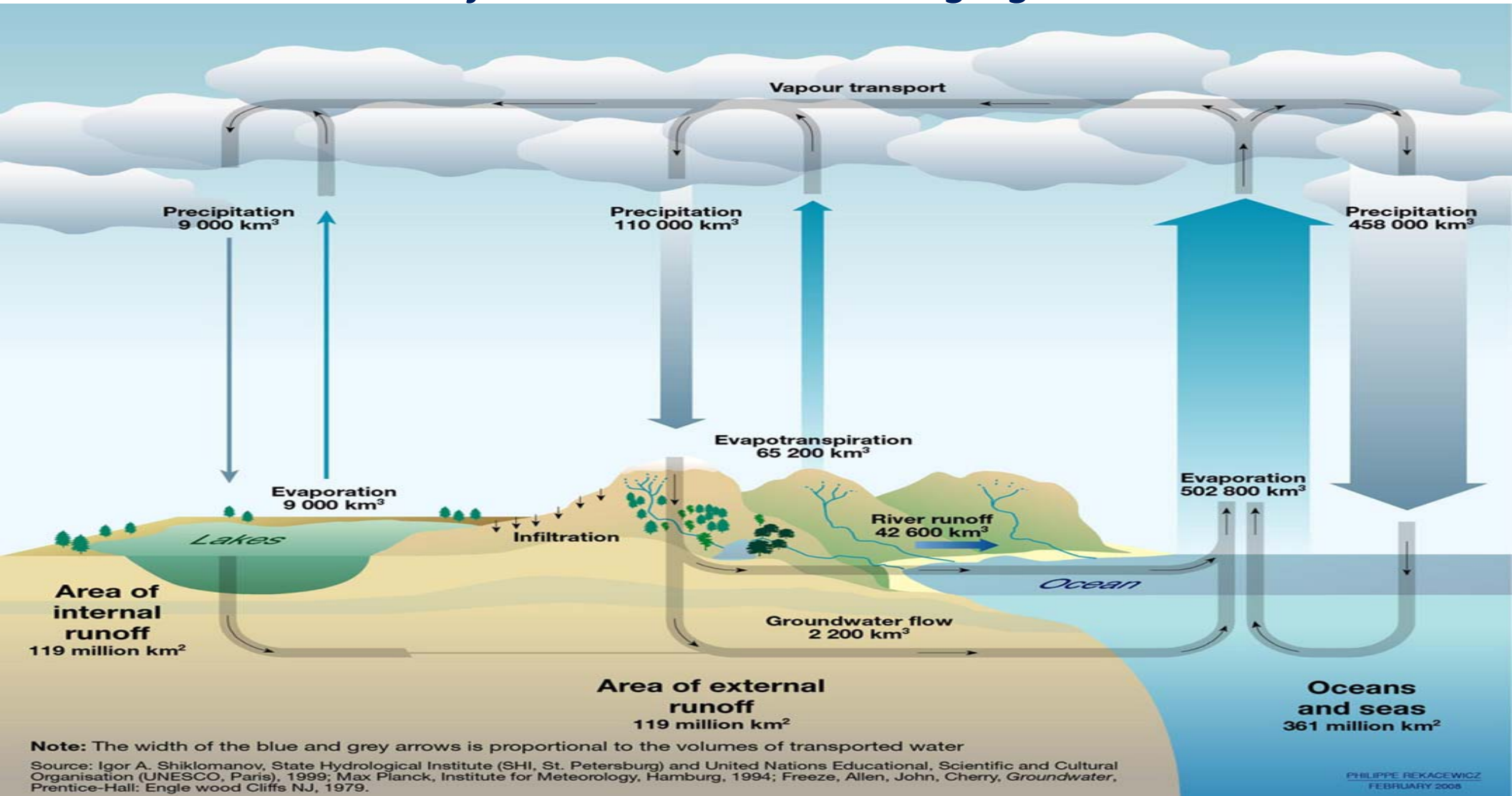
CC BY



Other available natural sources  
for potable water?



# Water from air as a new emerging source

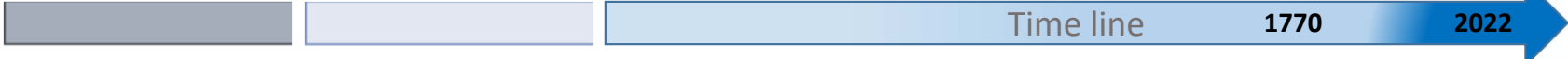


# The 21<sup>st</sup> century, a turning point of water consumption ?

Evolution/water consumption



[https://www.toonpool.com/cartoons/We%20depleting%20water\\_148602](https://www.toonpool.com/cartoons/We%20depleting%20water_148602)



<https://www.dkfindout.com/us/science/amazing-inventions/wheel/>



<https://www.popularmechanics.com/technology/g987/a-brief-history-of-the-steam-engine/?slide=3>



<https://pixy.org/594987/>

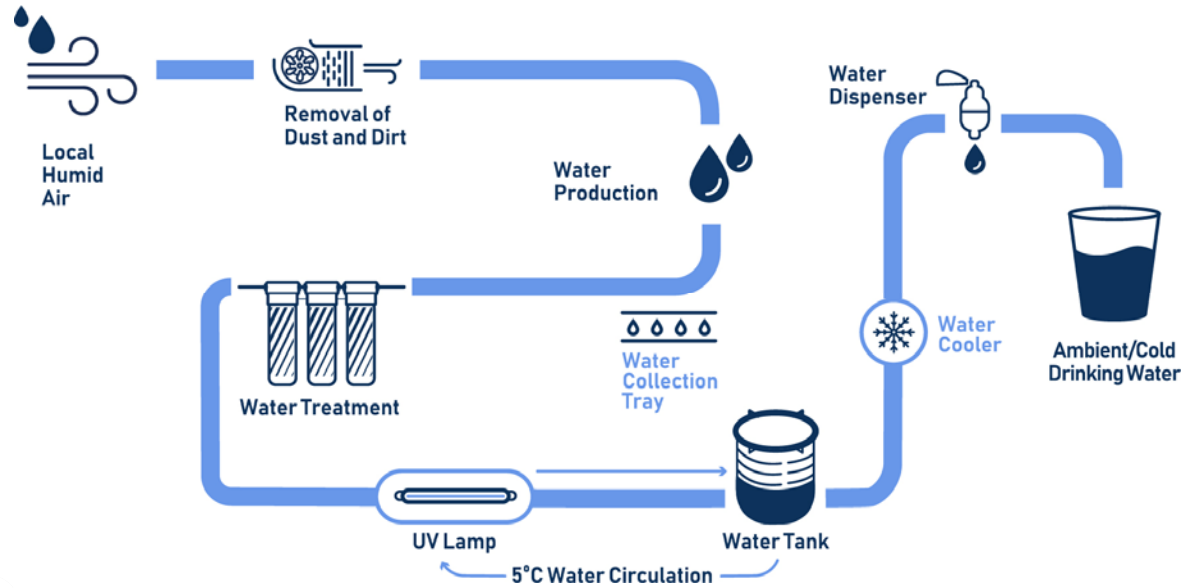


<https://gifimage.net/auto-gif-8/>



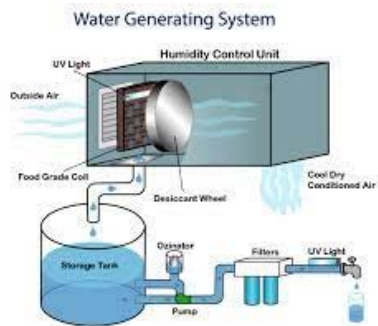
# AWG technology

<https://www.youtube.com/watch?v=VG7C9HosSTk>





# Integration of AWG in automotive world



## Military Vehicles

Lack of fresh water behind enemy lines can make the difference in a successful mission. Reduce logistics of carrying heavy tanks of water while providing troops fresh, healthy water in the field and off the grid.



