

# AQUA-Q



## AQUATRACK® & AQUA-RENOVATE™

Unlocking opportunity for safe-reuse of treated wastewater

Novel Swedish monitoring and automatic smart sampling system  
combined with novel ozone polishing system for safe re-use of water

Sudhir Chowdhury, [sudhir@aqu-q.se](mailto:sudhir@aqu-q.se) & Ulla Chowdhury, [ulla@aqu-q.se](mailto:ulla@aqu-q.se)

[www.aqua-q.se](http://www.aqua-q.se)



This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 821051.  
This project has been co-funded by Department of Biotechnology (DBT), Government of India.



# National & international co-operation partners



Confederation of Indian Industry




Teknikmarknad



**AQUATRACK®** EU ETV verified (patented) for early detection of contamination, Fingerprint & smart sampling in water.

To monitor drinking water quality, through an optical unmanned surveillance system with sampler, which gives real-time information to the operator of a treatment plant when water gets contaminated so that the operator can act pro-active.

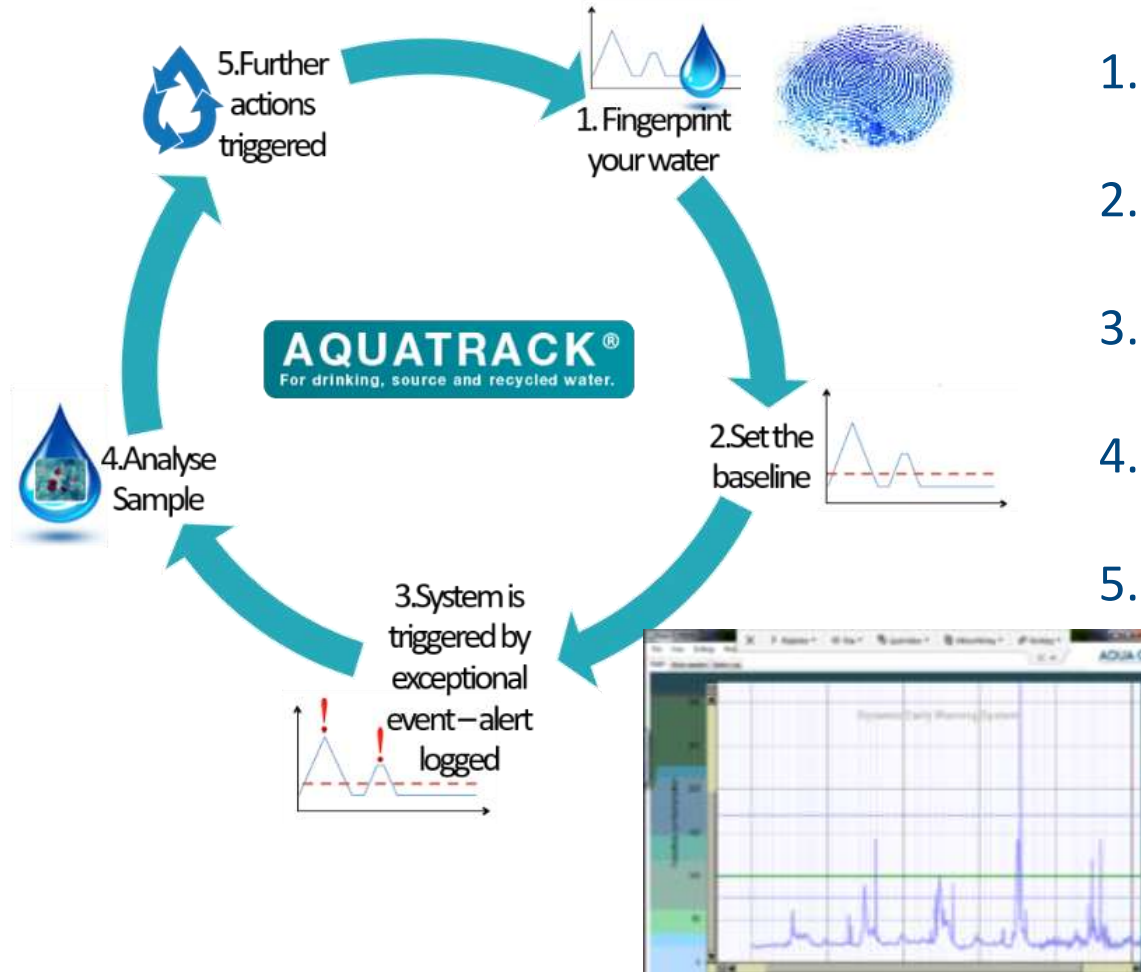
Early Warning & Sampling system for drinking water, water to hospitals, nursing homes, hotels & food industry etc.



