



NOVEMBER 2022

SPECTRAGUARD™ 111

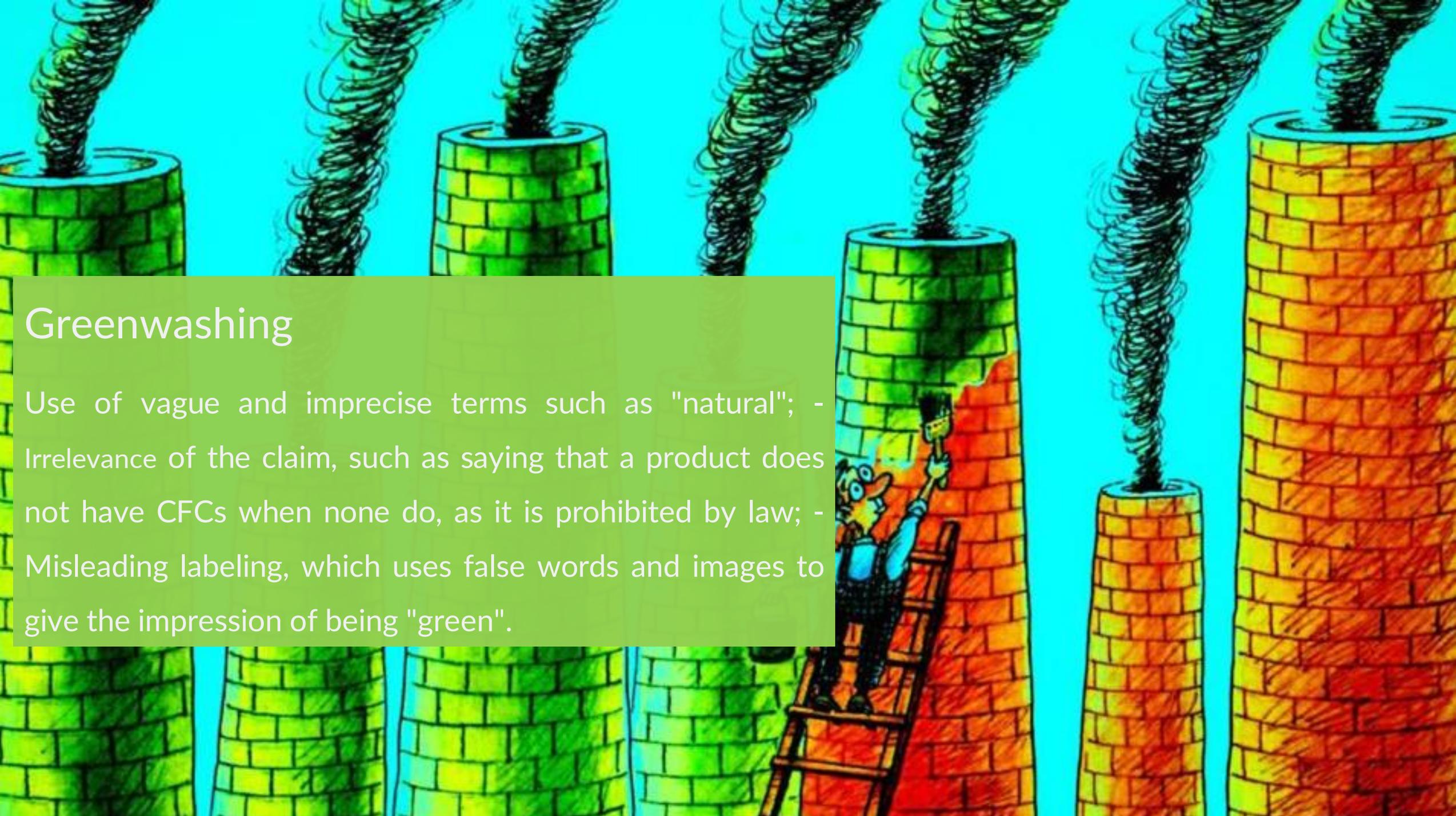
DANIELA VIDAL NAZAR

Piedmont



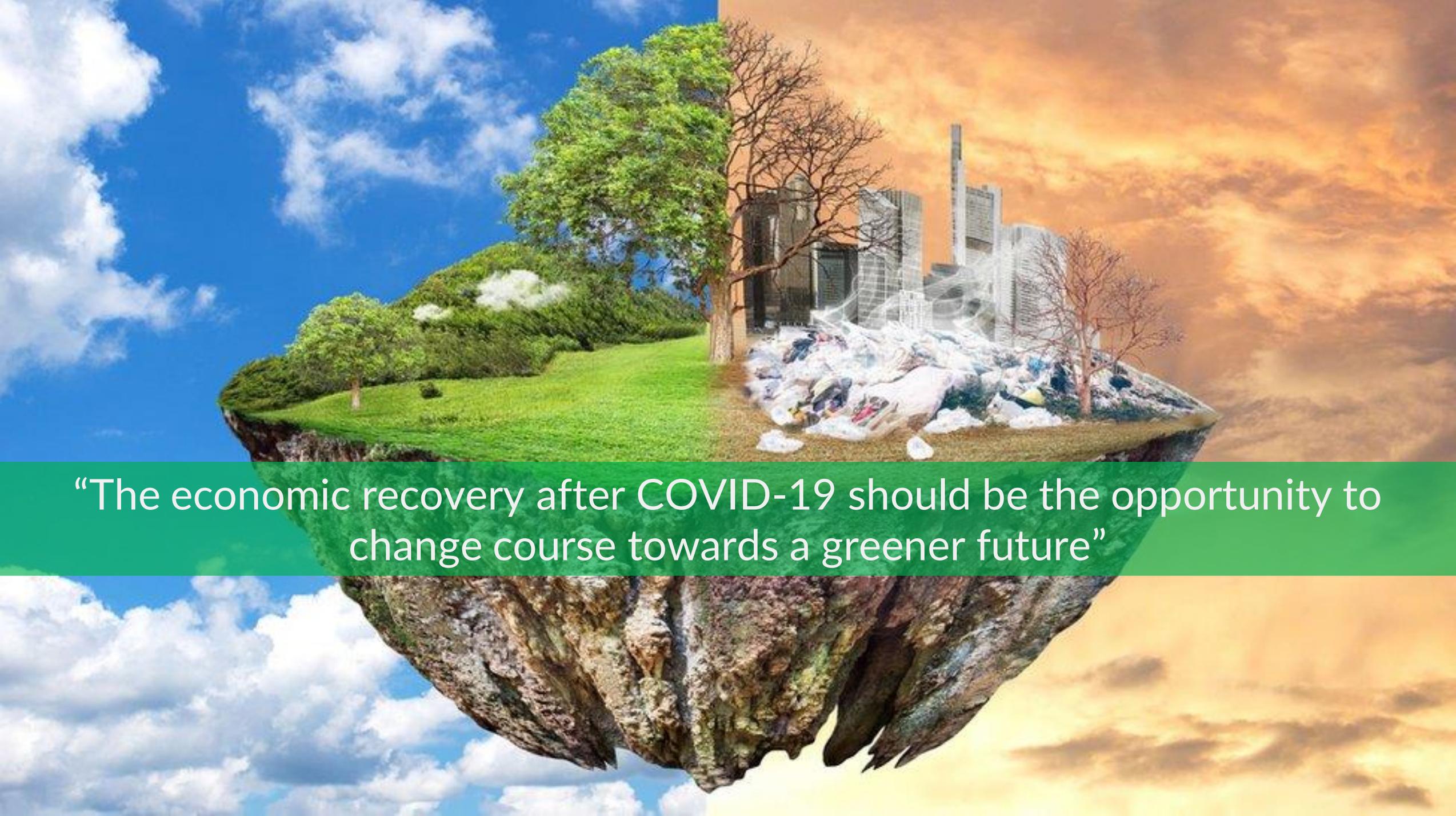
DISTRIBUTOR SUMMIT

NOVEMBER 13-17, 2022