## Trucks

Long-distance traveling for truckers requires storage space to carry enough water supply to avoid dehydration on the road. Watergen Mobility's AWG brings the water sources to the truck, leaving the worry of running out of or not having enough water for long-distance hauls.



## RVs, Caravans & Motorhomes

Drinking water is essential when traveling or camping off-grid. Watergen Mobility creates a constant supply of drinking water from air for RVs, permits lengthier camping trips and avoids the necessity to store bulk water in the trunk.



## Passenger Vehicles

While traveling long distances, the availability of fresh, pure water is a problem. Passengers forget to bring their own, or your car service runs out of bottled water. Watergen Mobility provides premium MaaS with integrated, on-the-go hot or cold premium water in the car at the push of a button.



## Autonomous Vehicles

Today's vehicles use advanced sensors and cameras that need constant cleaning. The lack of a continuous, clean water supply inhibits growth in this sector. Watergen Mobility provides a sustainable, ongoing, zero-maintenance water solution for cleaning advanced sensors and cameras.



## Public Transportation

Trains, buses and airplanes do not currently offer a constant supply of clean, tasty water. Watergen Mobility offers passengers comfort and superior service with fresh, healthy water while reducing plastic waste and costs. It is a clear differentiator for shared mobility, offering all passengers fresh drinking water as a service on the go.

# Watergen Inside solution for Drinking & Technical water

Fully integrated system within the structure of a vehicle

## Specifications

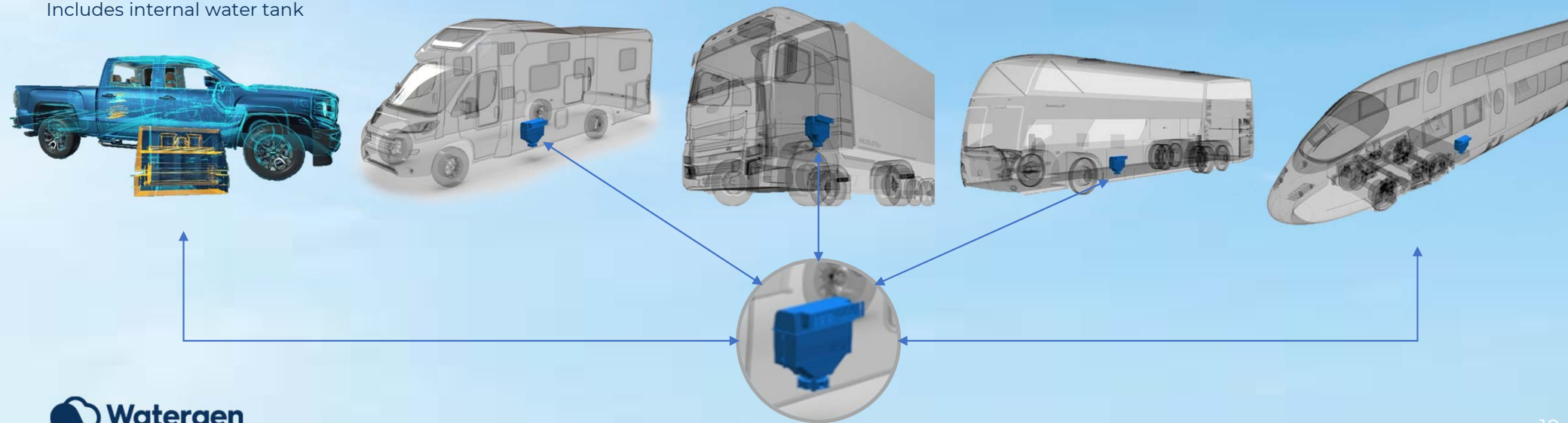
Water production capacity – 20 liters per day

Operational temperature – from 15 to 50 °C

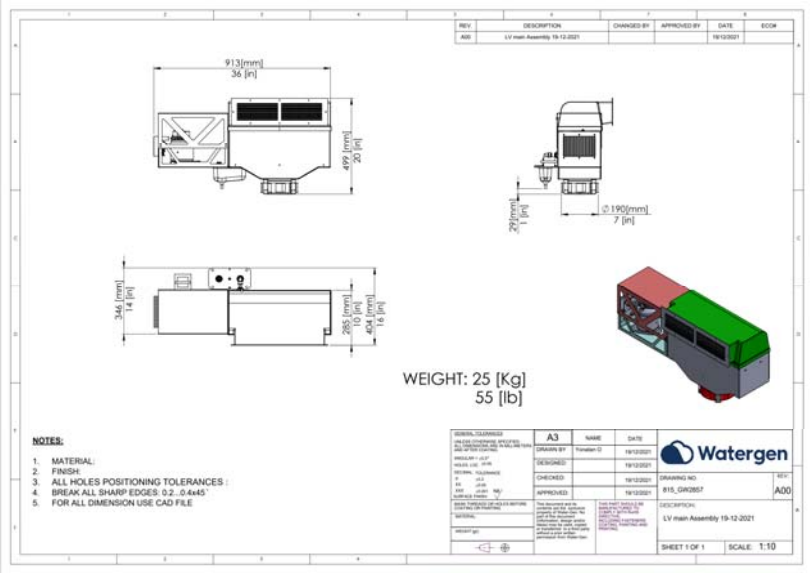
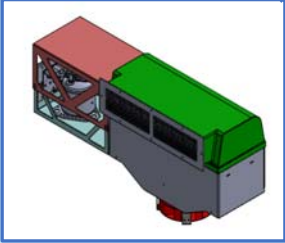
Operational humidity rate – from 20 to 99%

Complex air filtration and water treatment systems for high quality drinking water (mineralized)

Includes internal water tank



# Collaboration with Leading US Manufacturer – Watergen Integrated Drinking Water system



Watergen Drinking Water – up to 20 liters  
Serial Production



# Looking for a Collaboration on integrating our Genius Technology within the car

The target of this project is to integrate completely our technology – the Genius – within the car by replacing the existing Air evaporator in order to get the following:

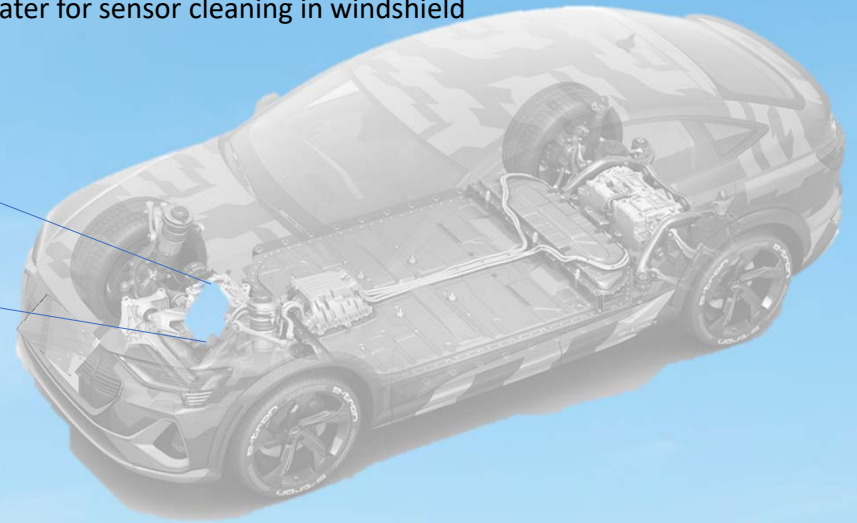
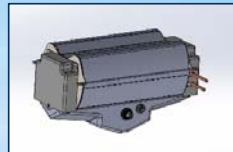
- Same functions like a regular air evaporator – HVAC...
- Saving Space around the engine (TBD)
- Genius produces more water in wider climate conditions with less power consumption
- Genius will produce more water in order to leverage existing system to fill the water tank automatically for several matters – cleaning sensors of the car, windshield etc...
- Energy efficiency - in water production mode it is possible to slightly pre-cool the cabin, without a need to operate the HVAC in full power. Example: hot weather. A vehicle is parked and charging. It produces water and pre-cools the cabin. Once a driver gets into the car and starts driving he doesn't need to operate HVAC in full power, because a cabin is not as hot as it could be.
- In case of autonomous/electric vehicles: no need to refill any liquids in a vehicle, even water for sensor cleaning in windshield



