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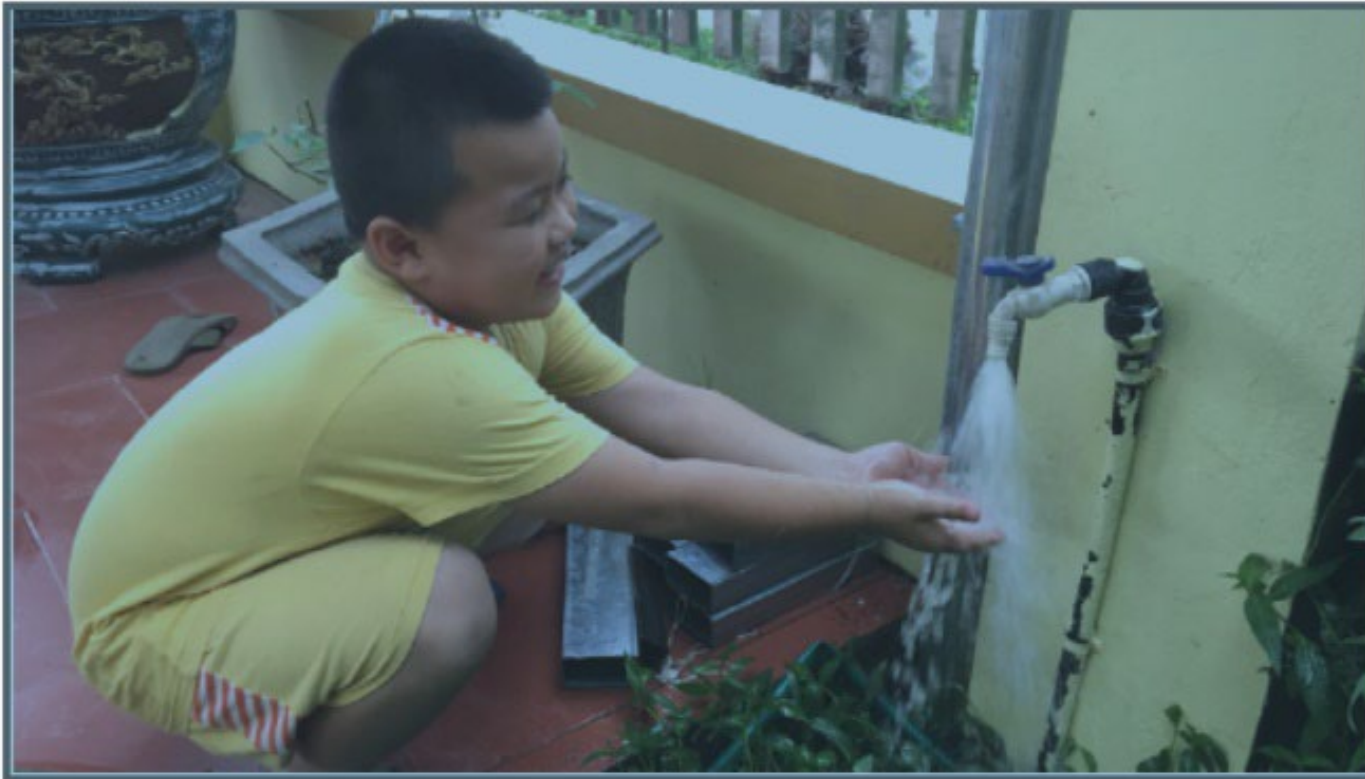
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NGÀY KHOA HỌC ĐỨC VIỆT  
26 – 27 APRIL 2023  
ĐÀ NẴNG

Keynote speech Workshop Clean Water for Rural Areas

# (Re-)Financing of Water Infrastructure

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With IDA, Vietnam has delivered sustainable water supply and sanitation services to nearly 2.2 million rural residents since 2013.



## Clean Water for Rural Areas

The main focus has been on the development of rural water systems through pipes („on-grid supply“).

The joy of a child in Quang Ninh Province playing around with water. (Photo: PforR)

## Clean Water for the people living off-grid

From ca 18 million people living in the Mekong Delta, 1 to 3 million cannot be connected to pipe systems.

