

# AFFORDABLE DRINKING WATER WITH JUST THE SUN

Projects engineered and implemented by



Dr. Fechter Clean City GmbH, Germany

*in cooperation with*



SOLAR WATER  
SOLUTIONS

Solar Water Solutions Oy Ltd, Finland



# Our Mission And Vision

**WE RUN ON SOLAR, WE'RE PART OF THE SOLUTION**

Our company has solved how to turn brackish and seawater into drinking water with purely renewable energy – diving into one of the biggest problems in the world. We've grown together from an innovation to a family enterprise whose mission is to make sustainable drinking water that people can afford.



**Economic Life  
Cycle Cost Works**



**Works With  
Local Trusted  
Service Partners**



**Laboratory Tested  
Clean And Safe  
Drinking Water**



**Committed To  
Ecological  
Sustainability**



**Intelligent IoT  
Communication  
And Control**

## About FCC Energy Dr. Fechter Clean City GmbH

- As part of the Dr. Fechter Group of Companies with more than 38 years of activity in the field of environmental technologies, Dr. Fechter Clean City GmbH specializes in the developing and running of sustainable Clean Water and Waste-to-Energy projects.
- With all its experience and German engineers combined with deep knowledge about the needs in emerging regions, Dr. Fechter Clean City GmbH creates a better life and a smarter planet.



## Structure

### FCC Energy - Affordable Drinking Water Projects

- Dr. Fechter Clean City GmbH, Germany: Engineering, know-how and holding of the local operating clean water production company.
- Local Water Production Company (100% subsidiary of Dr. Fechter Clean City GmbH): Project development and operating business of clean water production.
- Local Water Distribution Company: Buyer of the production, branding, marketing and distribution of the clean water produced.
- Clean Water Technology Provider: Solar Water Solutions Oy Ltd, Finland, with over 140+ already installed and operating locations worldwide.
- Goal: To provide clean water production and social water supply generating social, environmental and economic benefits.



Dr. Fechter GmbH

## **WE PROVIDE THE SUSTAINABLE SOLUTION.**

Engineering center for energy and process engineering  
as well as environmental management.

# ABOUT US

The focus of our engineering center is in the field of energy and process engineering. We plan and monitor process engineering systems, e.g. gas and water purification as well as for suspension dewatering.

We follow water remediation measures according to HOAI in service phases 1 to 9.

With the help of our technical center, we are able to determine the process data experimentally, with which the planned process or the production plant that is supposed to be built can be designed.

## Solar Water Solutions

- Solar Water Solutions makes clean water with solar power. Affordable and sustainable desalination can revolutionize economies in the developing world and in the water-thirsty regions globally.
- **REVERSE OSMOSIS WITHOUT BATTERIES**
- Solar energy's nature is to be variable. Solar Water Solutions unique technology creates constant pressure for the reverse osmosis purification process, even when it's cloudy.
- The automatic ANVS® system (adaptive nozzle valve system) maximizes water production with optimal flow rate throughout the day. It enables you to make high-quality drinking water with solar power without any energy storage. All units can also be used with a hybrid power source.
- The patented ANVS® technology is ideal for solar-powered water production because it can maintain constant pressure even on cloudy weather. Overall, ANVS® has the lowest energy consumption of all reverse osmosis systems.



## The Advantages Of ANVS® Technology

- No batteries or energy storage needed when connected to solar
- Can be connected to grid or generator e.g., for night-time use
- Easy installation and automatic operation
- Low-maintenance, no on-site adjustments
- Remote monitoring and smart control features
- Produced water meets the highest WHO quality standards
- It's modular and scalable

Solar Water Solutions has received in 2020 an environmental management system certificate ISO 14001:2015 and a quality management system certificate ISO 9001:2015.