Technical Water



Drinking Water



Watergen Technical Water solution is flexible and scalable within the car

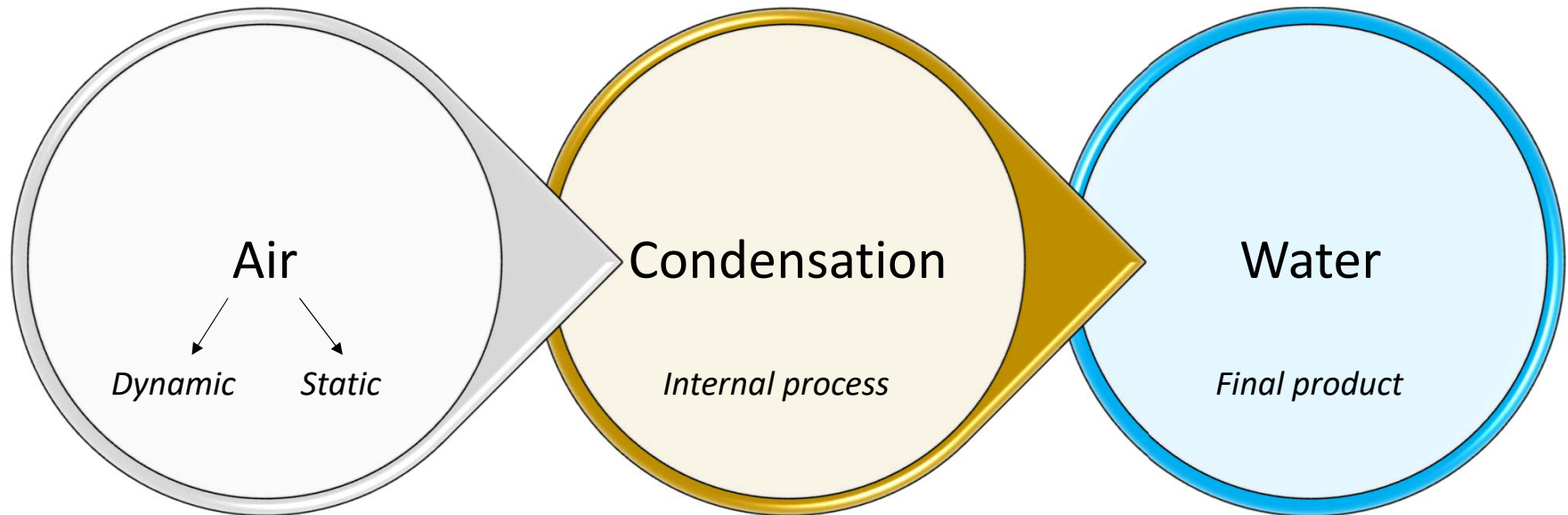




# Improve your contribution to the UN SDG – Watergen impacts 13 out of 17 SD Goals



# Mapping potential hazards





- vapors
- Odors
- Sulfur/Nitrogen primary and secondary pollutants
- Pesticides

- Carbon monoxide
- Volatile organic compound
- Lead/other gasoline additives

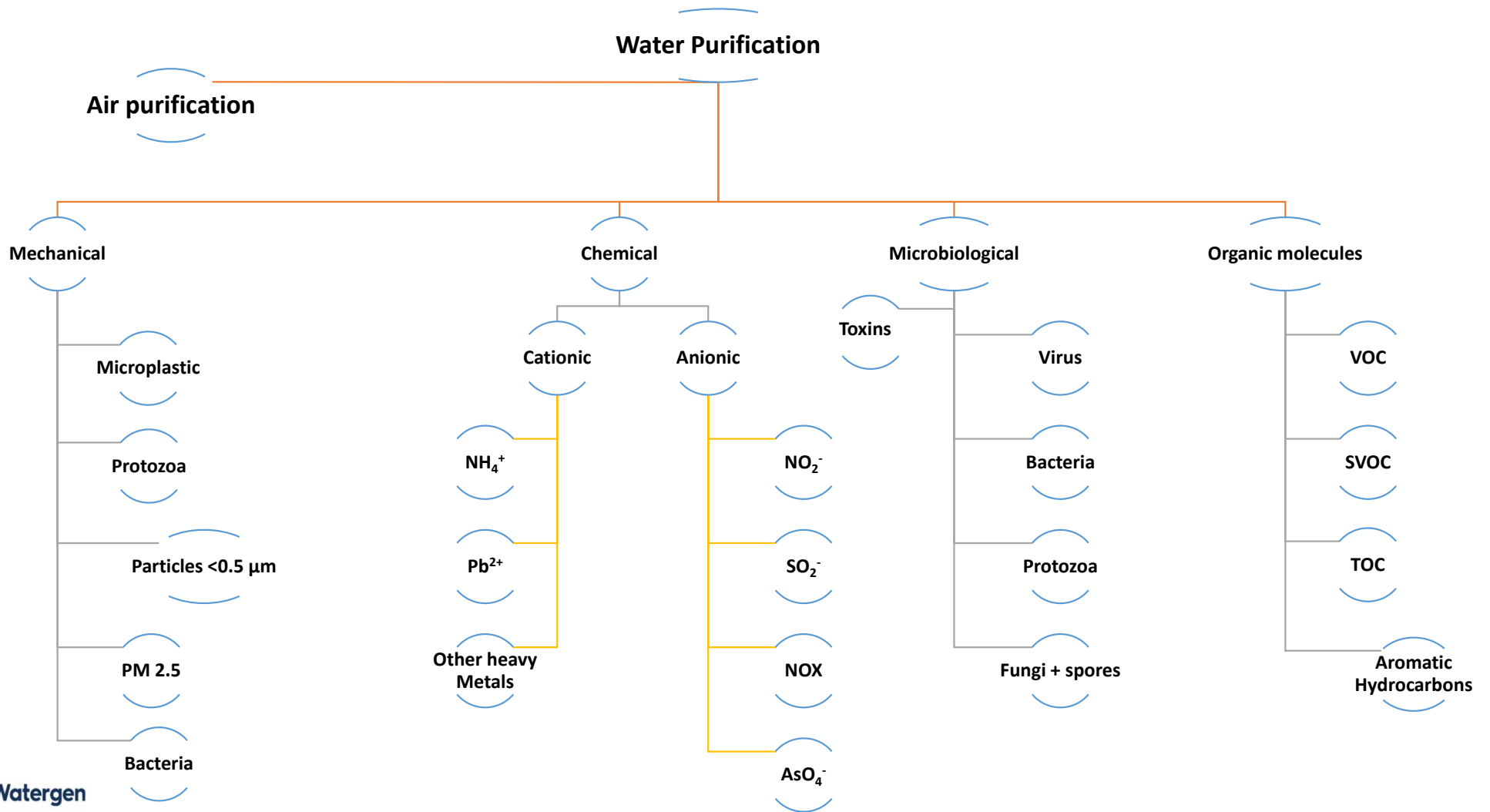
- Dust
- Fumes
- Mist
- Smoke

- Viruses
- Bacteria
- Fungi
- Protozoa

Understanding the route of contaminants and its significance on potable water



# Potential Contaminants







# Revealing The Unknown.



Article

## Producing Safe Drinking Water Using an Atmospheric Water Generator (AWG) in an Urban Environment

Offir Inbar<sup>1</sup>, Igal Gozlan<sup>1</sup>, Stanislav Ratner<sup>2</sup>, Yaron Aviv<sup>1,2</sup>, Roman Sirota<sup>2</sup> and Dror Avisar<sup>1,\*</sup>

<sup>1</sup> The Water Research Center, Porter School for Environment and Earth Sciences, Faculty of Exact Sciences, Tel Aviv University, Tel Aviv 66978, Israel; offirinbar@gmail.com (O.I.); gozlan.igal@gmail.com (I.G.)