**AQUA-RENOVATE™** novel oxidation ozone polishing process to eliminate pathogens, pharmaceutical residues & micro-contaminants in water for re-use.

Application; water for reuse, reproduction of potable water, recharging of ground water, different industrial applications like technical water etc.

# AQUATRACK® Early Warning & Sampling System Monitor & Sampling water on deviation of water quality



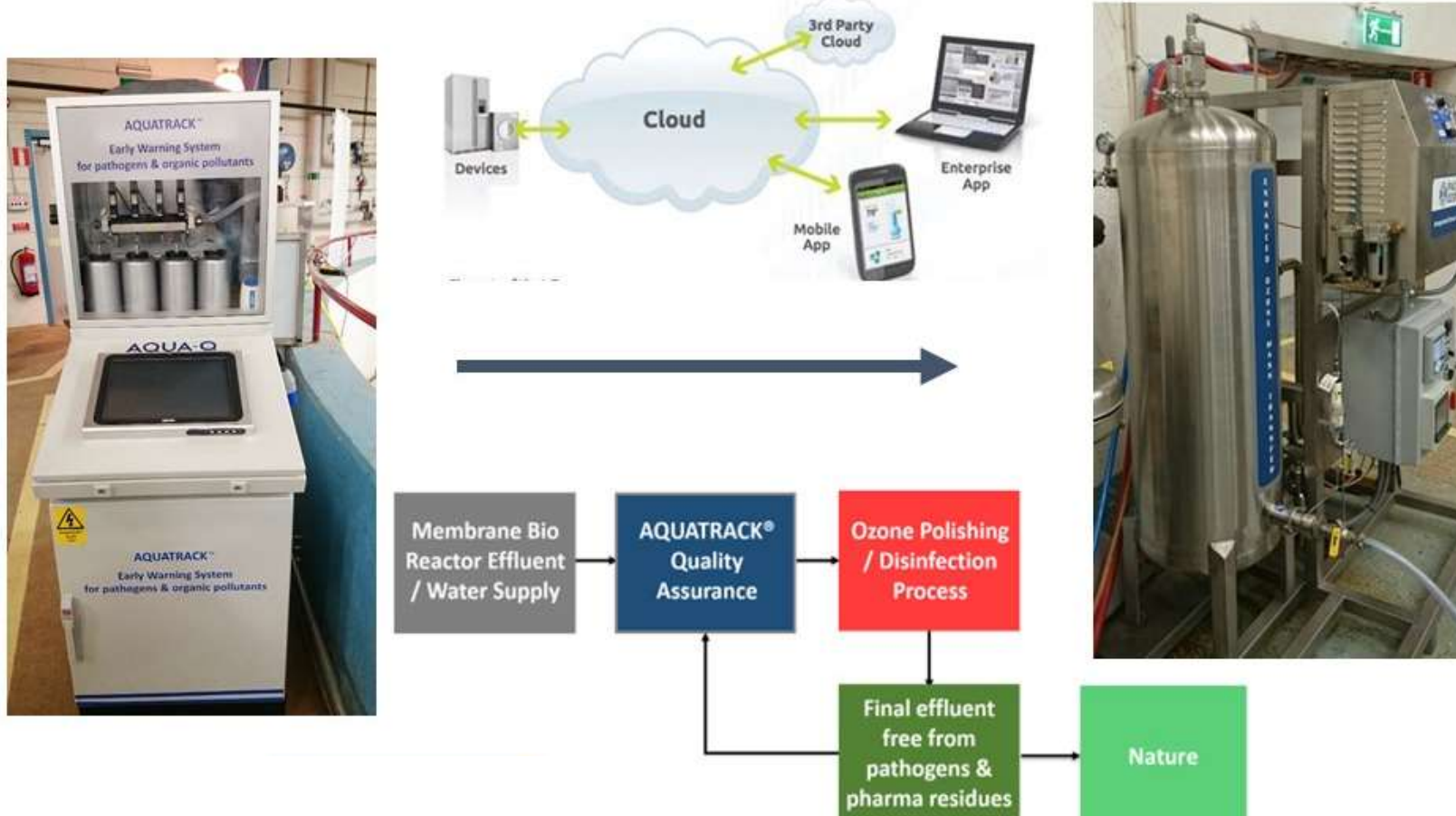
1. Connect to a side flow of the water and create a fingerprint (FP)
2. Decide highest amount of variation that will be allowed.
3. The variation will trigger the alarm and automatically take water sample.
4. The water samples are stored in a cold chamber for analyse.
5. Further action triggered.