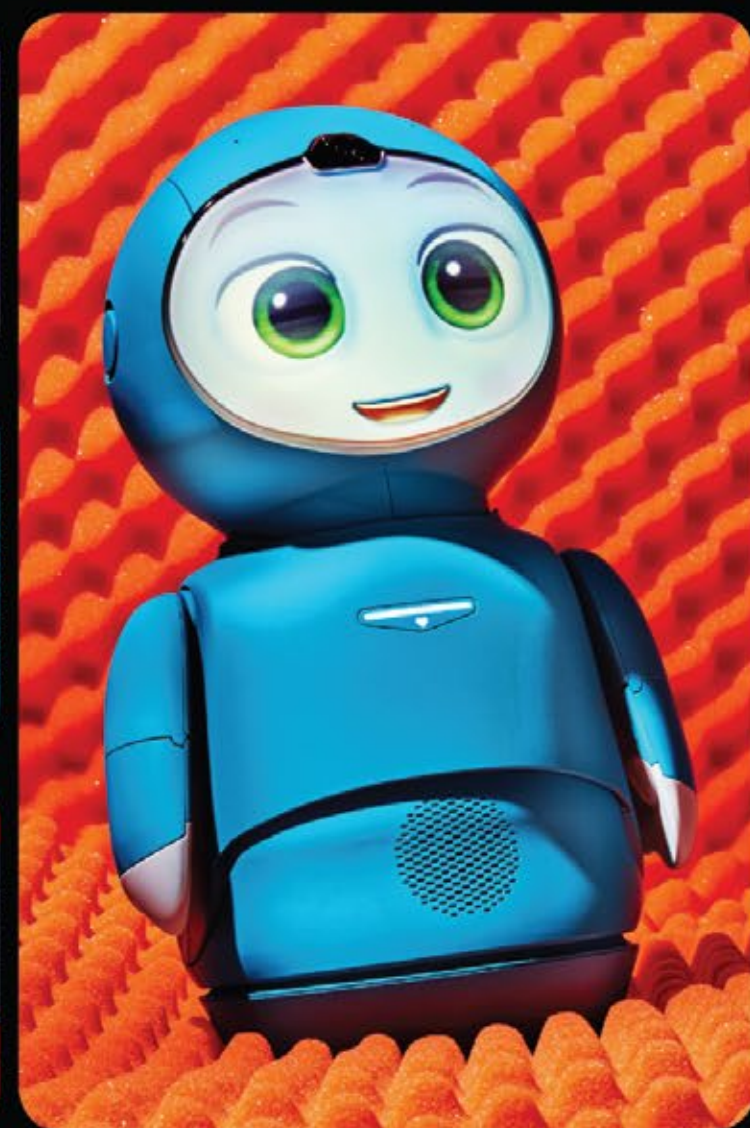


# TIME



# THE BEST INVENTIONS OF 2020

100 INNOVATIONS CHANGING HOW WE LIVE



## Solar Water Solutions awarded in TIME's 2020 Best Inventions list

The patented ANVS® (adaptive nozzle valve system) technology was selected as a special mention in TIME's Best Inventions of 2020.

With this recognition, we are honored to continue taking action to achieve sustainable development goals by 2030.

ANVS® technology is the heart of our water purification system, enabling the most energy-efficient way to produce clean water with just the sun.

## Solar Water Solutions Sea Water Products

The performance of Solar Water Solutions Sea Water units has been proved in salty waters from the Atlantic to the Pacific and in the most polluted sea in the world, the Baltic Sea. With ANVS® technology and an energy recovery device, you can reduce energy consumption by 50 %. It means that you need 50 % less solar panels to make the same amount of water. Energy consumption can be as low as 1,6 kWh/m<sup>3</sup> in a 24/7 operating system.

SolarRO model name	SW 10	SW 18	SW 36	SW 100	SW 200	SW 300	SW 600
Product flow (m <sup>3</sup> /d)	10	18	36	100	200	312	600
Product flow (L/h)	420	750	1620	4200	8300	13000	25000
Feed water flow (m <sup>3</sup> /h)	12	3	6	20	25	36	74
Energy recovery % with ERD	-	-	-	60	50	50	46
Membranes	3 x 4040	6 x 4040	12 x 4040	8 x 8040	12 x 8040	18 x 8040	30 x 8040
High-pressure pump (kW)	2,2	5	8,2	9,2	18,5	30	60
Overall power consumption *	3	7	11	17	29	44	85
Approximate number of PV panels (285Wp)	16	37	60	90	153	232	420
Container (ft)	8	8	20	20	20	20	40

\* Includes seawater feed pumping



## Solar Water Solutions Brackish Water Products

Solar Water Solutions Brackish Water product line can turn any lake, river or contaminated borehole into a source of clean drinking water. The units save borehole water with a unique ANVS® recycling system that can have a recovery rate of 90%. Energy consumption is only 0,6 kWh/m<sup>3</sup> in hybrid use.

