

# SOLAR DRIVEN WATER TREATMENT FOR RURAL AREAS, BASED ON ANODIC OXIDATION

Blue Planet Water Dialogues Berlin, Nov 29<sup>th</sup>, 2017

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# AUTARC-ON GmbH Kassel

- First research started in 2003 at University of Kassel
- 2010 Spin-Off of AUTARCON GmbH (2009 funding through “exist“)
- AUTARCON currently 5.5 employees, 3 Interns and Students,...



# AUTARCON GmbH

- Drinking Water Treatment
- Online Monitoring
- Renewable Energy Supply
- Research and Development



Bundesministerium  
für Bildung  
und Forschung

HELMHOLTZ  
CENTRE FOR  
ENVIRONMENTAL  
RESEARCH - UFZ



सत्यमेव जयते



SEVENTH FRAMEWORK  
PROGRAMME

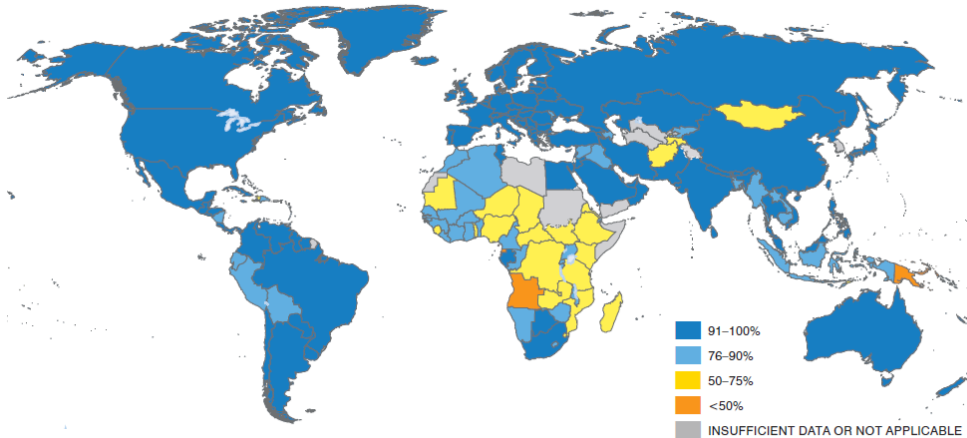


Hochschule für  
Technik und Wirtschaft  
Dresden  
University of Applied Sciences

Fraunhofer  
ISE



# Initial question for our Product



The populations without access to safe drinking water are mainly in Sub-Saharan Africa and Asia\*\*:

<b>Sub-Saharan Africa</b>	<b>319 Mio</b>
Southern Asia	134 Mio
Eastern Asia	65 Mio
Southeastern Asia	61 Mio
All other Regions	<u>84 Mio</u>
	<b>663 Mio</b>

Ref.: WHO / Unicef Joint Monitoring Program „JMP Update Report 2015 English“

“Der sicheren Abtötung pathogener Keime ist oberste Priorität in der Wasseraufbereitung einzuräumen.” WHO 2010

- 79 % without access to “improved” drinking water live in rural areas
- 93 % of the population drink surface water

# Priorities in off-grid drinking water supply

“Pathogen removal is of most important concern to assure safe drinking water conditions”

WHO 2010

Legal Limits            **0**            CFU/100 ml E.Coli  
                                  **0**            CFU/100 ml Thermotol. coliform

Deaths due to pathogens worldwide:    ~ 3.800.000 per year/a

Minimal infection dose	Colonies [CFU/100 ml]	Reduction [%]	Reduction [Log]	Technologies
Samonellen ssp.	1.000.000	0%	0,0	
	500.000	50%	0,3	
	100.000	90%	1,0	Sandfilter
	50.000	95%	1,3	
	10.000	99%	2,0	Micro Filtration
Cholera	1.000	99,9%	3,0	SoDis
E. coli O157:H7	100	99,99%	4,0	UF/UV/Chlorination
Cryptosporidia	10	99,999%	5,0	
	1	99,9999%	6,0	RO / Memdis
	0	99,99999%	~7,0	Boiling



Fotos: GhHeadlines, sott.net

# Legislative requirements for drinking water supply

Chlorine assures residual disinfection (required for any technology)

Parameter	WHO (2008, water for distrib.)	Vietnam (QCVN02- 2009/BYT)	Thailand (National Standard for DW-Quality)	Malaysia (National Standard for DW-Quality)	Egypt Decree MOHP 108/1995
Residual Chlorine	min 0.5 mg/L	min. 0.3 mg/L-0.5	min. 0,5 mg/L max. 2,5 mg/L	not less than 1.0 mg/L	up to 5 mg/L