<sup>2</sup> Watergen LTD, 2 Granit St, Petach Tikva 4951446, Israel; ratners@watergen.com (S.R.); yarona@watergen.com (Y.A.); romans@watergen.com (R.S.)

\* Correspondence: droravi@tauex.tau.ac.il

Received: 22 September 2020; Accepted: 17 October 2020; Published: 21 October 2020



ELSEVIER

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: [www.elsevier.com/locate/scitotenv](http://www.elsevier.com/locate/scitotenv)



Air-water interactions: The signature of meteorological and air-quality parameters on the chemical characteristics of water produced from the atmosphere



Offir Inbar<sup>a</sup>, Alexandra Chudnovsky<sup>b</sup>, Kevin Ohneiser<sup>c</sup>, Albert Ansmann<sup>c</sup>, Stanislav Ratner<sup>d</sup>, Roman Sirota<sup>d</sup>, Yaron Aviv<sup>d</sup>, Dror Avisar<sup>a,\*</sup>

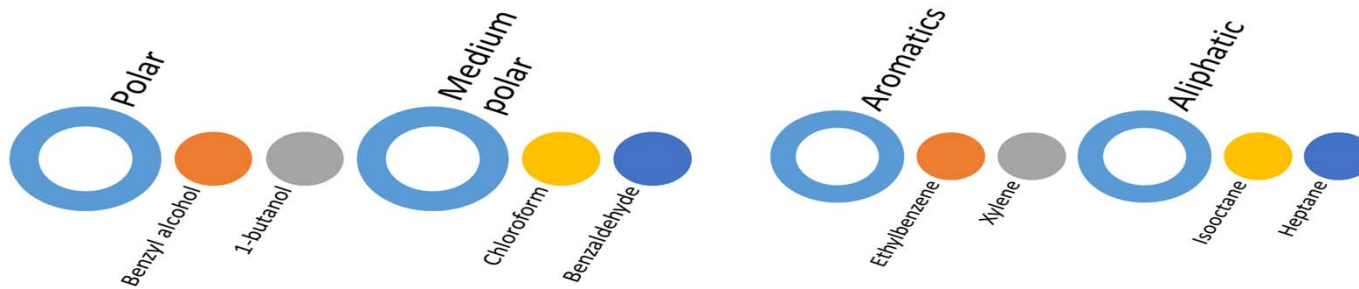
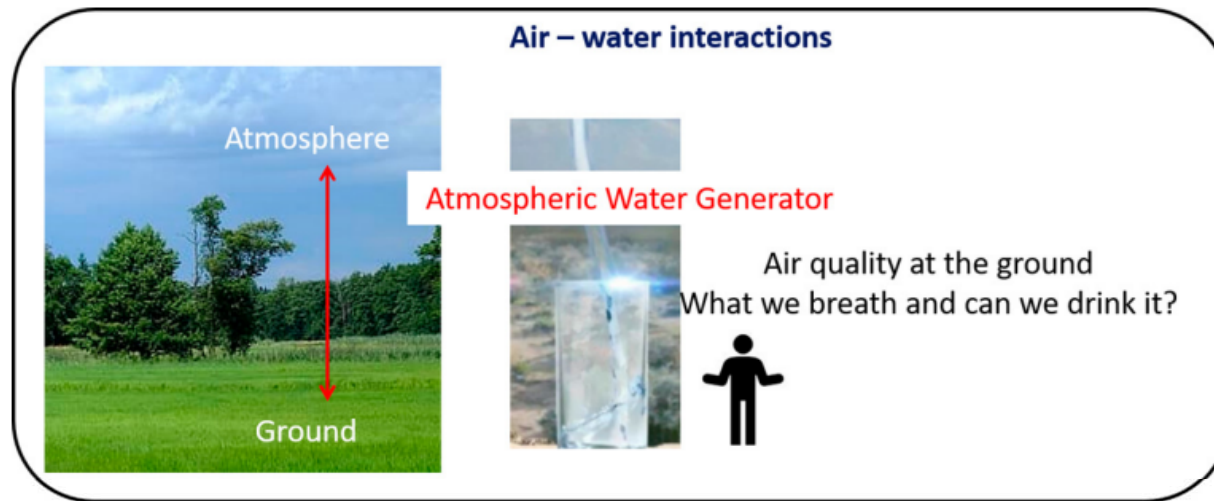
<sup>a</sup> The Water Research Center, Porter School for Environment and Earth Sciences, Faculty of Exact Sciences, Tel Aviv University, Tel Aviv, Israel

<sup>b</sup> AIR-O Lab, Porter School for the Environment and Earth Sciences, Faculty of Exact Sciences, Tel Aviv University, Tel Aviv, Israel

<sup>c</sup> Leibniz Institute for Tropospheric Research, Leipzig, Germany

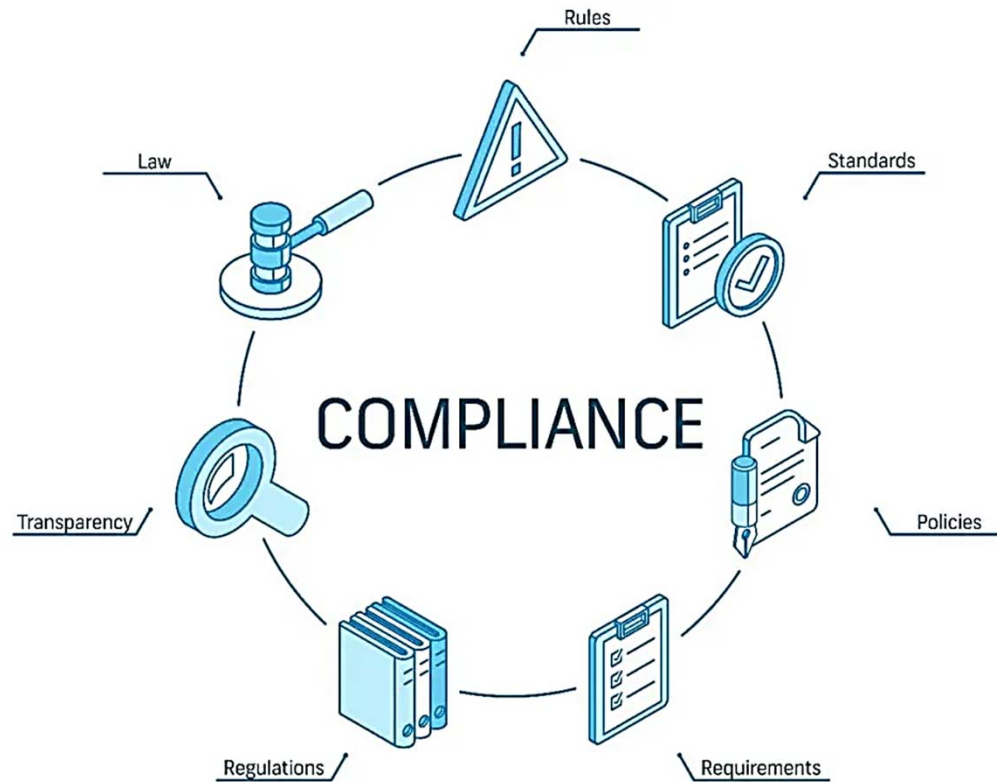
<sup>d</sup> Watergen Ltd., Petach Tikva, Israel