SolarRO model name	BW 7	BW 18	BW 30	BW 300	BW500
Product flow (m <sup>3</sup> /d)	7	18	29	300	500
Product flow (L/h)	300	750	1200	13000	20500
Feed water flow (m <sup>3</sup> /h) (TDS 2000 mg/L)	0,5	1,8	1,2	16,4	24
Recovery rate %	60	40	70	80*	85*
Membranes	4 x 2521	3 x 4040	6 x 4040	12 x 8040	18 x 8040
High-pressure pump (kW)	0,5	1,1	2,2	7,5	18,5
Overall power consumption** (kW)	0,9	2	3	18	35
Approximate number of PV panels (285Wp)	6	10	16	95	148
Container (ft)	-	-	8	20	20

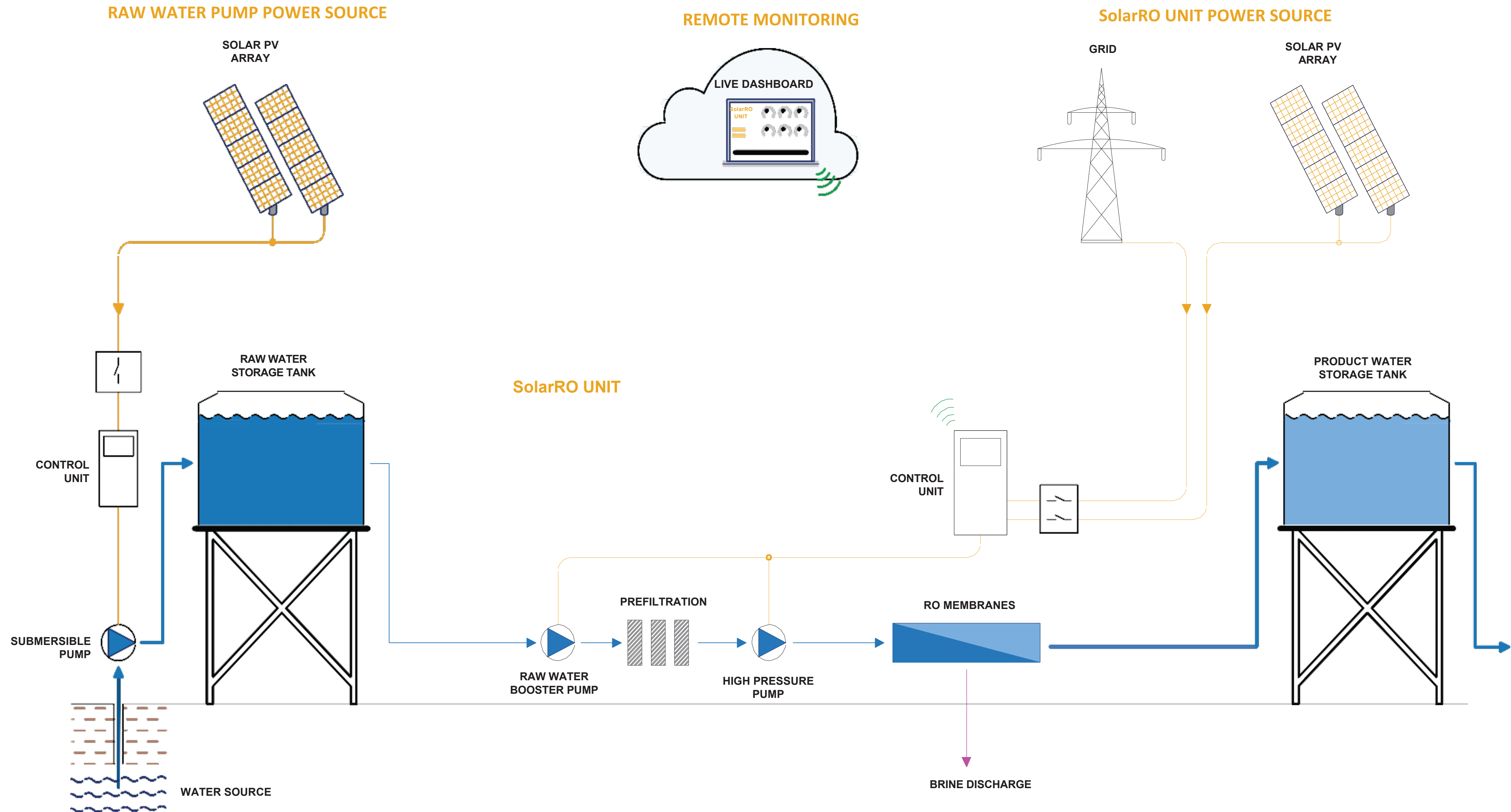
\* Hybrid with recycle

\*\* Includes raw water feed pumping





# Solar Water Solutions Sample Set-Up



# Key Benefits

1

Energy consumption and amount of PV panels reduced by 50% due to the patented mechanical ANVS® system.

2

During the daily solar hours the power is taken directly from PV panels – no batteries or energy storage are needed. During the non-solar hours, power can come from the grid or a generator.

3

Water recovery rate is greater than 90% (whereas competitors can generate only 60-70% clean water).