# Chlorination in rural Brasil & India



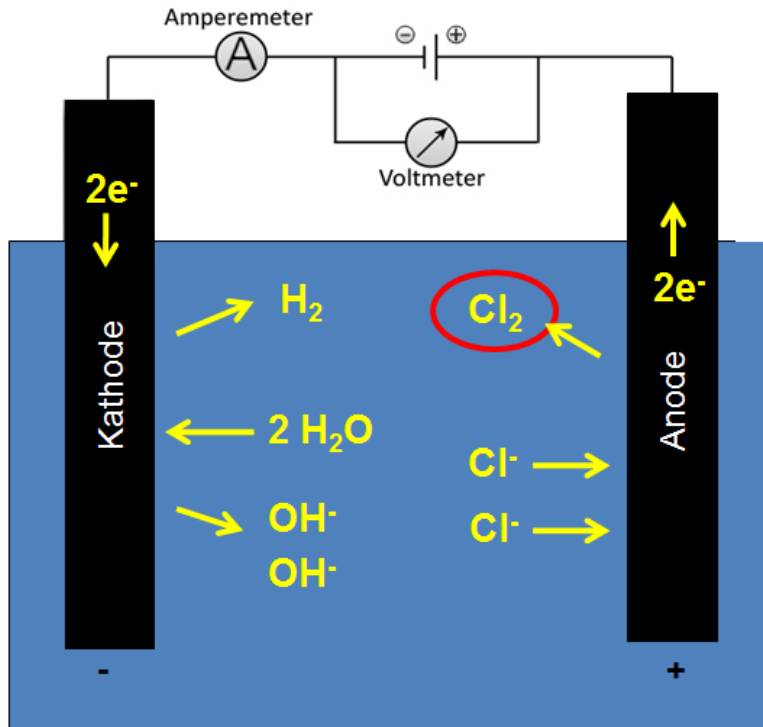
# Water Supply Scheme in India



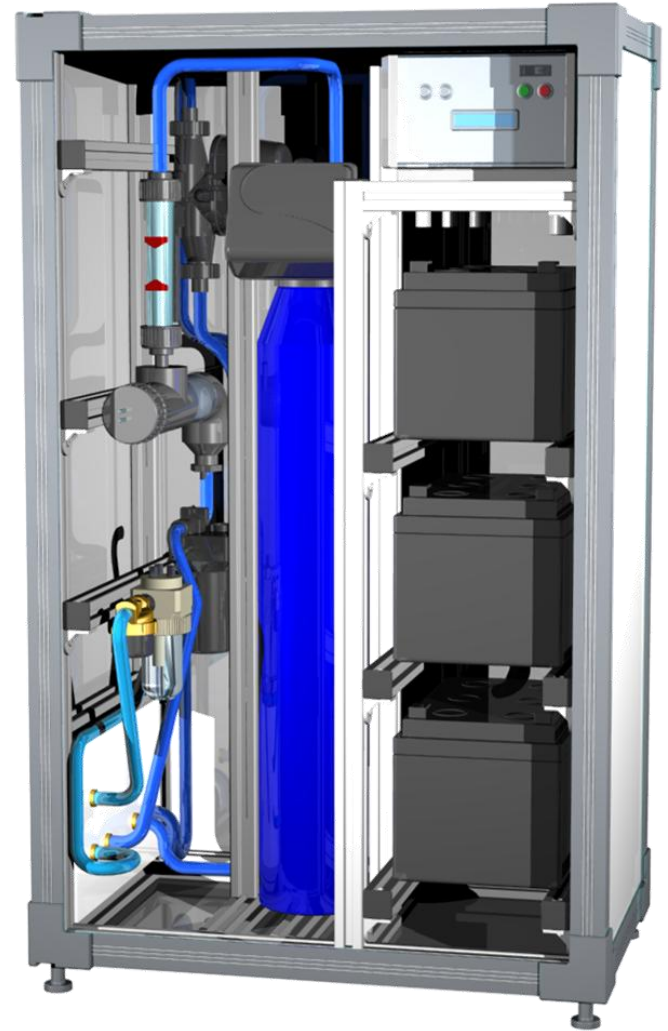
# Water Disinfection Scheme – Uttarakhand India