Where there is no clean water source available, people have to rely on water delivered with motorbike or boat.

The price for potable water is high:

50,000 VND = 2 € per 19L canister

= 2.63 mioVND/m<sup>3</sup> = **105 €/m<sup>3</sup>** ... and the quality control is not reliable





For small, off-grid water supply various technologies, manufacturers are available



- ➔ good solutions for off-grid consumers if raw water quality and availability is consistent
- ➔ **Unfortunately, raw water conditions can be more difficult in VN, like in the Mekong Delta**



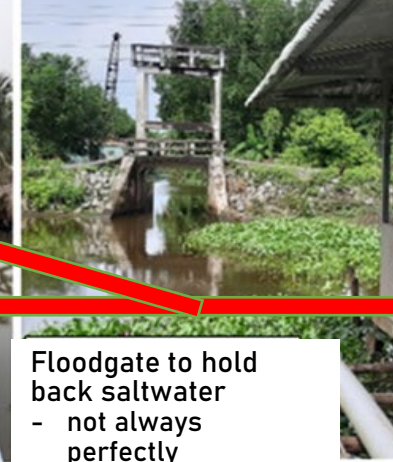
# Some photos from the Mekong Delta



Boats to transport people and goods



Pathway or bridges too small for trucks



Floodgate to hold back saltwater  
- not always perfectly



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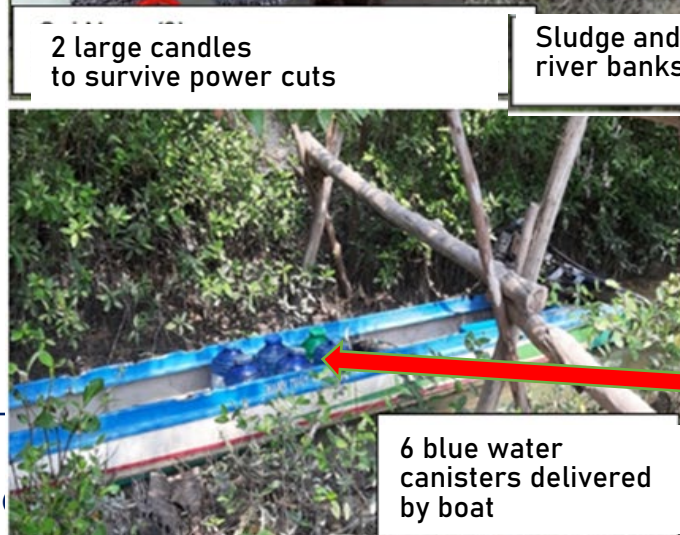
2 large candles to survive power cuts