# Increasing Global Demand For Clean Water

A major global problem in our time is the supply of clean drinking water to the population. A significant portion of the global population often has no or only limited access to sufficient clean water. A sufficient environmentally friendly production of affordable drinking water is one of the main tasks of our time.

Example Issues and opportunities:-



**Caribbean Countries**

There are 13 countries in the Caribbean.

It is not surprising that, of the 37 countries that the World Resources Institute has identified as having “extremely high” levels of water stress, seven are from the Caribbean.



**Island Countries**

There are 47 island countries in the world. There are island countries in every part of the world, in each of the world’s oceans.



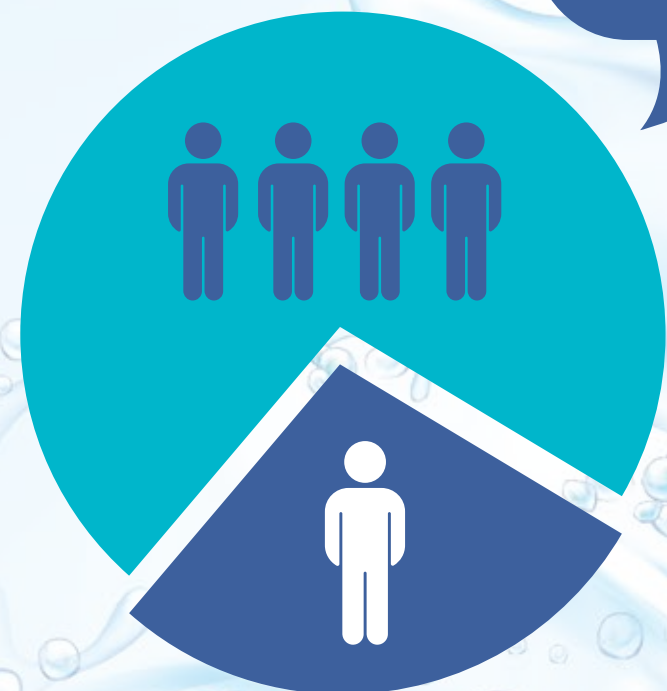
**Brackish Water Sources**

There are many Brackish water bodies like lakes and seas which are very near to the populated area.

Solar Water Solutions Brackish Product can turn any lake, river or contaminated borehole into a source of clean drinking water.