# Current & Future investigation



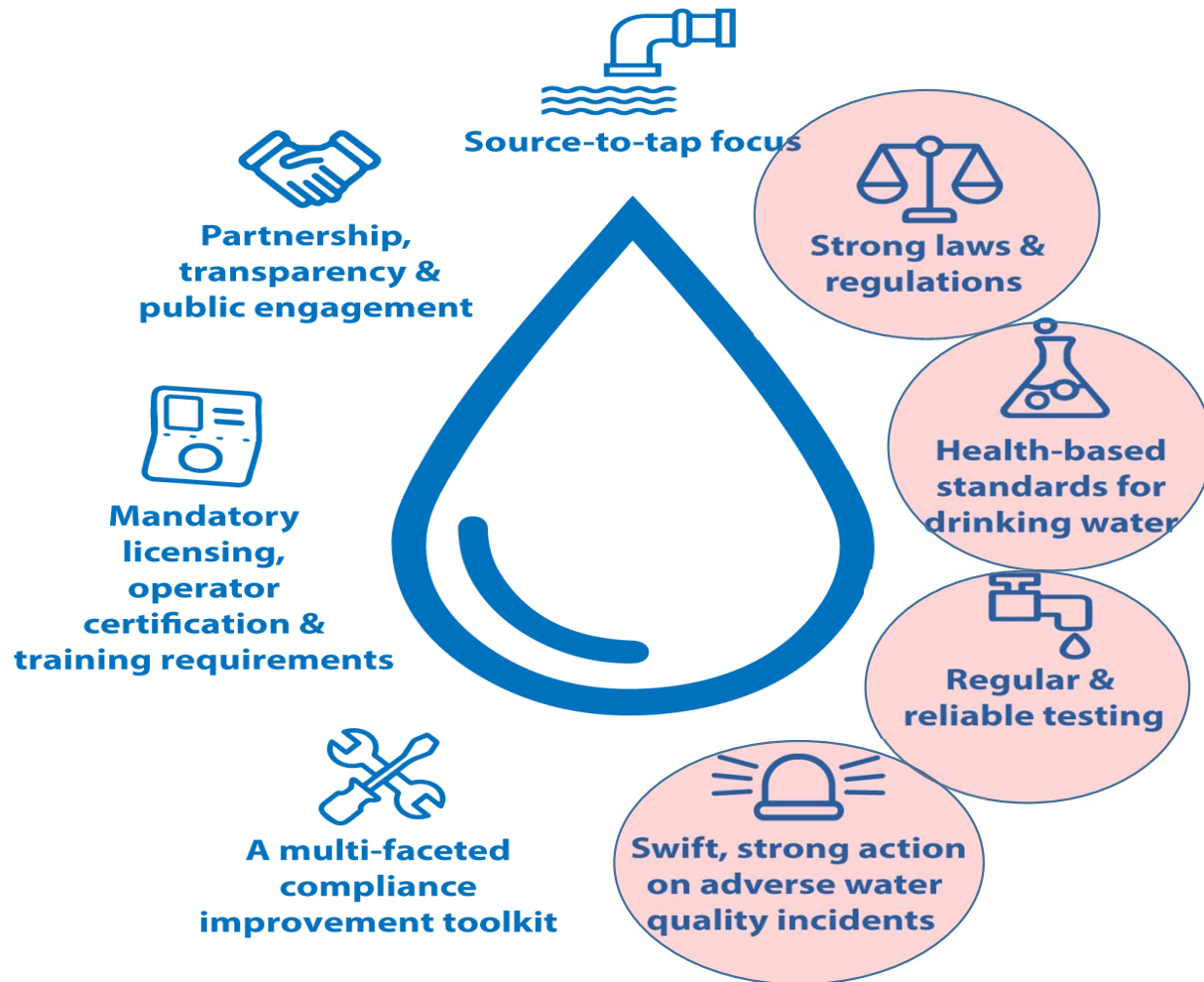
# Regulatory aspects of water

## Municipal vs. stand alone device



<https://www.testify.io/en/effective-compliance-management-in-organizations-definition-opportunities-challenges/>