Sludge and waste at the river banks



Poster to advertise pesticides against floating weeds



6 blue water canisters delivered by boat



Rainwater collection with plastic sheets and clay storage tanks

Off-grid water plants must be

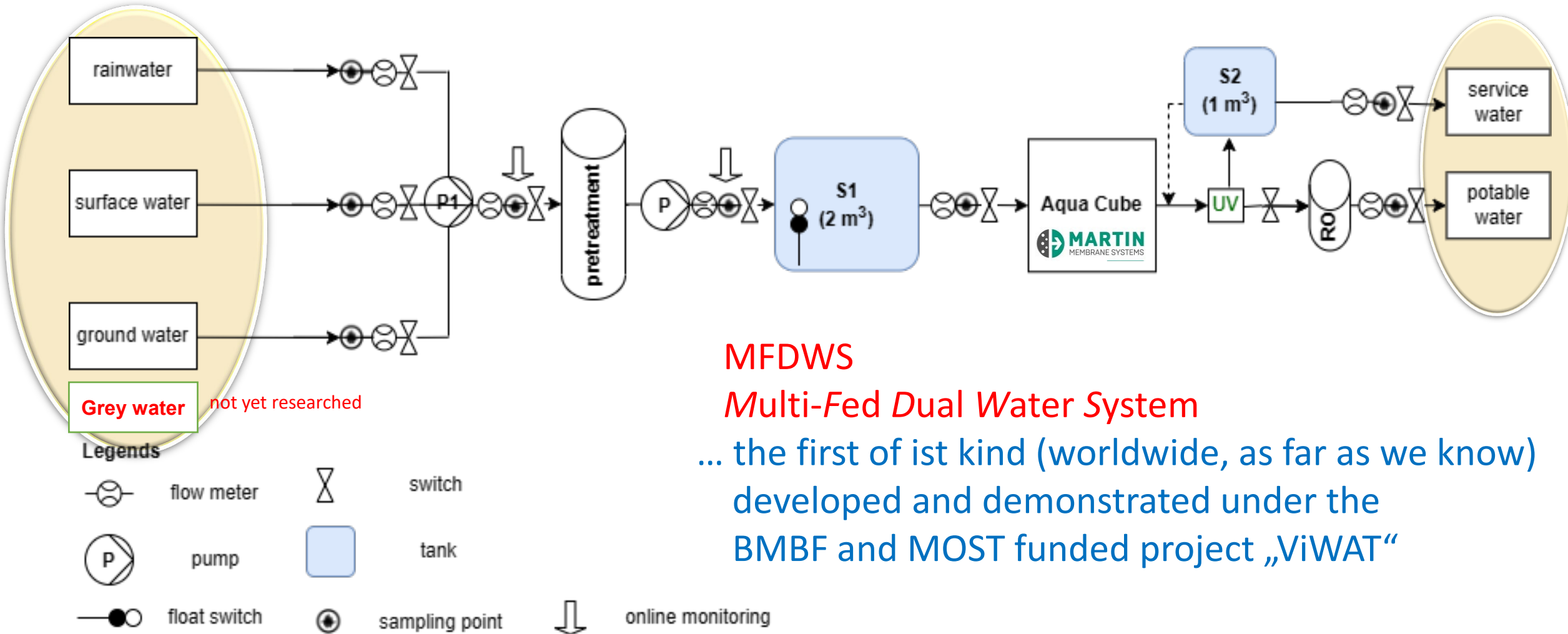
- built as small units or on racks, which can be **carried by hands**

- flexible to **purify different raw waters** of inconsistent qualities

- prepared for **interrupted power supply**

- be **affordable, price-competitive** to mobile water from canisters, tankers

# Process technology used and calculated for the Mini Water Works in Vietnam



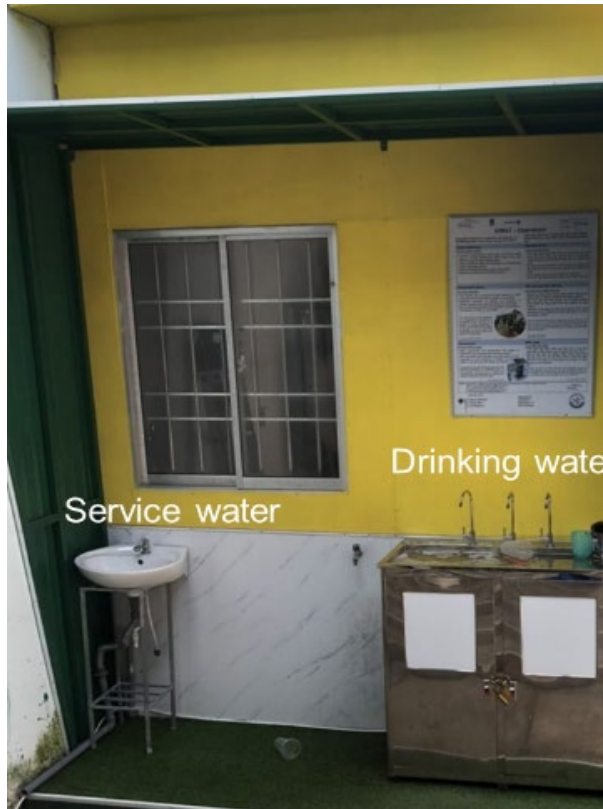
**MFDWS**

**Multi-Fed Dual Water System**

... the first of its kind (worldwide, as far as we know)  
developed and demonstrated under the  
BMBF and MOST funded project „ViWAT“