# Chlorine production with Anodic Oxidation (AO)

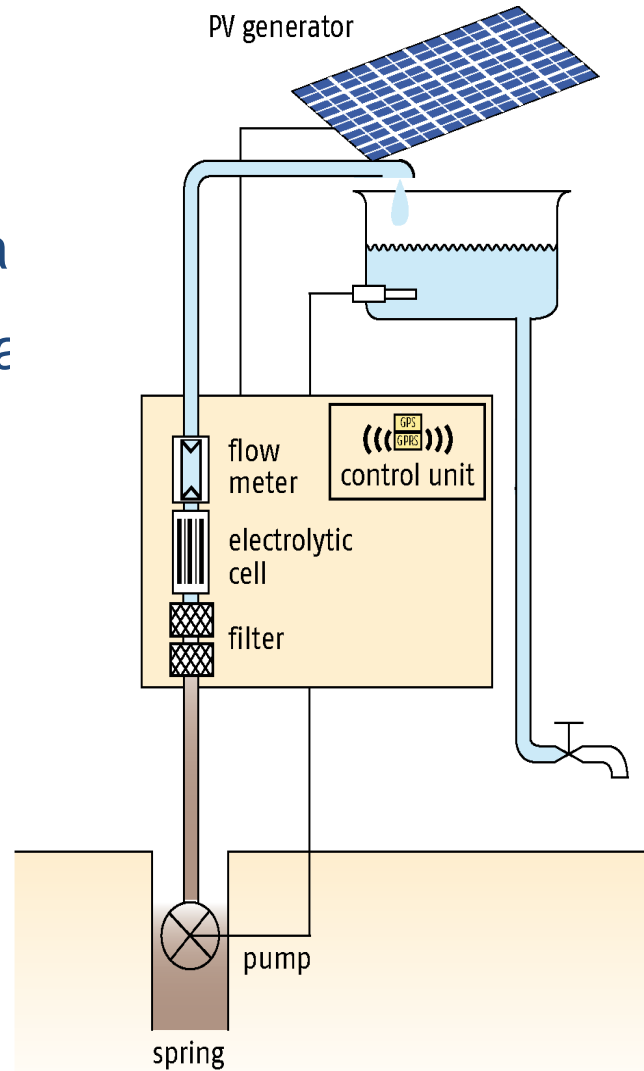
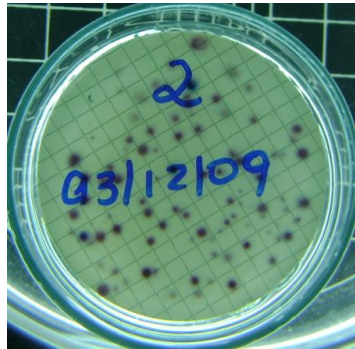


- Natural mineral content of water is sufficient
  - Reliable disinfection without any chemicals
- New robust solution for remote regions