EU ETV Verified



**USP:** Real-time Monitoring – Sampling – Removal of Pharmaceutical residues, Pathogens & Organics



## Ozon (O<sub>3</sub>) Polishing, Manual Batch Lab set-up to evaluate treatability of STP effluent in Sweden



Feed gas is oxygen from oxygen cylinder



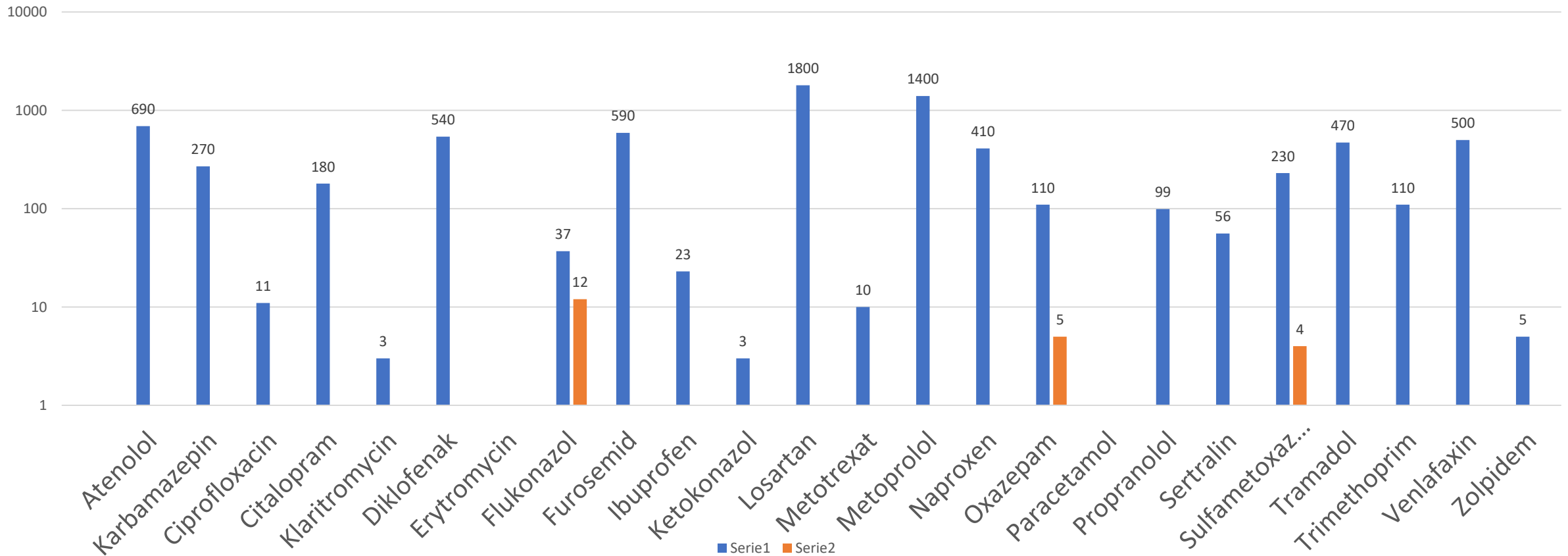
Following pharmaceutical substances were found in STP effluent ng/L before ozone polishing