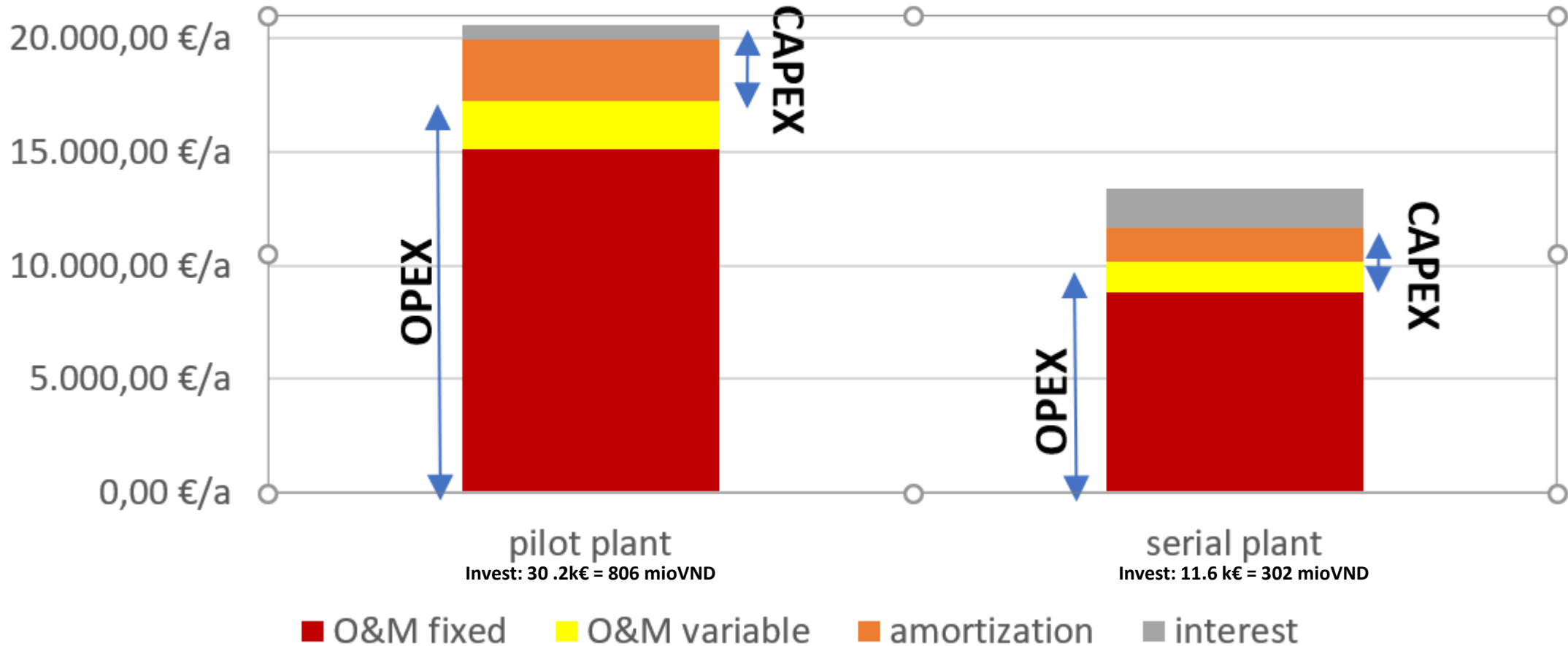


# The input data for the financial calculations are from the pilot plants as built and operated



# Annual water production costs

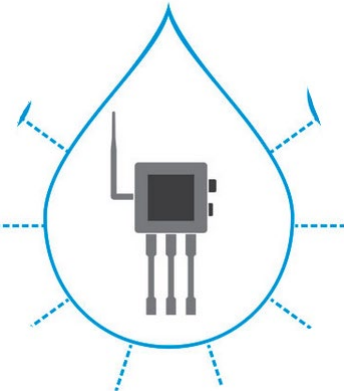
(baseline for 75% capacity used and 83 L/pers/d)