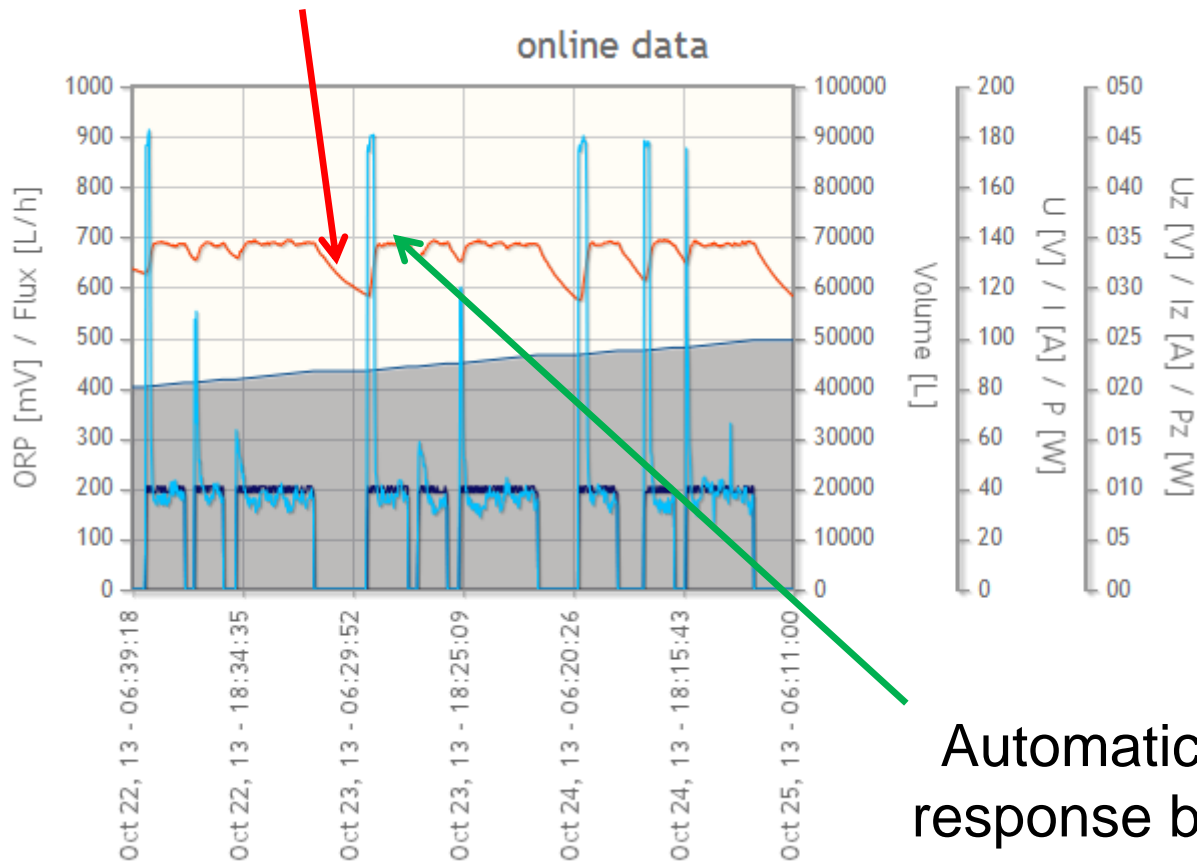
# Our solution – SuMeWa|SYSTEM

1. Chemical free residual Chlorination
2. Online control of water qua
3. Easy to operate and mainta



# System performance and Water Quality Control

## Drop of water quality



Automatic  
response by  
system

[Link to online monitoring in Costa Rica](#)

# Transportation



# Delhi, Gambia, Brazil



# Problems in Pilotprojekt in Pakistan



# Development at KasselWasser



# Examples AUC RISE Egypt



# SuMeWa|IRON



# 15 (+1) Stations in Egypt



# Stations in Nepal



# AUTARCON Awards

# IKU

Der Innovationspreis für  
Klima und Umwelt 2013



## CLEAN TECH MEDIA AWARD



**ENERGY GLOBE**  
The world award for sustainability



**promotion**  
Nordhessen

365 Landmarks in  
the Land of Ideas



# Business Generation in Egypt



# Prepaid Public Water Tap



# Business Generation in Egypt



# Drinking water treatment – Arsenic

Long term exposure causes cancerogenic diseases and death

People Affected

Bangladesh: 30 million

Worldwide: < 100 million

Deaths due to arsenic contamination:

Bangladesh: ~ 20.000 per Annum

Worldwide: ~ 100.000 per Annum

Limits

**50** µg/L

**10** µg/L

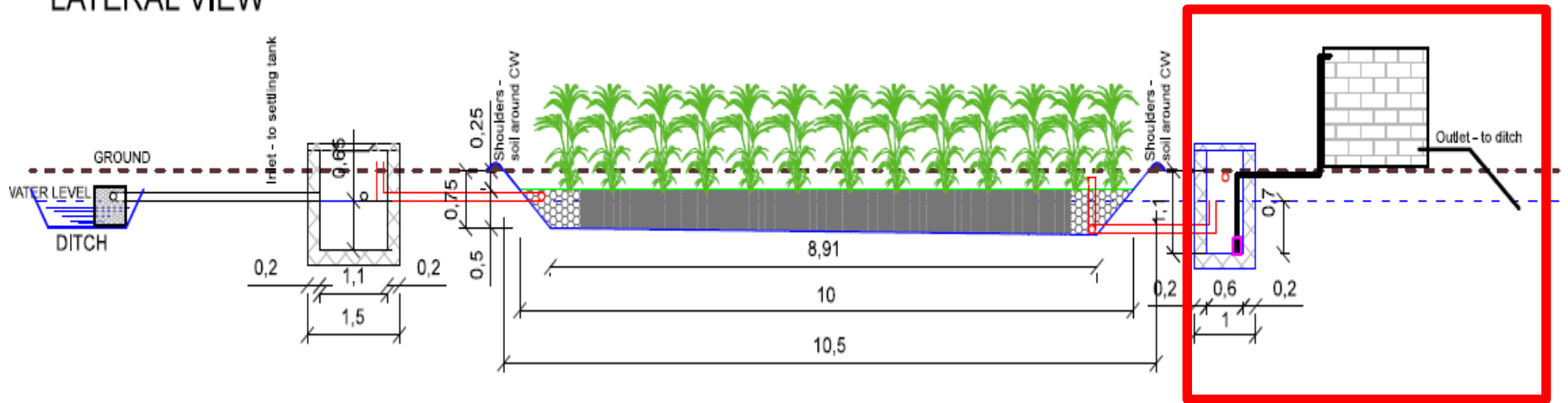
Switzerland, Bangladesh, Rural India

WHO Guideline



# IGNTU, MP: gravel bed effluent polishing

## LATERAL VIEW



# Indira Gandhi National Tribal University water supply



# Thank you for your attention