| Substances     | Before O3 | After O3 |
|----------------|-----------|----------|
| Atenolol       | 690       | 0        |
| Karbamazepin   | 270       | 0        |
| Ciprofloxacin  | 11        | 0        |
| Citalopram     | 180       | 0        |
| Klaritromycin  | 3         | 0        |
| Diklofenak     | 540       | 0        |
| Erytromycin    | 0         | 0        |
| Flukonazol     | 37        | 12       |
| Furosemid      | 590       | 0        |
| Ibuprofen      | 23        | 0        |
| Ketokonazol    | 3         | 0        |
| Losartan       | 1800      | 0        |
| Metotrexat     | 10        | 0        |
| Metoprolol     | 1400      | 0        |
| Naproxen       | 410       | 0        |
| Oxazepam       | 110       | 5        |
| Paracetamol    | 0         | 0        |
| Propranolol    | 99        | 0        |
| Sertralin      | 56        | 0        |
| Sulfametoxazol | 230       | 4        |
| Tramadol       | 470       | 0        |
| Trimethoprim   | 110       | 0        |
| Venlafaxin     | 500       | 0        |
| Zolpidem       | 5         | 0        |

Method of detection:  
HPLC- MS/MS, IVLs Lab at Stockholm on  
2023-11-09, (results are ng/L)

## Pharmaceutical residues in STP effluent

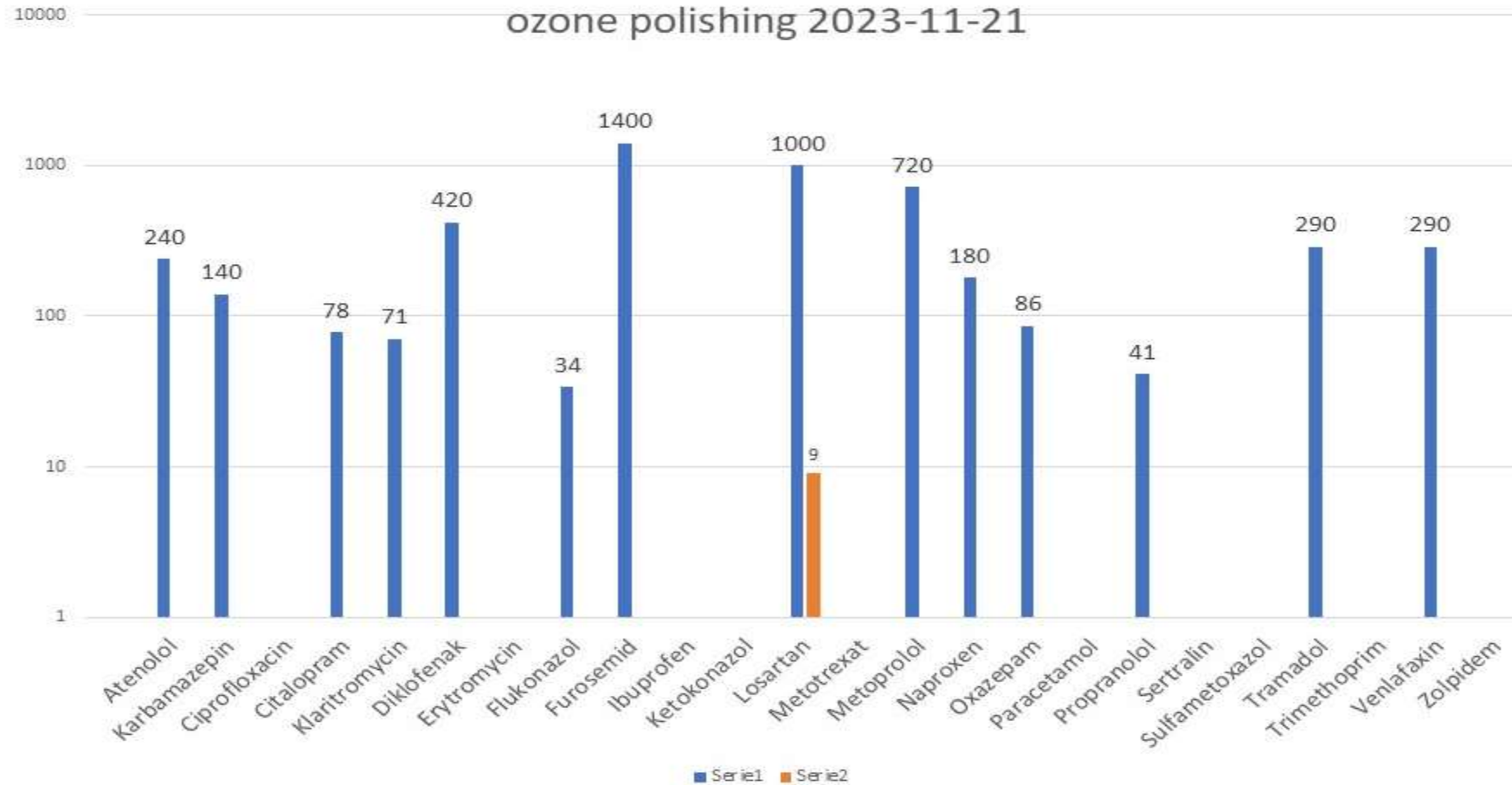
### Series 1 before ozone polishing, Series 2 after ozone polishing (ng/L) 2023-09-29