# Drinking Water Quality and Enforcement



Requires more attention when dealing on AWGs



# Energy consumption



<https://repositorio.cebras.com/2021/03/24/achilles-heel/>

B. Gido et al. / Atmospheric Research 182 (2016) 156–162

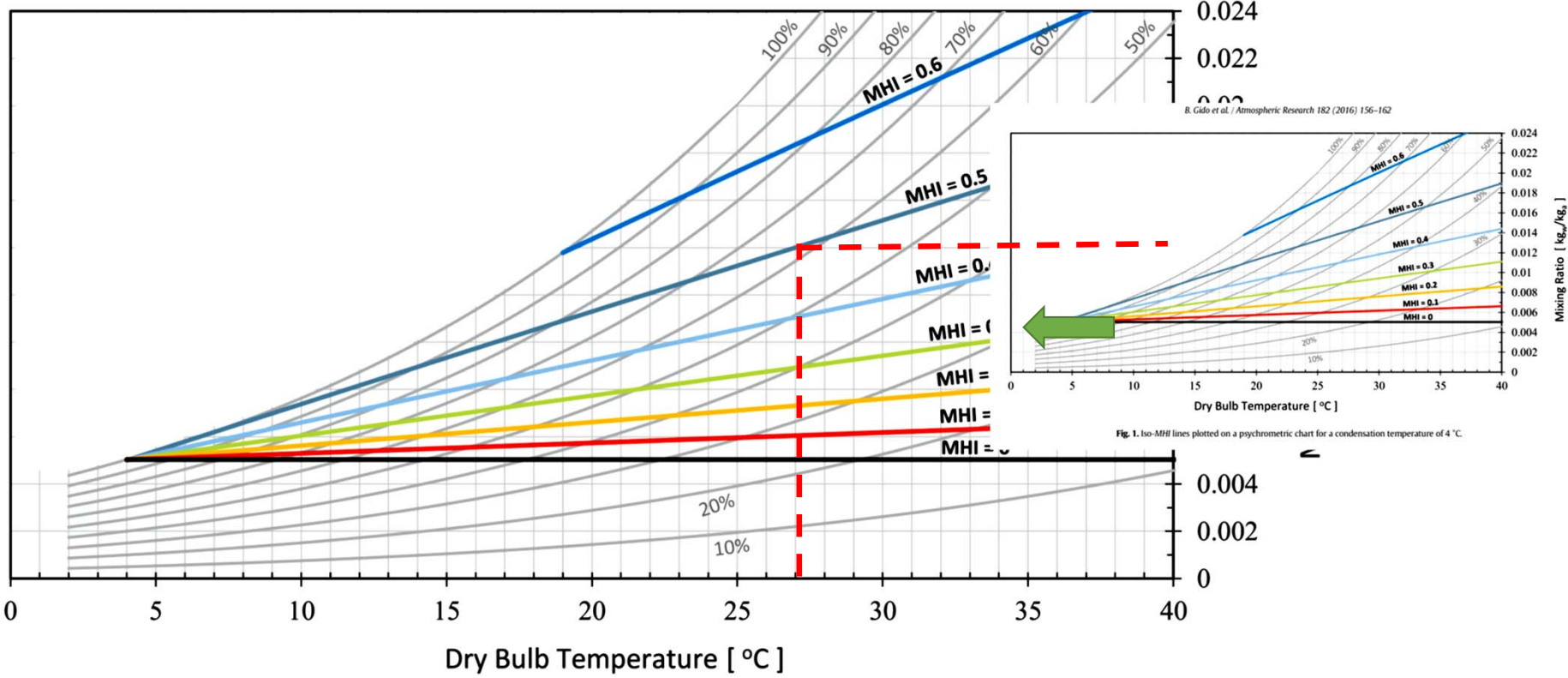
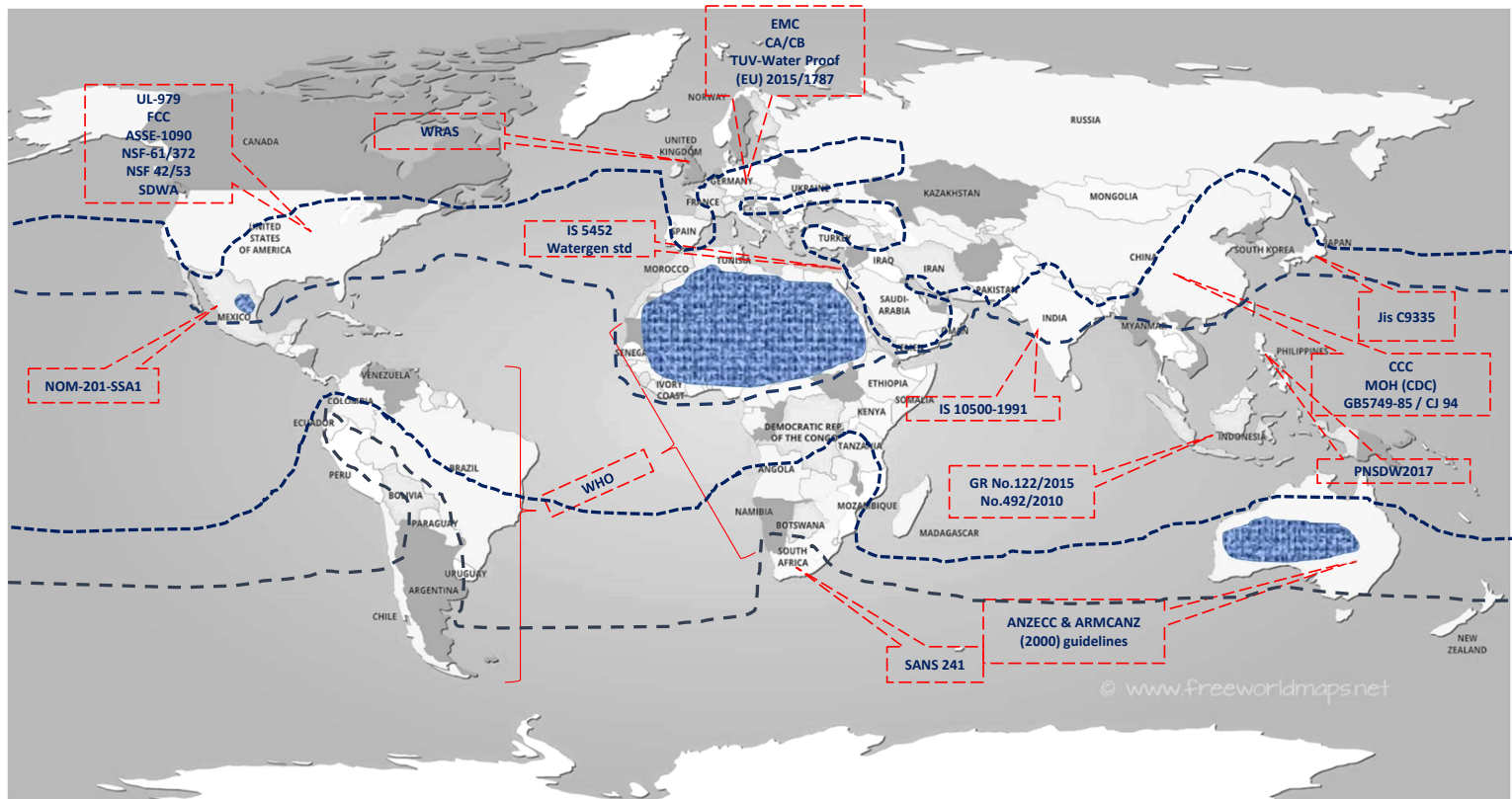


Fig. 1. Iso-MHI lines plotted on a psychrometric chart for a condensation temperature of 4 °C.

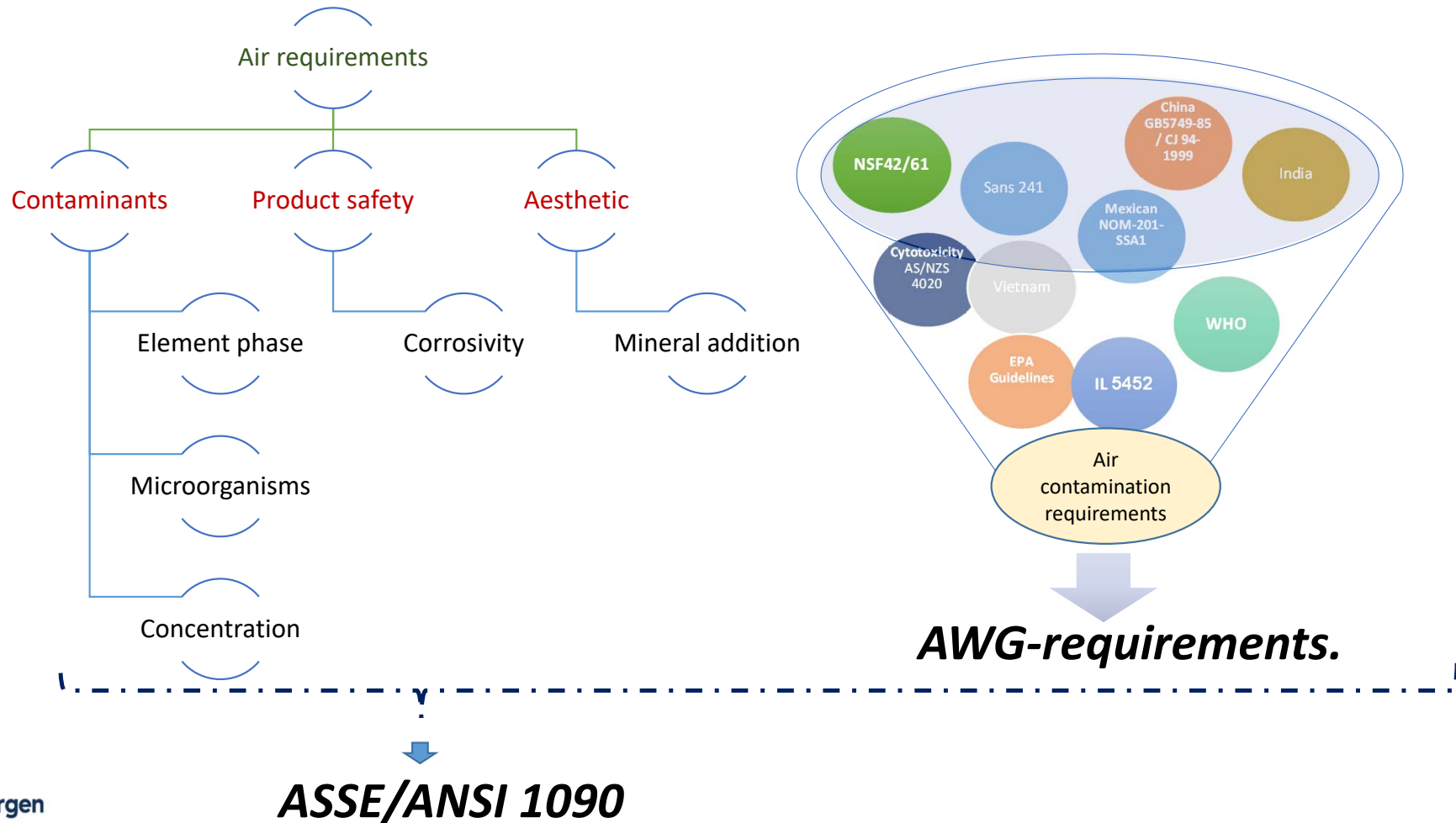
Moisture Harvesting Index (MHI)