# Water Scarcity Situation Globally

**2/3 of the world's population** could face water stress by 2025



**1 in 6 people** don't have access to safe freshwater.

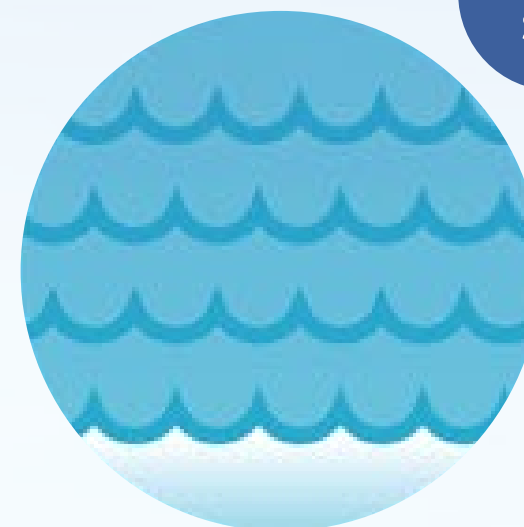


Water scarcity occurs even in areas where there is plenty of rainfall or freshwater.



Two-thirds of the global population (4 billion people) live under conditions of severe water scarcity at least one month of the year.

Half of the world's largest cities experience water scarcity.



**75%** of planet earth is covered in water



**2.5%** is fresh water

More than 10% of people worldwide consume foods irrigated by wastewater that can contain chemicals or disease-causing organisms.



## Fighting the Water Crisis in the Dominican Republic

- Long Periods Of Drought Lead To Water Scarcity And Cause Malnutrition For Many Populations.
- Women And Children Are Especially Susceptible To The Effects Of Water Scarcity And Uncleanliness.
- Diarrhea Causes Half The Deaths Of Children Under Age 1 In The Dominican Republic.
- Those Affected Not Only Experience Decreasing Personal Wellness, But Also A Decreasing Ability To Make A Living.
- According To The World Bank, More Than A Fifth Of Dominican Citizens Work In The Agricultural Sector.
- Rural And Remote Cities Get Their Water From Community Collection Tanks That Are Frequently Contaminated With Bacteria, Insects, And Even Dead Birds That Get Trapped Inside.
- There Are Trucks And Pipelines That Transport “Clean” Water Through Cities, But These Methods Are Also Prone To Boasting More Cleanliness Than They Should.



These regions have a difficult time receiving the support they need to maintain proper functioning of livelihoods and community services, even though they experience greater suffering from water shortages and the repercussions of pollution. Ultimately, the water crisis proves to be a health and financial crisis.

### Dr. Fechter Clean City S.R.L Aim :-

- **Economic Sustainability:** We create thousands of new jobs in our Solar Water Solutions plants.
- **Youth Empowerment:** We provide jobs to unemployed youth and train them for better career opportunity.
- **Donate more than 50,000 L fresh water to Poor and Underprivileged communities in Dominican Republic.**

## Benefits for the population of Dominican Republic

- The Dominican Republic is the most fastest growing country in Latin America.
- The growth of economy was in relation to other Caribbean countries before COVID extraordinary good (7-8 %).
- Beside the growing of the economy the population was and is growing very fast.
- The average age of the population is 17,9 years.
- Many young people are living on the street without any education, any opportunity to work.
- We want to open this generation of adolescents a vision, hope, a door to the future.
- Our mission to produce drinking water for everybody will give thousands of people the opportunity to support us by producing water, filling bottles, cleaning bottles, for distribution and much more.
- Based on our experience in the years 2007-2011, where we trained 250 engineers in the country to become solar specialists, we will also be in the water business as a serious partner to teach and educate them to have a more structured daily routine and of course a weekly salary.
- Population growth is always accompanied by growth in poverty, unfortunately the number of people who do not have access to drinking water is also growing.
- 10 % of the daily produced drinking water we provide free of charge for the poor population in a kind of sponsorship.
- The mission and vision of Dr. Fechter Group help to make a better world on our island.