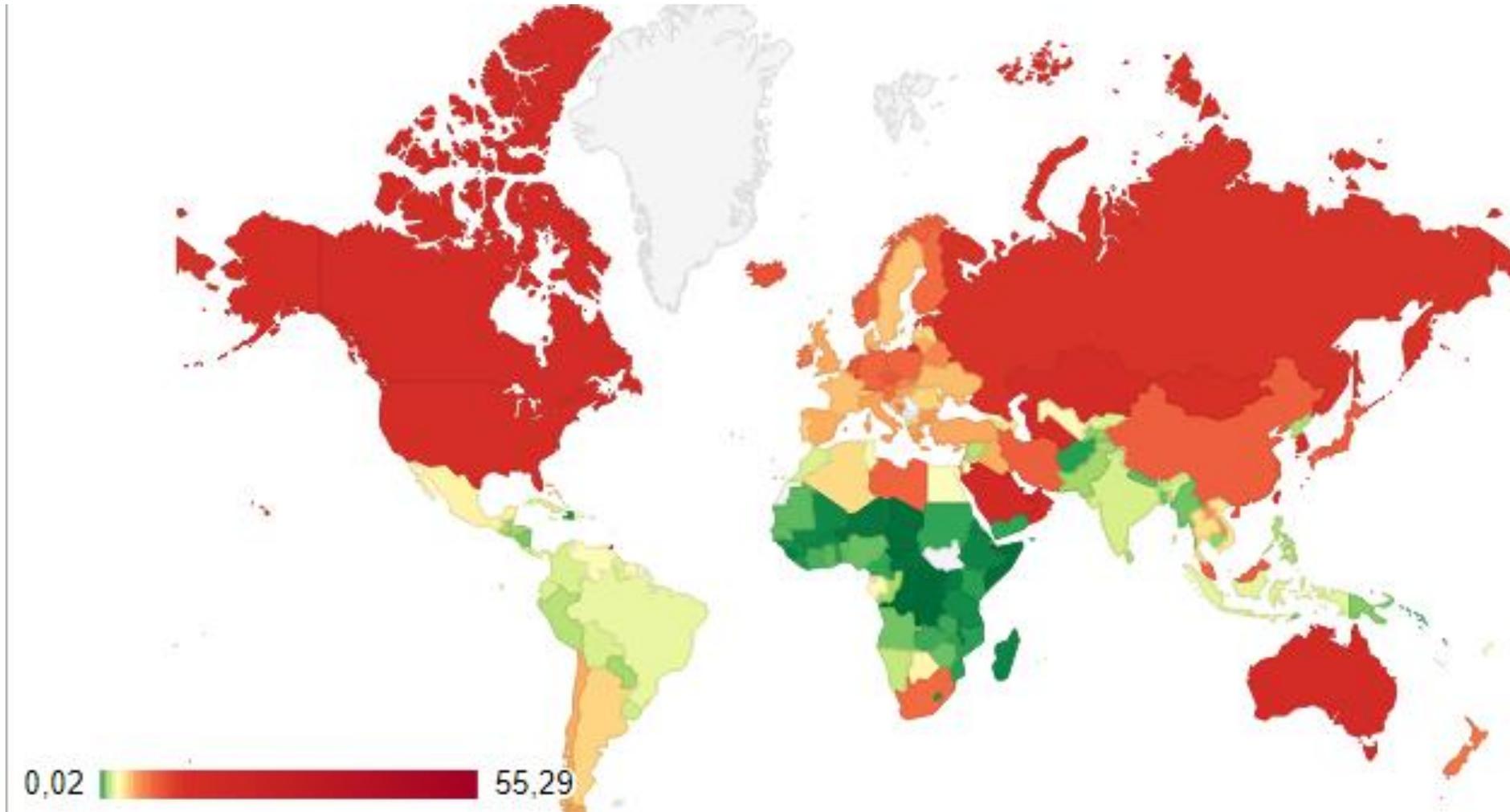
Greenwashing

Use of vague and imprecise terms such as "natural"; -
Irrelevance of the claim, such as saying that a product does not have CFCs when none do, as it is prohibited by law; -
Misleading labeling, which uses false words and images to give the impression of being "green".



“The economic recovery after COVID-19 should be the opportunity to change course towards a greener future”