## Certification and air production location-based



July limits for 67% of rated capacity  
 Jan limits for 67% of rated capacity  
 Too arid

# Watergen adjusts global SPEC's for testing water quality, in to one stringent standard





ASSE/ANSI 1090

## ASSE/ANSI 1090 Std. AWG 1<sup>st</sup> standard

- **AHAM DH-1-2008, Dehumidifiers**
- ASSE 1087-2018, *Performance Requirements for Commercial and Food Service Water Treatment Equipment Utilizing Drinking water*
- IAPMO PS 65-2019, *Air gap Units for Water Conditioning Installation*
- **NSF/ANSI 14-2018, Plastics Piping System Components and Related Materials**
- NSF/ANSI 42-2016, *Drinking Water Treatment Units – Aesthetic Effects*
- NSF/ANSI 53-2016, *Drinking water Treatment Units – Health Effects*
- **NSF/ANSI 55-2016, Ultraviolet Microbiological Water Treatment Systems**
- NSF/ANSI 58-2016, *Reverse Osmosis Drinking Water Treatment Systems*
- NSF/ANSI 60-2016, *Drinking Water Treatment Chemicals – Health Effects*
- **NSF/ANSI/CAN 61-2017, Drinking Water System Components – Health Effects**
- **NSF/ANSI 372-2016, Drinking Water System Components – Lead Content**
- NSF/ANSI/CAN 600-2018, *Health Effects Evaluation and Criteria for Chemicals in Drinking Water*
- UL 969-2017, *Marking and Labeling Systems*
- **US EPA Guide Standard and protocol for Testing Microbiological Water Purifiers, Revised April 1987**

# Values to consider in embedding AWG in automotive

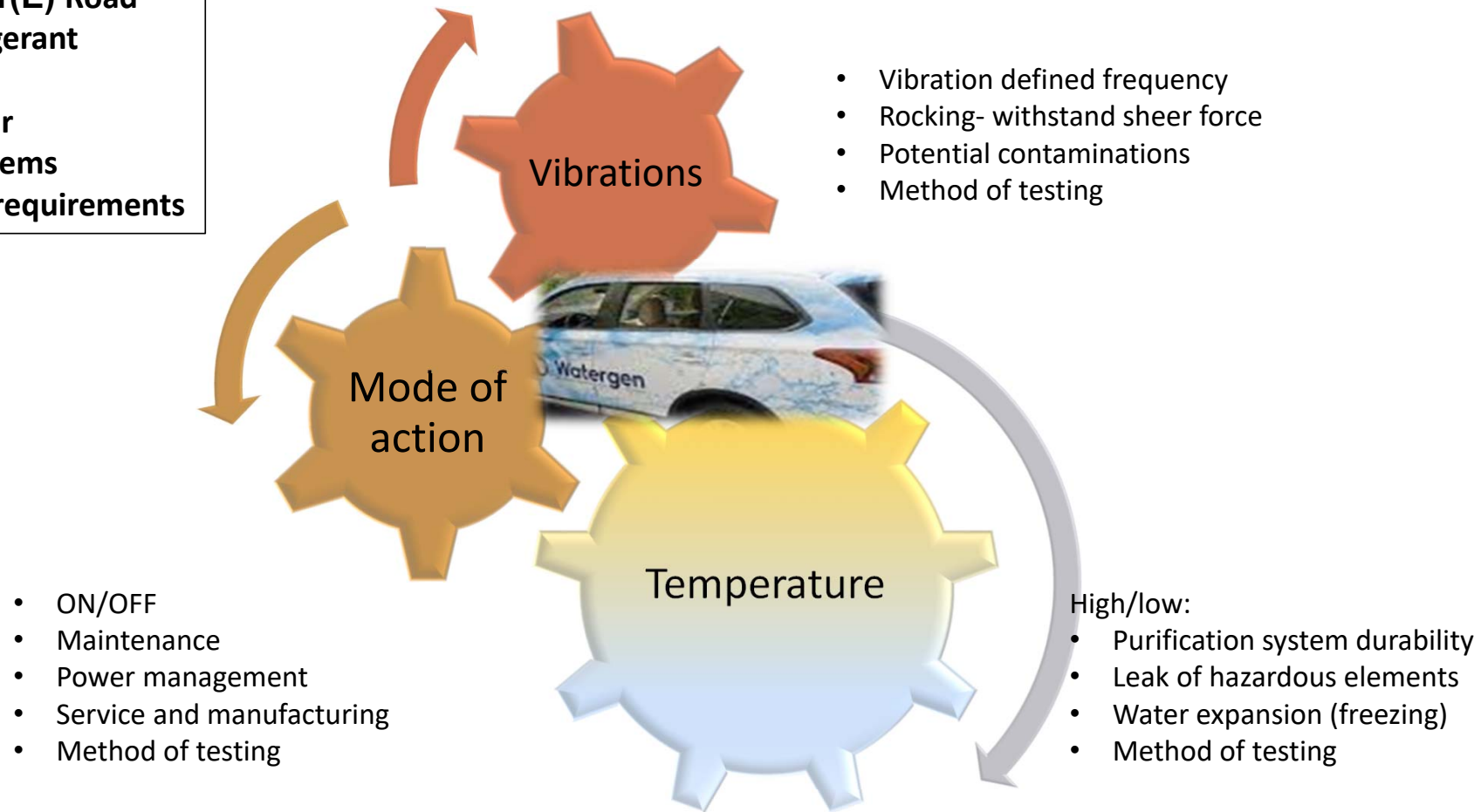


<https://www.dreamstime.com/stock-photos-rock-car-technology-wheels-image3511183>



# *AWG water-related adaptations required in the Automotive world*

**ISO 13043:2011(E) Road vehicles — Refrigerant systems used in mobile air conditioning systems (MAC) — Safety requirements**