80%

Maintenance

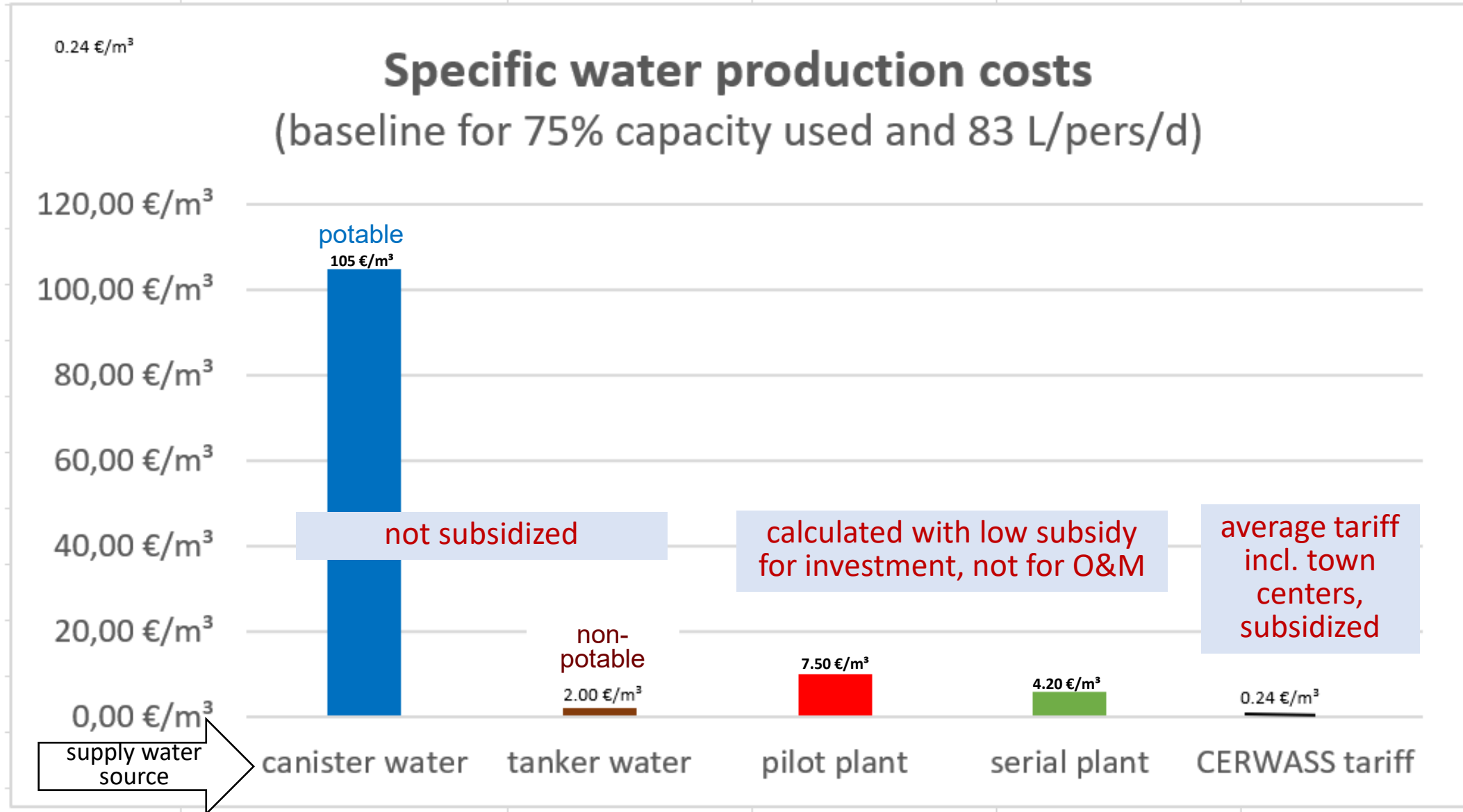


- - Electricity (not for own solar power)
- - Chemicals (NaClO)
- - Turbidity standard Formazin
- - Own personnel
- - Service Maintenance, cleaning, repairs
- - Annual monitoring
- - ***Plant management assistance (through extended plant functional guarantees, like water business franchise, the German “certified chimney cleaner model” or similar) (inevitable for sustainable performance of hightech components and durable lifetime of the plant)***
- - Security services (if the mini water plant is located on its own site)
- - Spare parts for Aqua Cube (pieces)
- - Pre-filter cartridge (exchange or new purchase)
- - Membranes FM10
- - Pumps + spare parts
- - Float switch
- - UV Lamp
- - E.Coli test kits
- - Waste (flat-rate environmental fee)
- - Concentrate disposal (flat-rate environmental fee)
- - Rents for land, buildings etc. (if separately invoiced)
- - Taxes (10% import tax, VAT/MWSt)
- - Ongoing permit fees and processing costs
- - Others...

