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SOLAR DRIVEN AND ENERGY EFFICIENT DRINKING WATER SUPPLY IN EGYPT'S WESTERN DESERT – TECHNOLOGY AND BUSINESS MODELS

IFAT 2018 Munich GWP Country Special MENA/Jordan Philipp Otter, AUTARCON GmbH, Kassel

WHO 2010:

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

WHO 2015:

The number of people without access to improved water source has been halfed between 1990 and 2015 to 800 Mio. people

WHO 2017:

"> 2 billion people drink water that is fecally contaminated."

Pathogens are of, top priority in drinking water treatment!

Situtation in rural developing areas Water distribution in unsecured containers Local storage in warm climate regions



Water distribution in unsecured containers

- Recontamination after source / treatment
- UV, membranes, boiling, etc. are not sufficient !

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Residual disinfectant requirements

Parameter	WHO	Vietnam	Thailand	Malaysia	India	Jordan
Residual Chlorine	≥ 0.5	min. 0.3 - 0.5	min. 0.5 max. 2.5	≥ 1.0	0.21.0	≤ 0.2 1.0



Challenges of disinfection in rural areas

- Availability
- Transport
- Correct dosing



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Chemical free water treatment
 Cl₂ + 2 H₂O ↔ HOCI + H₃O⁺ + Cl⁻

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Solar electricity supply is not a cost driving factor

- ~ 100 W for 10.000 L/d (pumping, disinfection, monitoring)
- Simple to operate with solar PV
- Additional PV for electricity supply



Online Data Monitoring

- System Performance
- Quality and quantity of treated water
- Nowadays very cost efficient

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Reliable, proven, simple (no addition of chemicals, no exchange of media required)

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- 6 log removal for pathogens,
- 99 % iron and manganese removal, > 90 % arsenic removal



Worldwide implementation

- Currently about 40 stations running up to 20 m³/d
- Developed and proven in the most remote regions

Chemical free removal of groundwater contamination
 Iron, Manganese, Arsenic, Trubidity...Fluoride



Systems to be installed in Egypt

- Village Drinking water supply in Western Desert
- Assembled and Installed in Egypt



Technology is only 10 % of the solution





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Example: Village drinking water supply

- Who is identifying and preparing the site?
- Who is investing? What is the business model?
- Who is operating, maintaining the station?
- Where does the water come from?



Pay-per-use through online prepaid water tapping
Simple to use, allows continuous income and refinancing AUTARC ON



Pay-per-use through online prepaid water tapping

- Simple and fair distribution of water
- Long term operation of drinking water infrastructures
- Online monitoring of tapped water quantity



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Local Business Development

- Water Delivery Services
- Automated Billing

Financing example – it is economic feasible Initial invest 30.000 €, 5% interest rate 1.000 €/a O&M 15.000 L/d for 1 cent/L (Local price: 1-20 ct/L) ROI: 1-2 years (through sales of water alone)

Foto: by: Tina Jas

What we are looking for!

- Project Investors,
- Project Sites

oyTina Jasl

Reliable Local Partners







Thank you very much! Visit us at IFAT: experience.science.future.: B4.138/238





Thank you very much

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Please speak to Mr. Goldmaier



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THE AMERICAN SCIENCES UNIVERSITY IN CAIRO ENGINEERIN

Research Institute for a Sustainable Environment

Third International Conference on Solar Energy Solutions for Electricity and Water Supply in Rural Areas

Renewable Energy for Clean Water and Sustainable Livelihoods

November 7th – 10th, 2018 Moataz El Alfi Hall AUC New Cairo

Sessions

- 1. International and national problems in energy and water supply for rural areas
- 2. Renewable energies for sustainable water management: The water energy food nexus
- 3. Social challenges for sustainable resource management in rural areas
- 4. Technical innovations in solar energy
- 5. Business models for renewable energy solutions
- 6. Technical innovations in solar energy for sustainable water management
- 7. Technical innovations in solar driven water treatment, water recycling and management
- Policy parameters and development goals for renewable energy and water supply
- International case study examples of community-based solutions for solar and water supply
- 10. Egyptian case study examples of community-based solutions for solar and water supply
- 11. Building and construction solutions for the sustainable supply of energy and water
- 12. Financing models and payment systems for renewable energy solutions and final discussion

Please submit a 500-word abstract, indicating the session it belongs to and stating whether you prefer a paper or poster presentation, by **August 1, 2018** to *rise@aucegypt.edu*. If accepted, a full paper will be due on **October 18, 2018**.

3rd international Conference on Solar Energy Solutions in Cairo (7-10th Nov. 2018)