# Business Case Dominican Republic

**Pilot project with 10 plants currently under development**

## Production Unit:

- Dr. Fechter Clean City S.R.L., a 100% subsidiary of Dr. Fechter Clean City GmbH, Germany

## Distribution Unit:

- CAWA Caribbean Clean Water, S.R.L.

## Clean Water Technology Provider:

- Solar Water Solutions Oy Ltd, Finland

## Local Supporter/Partner:

- Dominican Federation of Municipal Districts (FEDODIM)
- Dominicana Limpia

## Clean Water Solution:

- SolarRO 500 BW water desalination product

## Location:

- Entire Dominican Republic

## 2 Distribution Channels:

- Conventional drinking water market: Sales of fresh water in bottles, cans, jars, and gallons.
- Social drinking water supply: drinking water shall be offered at a low-profit / cost-covering, possibly subsidized price or as donation to poor people.



Dr. Fechter Clean City S.R.L. has already presented the solution to the Dominican Federation of Municipal Districts (FEDODIM), which consists of all decision makers of the individual Dominican provinces.

The FEDODIM has given green light to the 10 Pilot Projects in the Dominican Republic and signaled its agreement to a comprehensive countrywide implementation.

The Site for the pilot project is already selected and preliminary inspection by engineers is done.

*“The main objective of the Dominican Federation of Municipal Districts (FEDODIM) is to increase the number of people able to reach an adequate level of health and development through the installation of improved water sources in rural and semi-urban municipal districts of the Dominican Republic. To achieve this goal, FEDODIM offers its assistance to carry out projects for the construction of systems that guarantee the supply of drinking water.”*

**Ramon Santos**

Mayor of Los Botados, Monte Plata and President of FEDODIM

# Opportunities & Benefits

## Opportunities:

Includable in an integrative sustainability concept with clean water solutions and solar power, providing:

- Security of supply through clean water
- Security of supply through green energy
- Creation of jobs & increase of environmental awareness

## Benefit:

Creating social, ecological and economical IMPACT, like:

- Clean and economically efficient drinking water production from renewable energies
- Creation of economic development involving local communities for handling the social water distribution
- Creation of jobs in different economic sectors and different qualification requirements
- Profitable economic model through customer mix (social, conventional)
- Providing drinking water to people who until now have been cut off from clean and affordable drinking water



## Key People



### Stefan Schwind

Authorised Representative  
Dr. Fechter Clean City GmbH  
Co-Initiator



### Lorenz Sondergeld

Dipl.-Pol. B.Sc. Econ  
Co-Initiator



### Nathalie Winetzhammer

CEO  
Caribbean Water S.R.L.  
Co-Initiator

Stefan is German citizen and based in the Dominican Republic and Co-Initiator of the Project. He has been working as impact project developer in the Dominican Republic since 2007. His areas of expertise include among others integrative sustainability concepts, photovoltaic power plants (GEDER), waste to energy plants (FCC-Energy) and water preparation solutions.

With his initiative GEDER he was co-initiator of the Dominican Renewable Energy Law and provided advice to the Dominican government during the development of Dominican Renewable Energy Act (Law 57-07 ) based on the German model (EEG).

Stefan is leader in signing PPAs in the Dominican Republic.

Over 600MWp developments of photovoltaic (Spain and DR). Furthermore, 200MWp photovoltaic and 60MWe waste-to- energy currently in construction/under development.

Lorenz is German citizen and Co-Initiator of the Project. He is resident in the Dominican Republic and professionally based in London and the Dominican Republic.

As Partner for Corporate Advisory at HPL Lawyers, Tax Advisors and Business Advisors ([www.hplaw.com](http://www.hplaw.com)) Lorenz has many years of experience as an international business advisor with a strong focus on corporate development, business development and corporate finance. Furthermore, he has a strong focus on impact investment projects within the Caribbean region.

Lorenz is member of the Economic Council (Wirtschaftsrat der CDU e.V.) in Germany and speaks German, English and Spanish.

Nathalie Winetzhammer 28 years old German citizen born and raised in the Dominican Republic. Fluent in German, Spanish & English and holds a Diploma in Marketing.