## O&M costs for the Mini Water Works

### Financial explanations

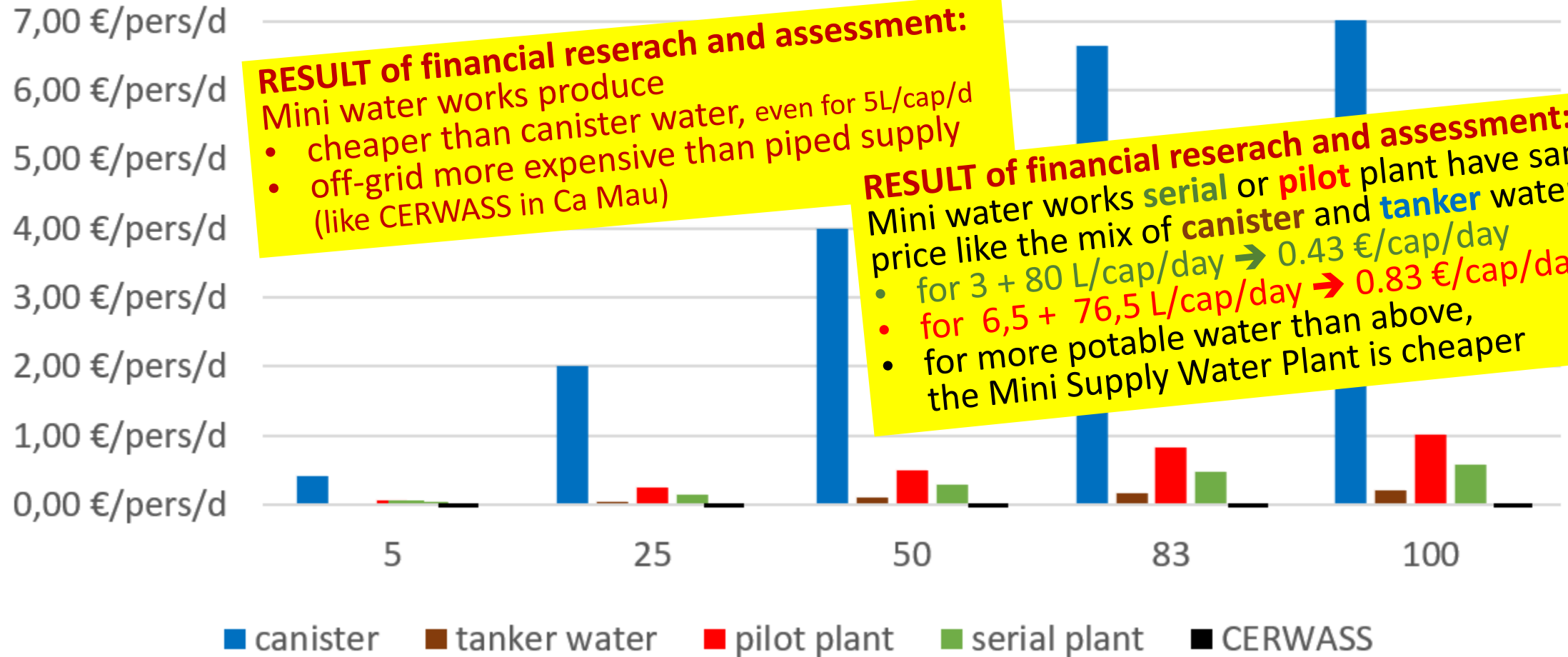
- A common average 50 % for O&M is for advanced water systems with plants AND networks
- Salesmen consultants and risk-free lenders tend to under-estimate O&M
- In Vietnam, O&M expenditures are not always sufficient.