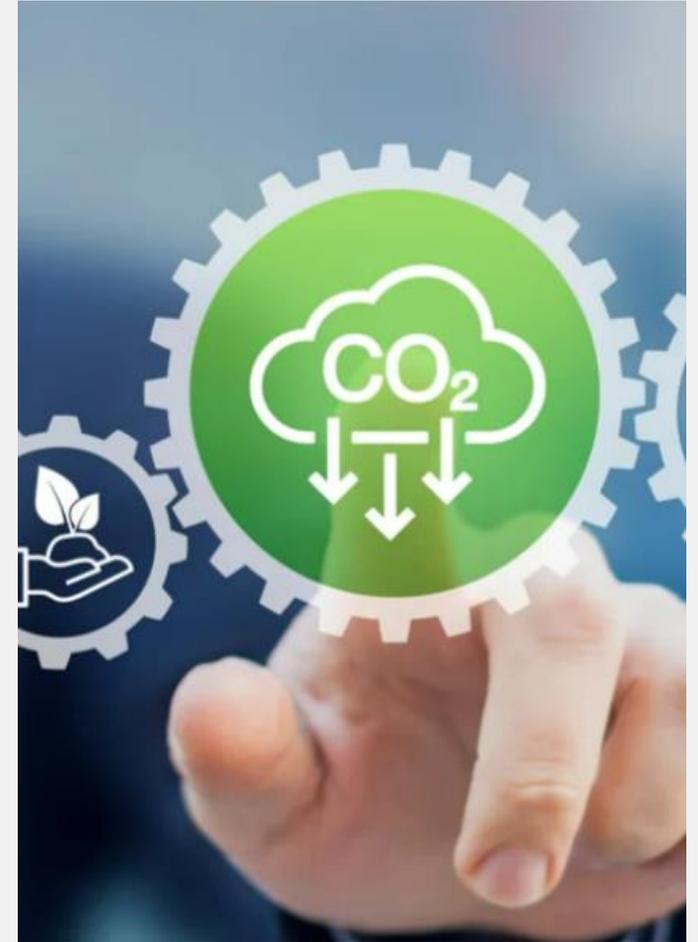
CO₂ Emissions Around the World



Source: <https://worldpopulationreview.com/country-rankings/carbon-footprint-by-country>

CO₂ Emissions and plastic waste

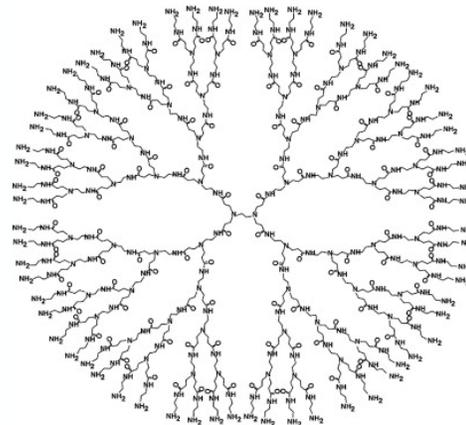
- ✓ The world is still on the way to a catastrophic temperature rise of more than 3 degrees, which will have devastating consequences for the planet.
- ✓ If we don't act now, we will have severe droughts, fires and floods. Plants and animals will lose their habitat.
- ✓ Governments and private companies around the world have committed to zero emissions by 2050 – 2060, but we are far from that commitment.
- ✓ Plastic waste incineration = 2.8 Gigatonnes of CO₂/year.
- ✓ A recent study shows that humans consume about 5 grams of small plastic particles (microplastics) per week, this is equivalent to a credit card



The Dendrimer Technology

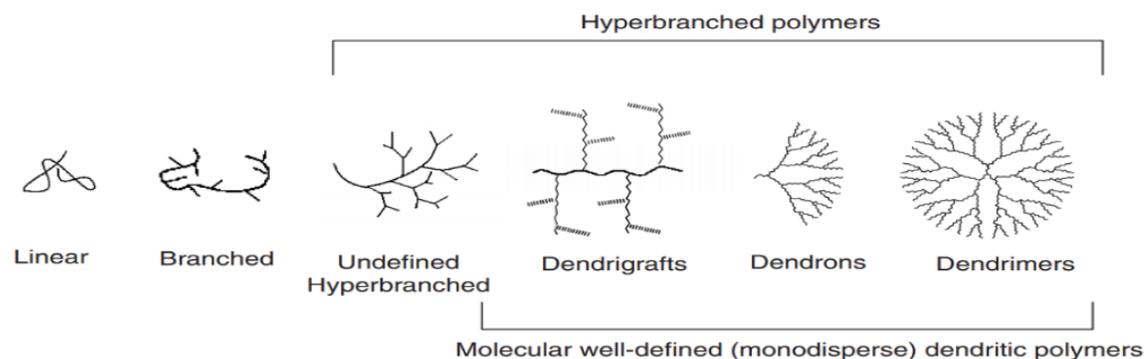
Forward thinking technology

- Highly branched organic polymer molecule, whose **unique configuration optimizes surface area and activity** with superior structural advantages.
- Phosphate free formulation.
- Strong spherical structure, common in nature: (trees, lung systems, neurons).
- Maximize the surface area for a given space.