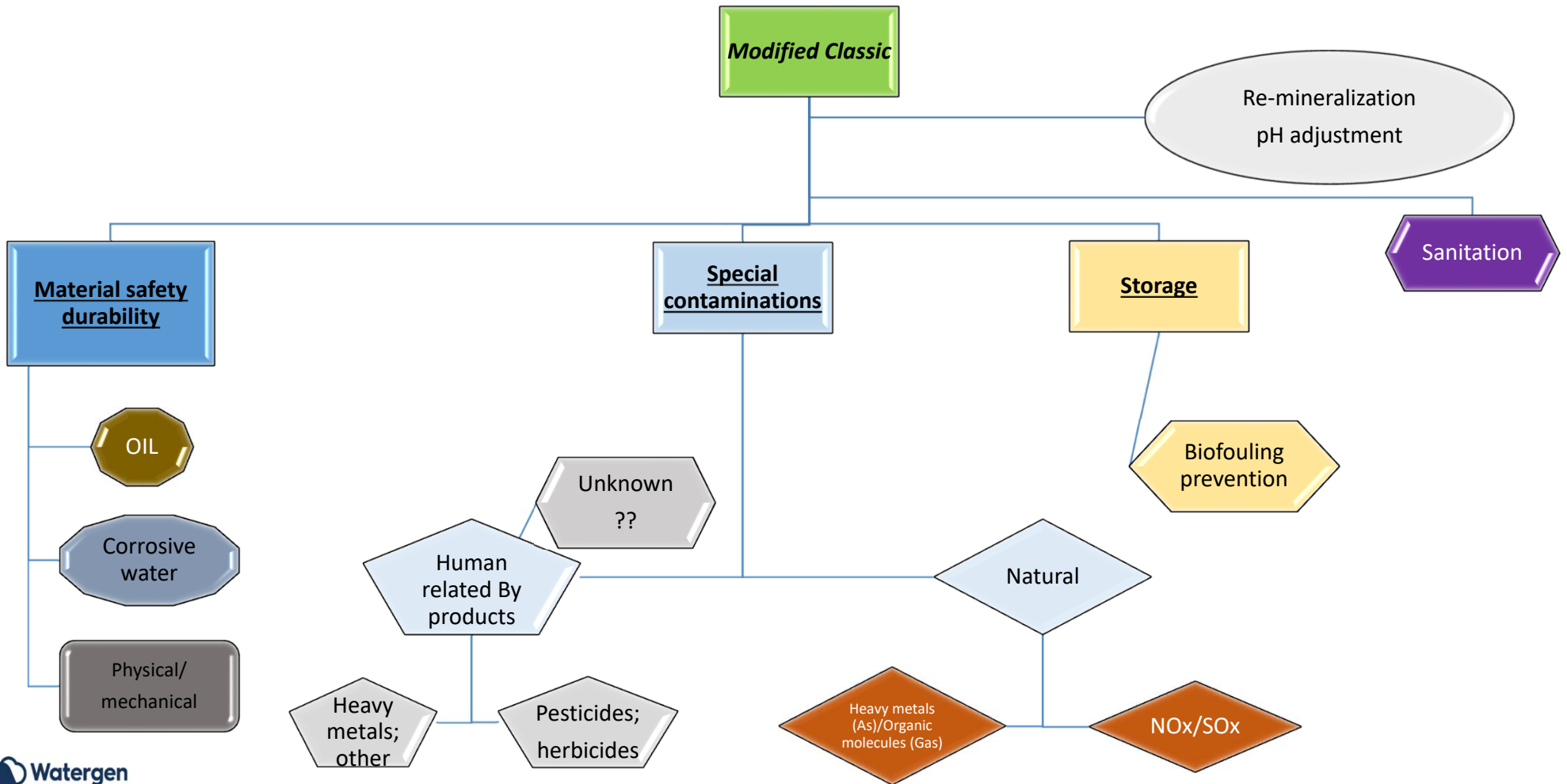
# *Water system adaptations*



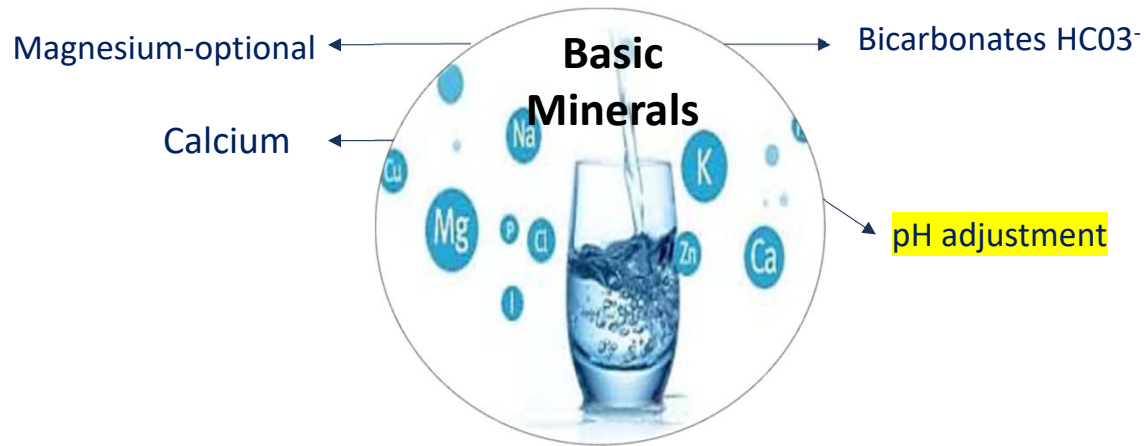
<https://www.istockphoto.com/photos/think-outside-the-box>

# Quality suggested outlines

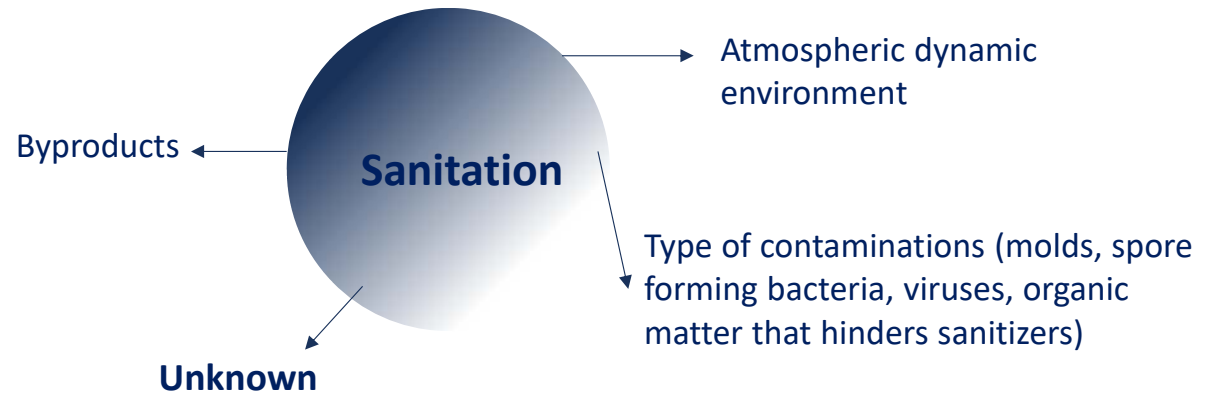
➤ safe raw materials and water parts as based on NSF 61/42/53/58 ASSE ANSI 1090 materials aesthetic and safety requirements.



# New concepts of air-water



Disinfectant	Byproduct
Chlorine	Trihalomethanes, Haloacetic acids, Haloacetonitiles
Chlorine dioxide	Chlorate, Chlorite, Chlorophenols, Quinones
Chloramine	N-nitrosodimethylamines (NMDA), Chloral hydrate
Ozone	Aldehydes, Carboxylic acids, Peroxides, Bromates & Brominated products, Quinones
UV	None
Titanium dioxide	3-methyl-2,4-hexadione, dihydro-4,5dichloro-2(3H)



# Summary

**AWG-Automotive conjugation is valuable and possible**



# Advantages of using AIR to Water

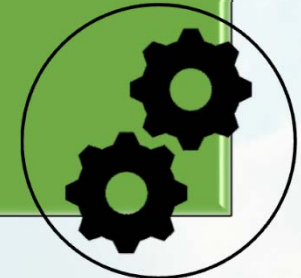
- Eco friendly
- Utilize green energy
- Unlimited & Renewable source
- Air source is cleaner

Environment



- Safe platform
- Easy to install
- Water transportation -not needed
- Infrastructure independent
- Low maintenance
- Mobile

Device





*Watergen technology is already making a big difference to people and communities around the world*



*Thank you*