|                | Untreated | Ozone polished |
|----------------|-----------|----------------|
| Atenolol       | 240       | 0              |
| Karbamazepin   | 140       | 0              |
| Ciprofloxacin  | 0         | 0              |
| Citalopram     | 78        | 0              |
| Klaritromycin  | 71        | 0              |
| Diklofenak     | 420       | 0              |
| Erytromycin    | 0         | 0              |
| Flukonazol     | 34        | 0              |
| Furosemid      | 1400      | 0              |
| Ibuprofen      | 0         | 0              |
| Ketokonazol    | 0         | 0              |
| Losartan       | 1000      | 9              |
| Metotrexat     | 0         | 0              |
| Metoprolol     | 720       | 0              |
| Naproxen       | 180       | 0              |
| Oxazepam       | 86        | 0              |
| Paracetamol    | 0         | 0              |
| Propranolol    | 41        | 0              |
| Sertralin      | 0         | 0              |
| Sulfametoxazol | 0         | 0              |
| Tramadol       | 290       | 0              |
| Trimethoprim   | 0         | 0              |
| Venlafaxin     | 290       | 0              |
| Zolpidem       | 0         | 0              |

Pharmaceutical residues reduction in treated wastewater by ozone polishing 2023-11-21



- Real-time detection of micro-contaminants, smart sampling & correct analysing result with removal of contaminants
- Cost effective removal of pharmaceutical residues and pathogens in treated wastewater (MBR, MBBR, STP effluent)
- Energy saving & no emissions
- Modular system of different capacity with IoT
- Clean & Safe reuse of water
- Recognizing contamination in an early stage improves water quality, saves money, environment protection & reputation



**MBR effluent, Sweden**



**Irrigation Spain,**



**Drinking water, Sweden**



**MBR effluent, Spain**



**Drinking water, Sweden**



**Wastewater treatment plant, Sweden**



**Swimming pool, Sweden**

- To Seek EU/India funding for a Co-operation/Co-creation together with Vito, Teri for on-line pilot/demonstration project of Ozone polishing to reduce the load of pharmaceutical residues at Teri's Habitat centre
- Post graduate environmental oriented students from IITD will be given opportunity to work/evaluate the efficiency of ozone polishing
- On successful pilot the system it can be scaled up commercially and can be duplicated in other applications, like monitoring of MBR effluent as well as at pharmaceutical manufacturing facilities in India for reuse and improvement of environment.



## Quality controlled reuse of water is essential for global water shortage

<https://www.youtube.com/watch?v=JKtEA2TEmtw&t=2s>

Sudhir Chowdhury, [sudhir@aqu-q.se](mailto:sudhir@aqu-q.se) & Ulla Chowdhury, [ulla@aqu-q.se](mailto:ulla@aqu-q.se) - [www.aqua-q.se](http://www.aqua-q.se)