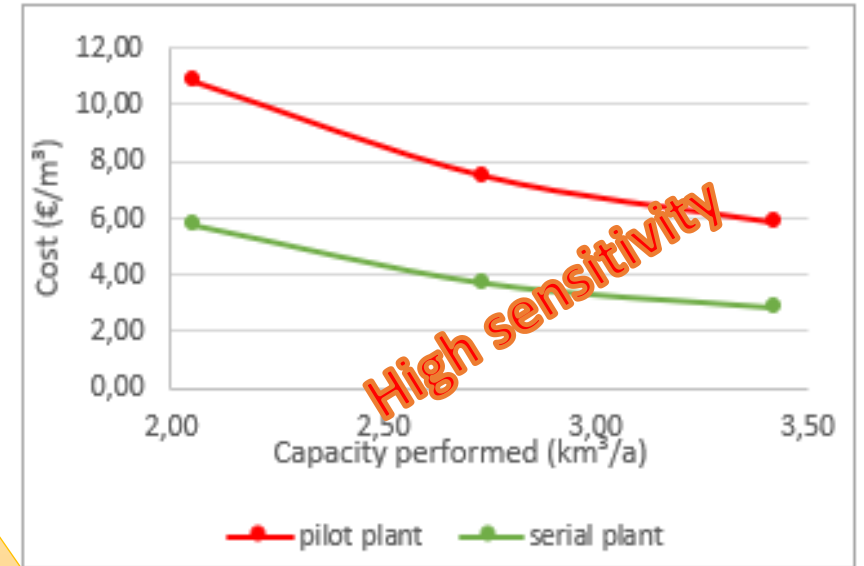
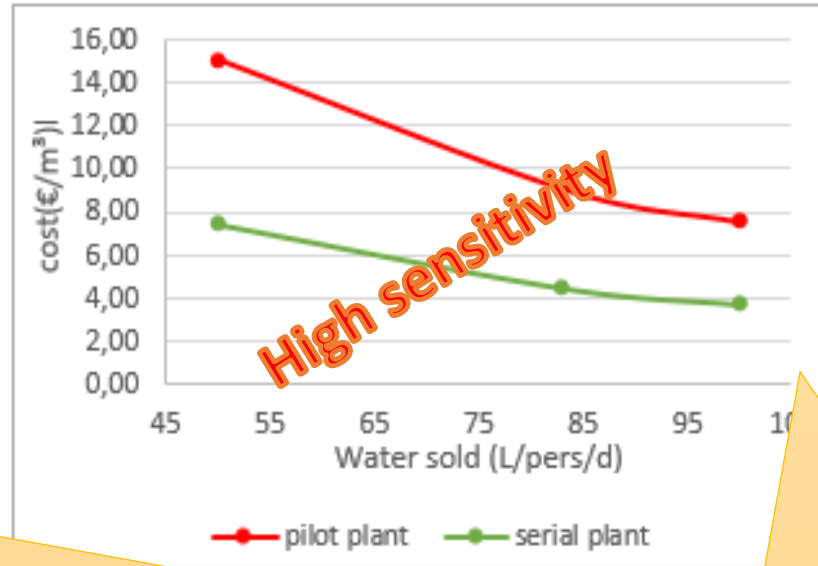
# Daily water production costs

Variations for 75% capacity used and 5 to 100 L/pers/d



## Results of the financial modelling

### Sensitivity analysis of the water production costs



Subsidies, softloans may help, but are not important for off-grid water supply (unless including O&M).  
 The challenge is FINANCE, not RE-FINANCE (unlike piped supply).  
 The main driver of progress in off-grid rural water supply would be **to provide financial guarantees**.  
 Anyhow, the most important issue is to secure technical and business operation, O&M, with the local water users.



Final word:  
My dream  
of the news tomorrow:

Thank you for listening

Prof. Dr. mult.  
Karl Ulrich  
RUDOLPH



Considering the findings of German-Vietnamese water research, the Minister has revealed plans to provide **financial guarantees for off-grid water supply in rural areas**. „We want to leave no one behind, provided sustainable O&M of the plants is guaranteed through liable professional water companies“. As the Minister emphasized, financial guarantees are cheaper than grants which is an important advantage for the public households. However, the **rural water supply should not be disadvantaged** compared to urban water supply in terms of political support and subsidies.