Growing up in the Dominican Republic as the daughter of the German engineer Edmund Winetzhammer, she was involved in the energy and water management business through her father from an early age. As managing director of Decon International and shareholder managing director of the ETEE consulting company since 1985, he has played a significant role in the development of the electricity infrastructure in the Dominican Republic. After the death of her father in 2018, Nathalie took over the management of the family holding Resilience Consulting S.R.L. entrusted. Among other things, there is projection and implementation of large-scale photovoltaic projects of up to 100 MW on the island, of which over 100 MW have already been installed and 73 MW are currently under construction.

As Managing Director of CAWA Caribbean Clean Water S.R.L her mission is to make sustainable energy and drinking water usable for everyone.

**FINANCIAL MODEL Dr. Fechter Clean City DR S.R.L. HYBRID BW 500**
**WATER PURIFICATION (PV/HYBRID/WATER GENERATION SYSTEM)**

Bezeichnung (description)	Wert (value)	Dimension	Comments
Elektrische Anlagenleistung Hybrid PV zu Water(Hybrid PV 50 kWp + 50 kW storage)	80.00	kWp	Plus 50 KW Battery Backup System for 24 h usage
Einstrahlungswerte (Irradiation)	1,600.00	kWh/kWp/day	
Wassermenge pro Tag (Amount of purified water per day)	500.00	cbm	500.000 Liter
Nutzungsdauer pro Jahr in Tage (Full operating days per year)	360.00	d/a	
Wassermenge pro Jahr (Production of purified water per year)	180,000.00	cbm/a	
Nutzungsdauer pro Jahr in Stunden (Full operating hours per year)	8,640.00	h/a	
Kostenberechnung (Cost calculation)			
Betrieb-, Instandhaltungs- und Personalkosten (Operating, maintenance and personnel costs)	250,000.000	USD/a	
Verwaltungskosten (Administrative expenses)	30,000.00	USD/a	
Versicherung (Insurance)	20,000.00	USD/a	
Gesamtkosten pro Jahr (Total cost per year)	300,000.00	USD/a	
Annuitätenberechnung (Annuity calculation)			
Effektive Nutzungsdauer der Anlage in Jahren (Effective service life of the system in years)	10.00	Jahre (Years)	
Herstellungskosten je Einheit (Production costs per unit)	600,000.00	USD	
Eigenkapital 30 % (Equity 30%)	180,000.00	USD	
Fondskapital 70 % (Funds 70 %)	420,000.00	USD	
Laufzeit 10 Jahre/Zinssatz 9 %/Annuitätenfaktor (Term 10 years / interest rate 9%/annuity factor)	0.156		
Kapitalkosten pro Jahr (Cost of capital per year)	93,600.00	USD/a	
Gesamtkosten pro Jahr (Total cost per year)	393,600.00	USD/a	
Wirtschaftlichkeitsberechnung (Profitability calculation)			
Vermarktbare Menge an Trinkwasser pro Jahr (Marketable purified water per year)	180,000.00	cbm/a	
Verkaufspreis pro cbm Trinkwasser (Purchase prize per cbm purified water)	4.00	USD/cbm	1000 Liter (0,004 USD per Liter)
Erlöse aus dem Verkauf (Revenues from the sale)	720,000.00	USD/a	
Gesamtkosten pro Jahr (Total cost per year)	393,600.00	USD/a	65,6 % ROI
Gewinn aus dem Verkauf von Trinkwasser (Profit from the sale of purified water)/Phase 1	326,400.00	USD/a	
Amortisation bzw. Kapitalrückfluss (Amortization or return of capital)	1.84	Jahre (Years)	
Kapitalverzinsung vor Steuern (rate of return before tax)	54.40	%	
Weiterverkauf Trinkwasser im Markt (Sales prize to distributors)	16.00	USD/cbm	1000 Liter (0,016 USD per Liter)
Erlöse aus Distrution im Markt (Sales prize market)	2,880,000.00	USD/a	
Distributionskosten (Total distributions costs)	1,500,000.00	USD/a	
Gewinn Marktverkauf (Profit sale market) Phase 2	1,380,000.00	USD/a	230 % ROI

*Thank You*