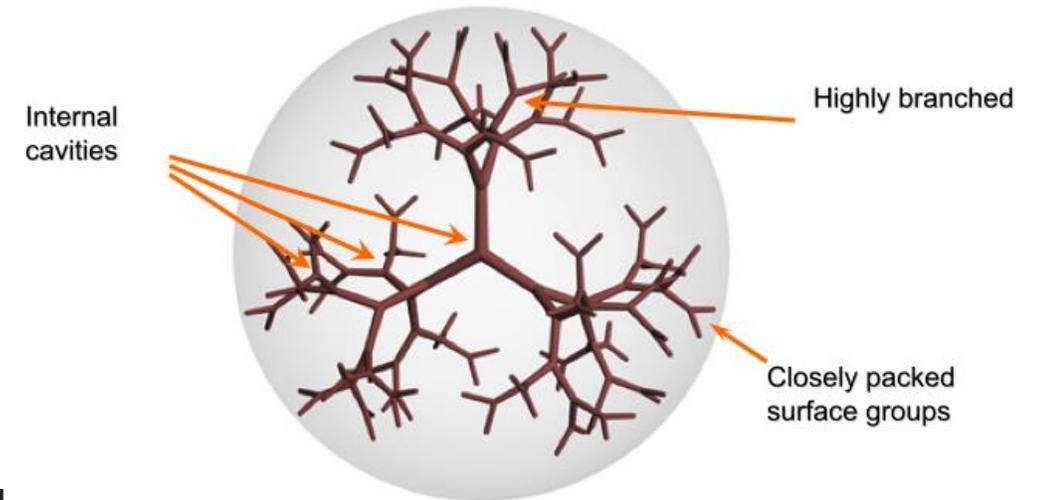
Toxicology

Property	Dendrimer-Based Scale Inhibitor	Phosphonic Acid
Typical Dosage Rate (Brackish Water)	2 – 5 ppm	2 – 5 ppm
pH of Solution	~ 2.5	< 1.0
Specific Gravity	1.0 – 1.02	1.3 – 1.5
Oral (LD50) Rat	> 100,000 mg/kg	2,400 mg/kg
Shelf Life	3 years	2 – 3 years



What is a Dendrimer?

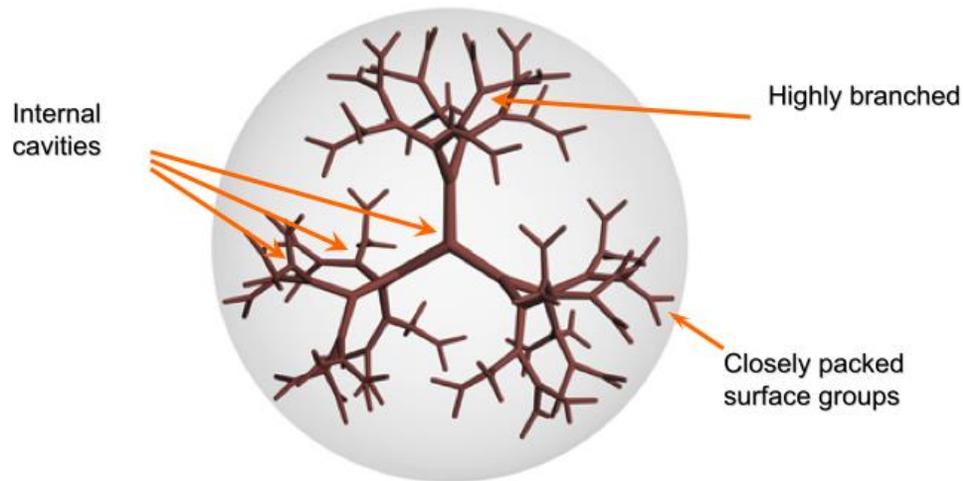
- High reactivity due to abundance of accessible functional groups and dendritic voids which leads to enhanced solubility. **This results in smaller dosage requirements and ability to super concentrate solution.**
- Structural integrity **guarantees performance in harsh environments** (pH, high TDS, etc.).
- Strong spherical structure provides **increased stability.**
- Precision synthesis required for Dendrimer manufacture results in high **repeatability and predictability, low Polydispersity ratio:**
 - Typical **polydispersity** value for a **Dendrimer** is on the order of **1.002** compared to 1.2 or greater for another type of polymers.



Dendritic Chelation & Dispersion

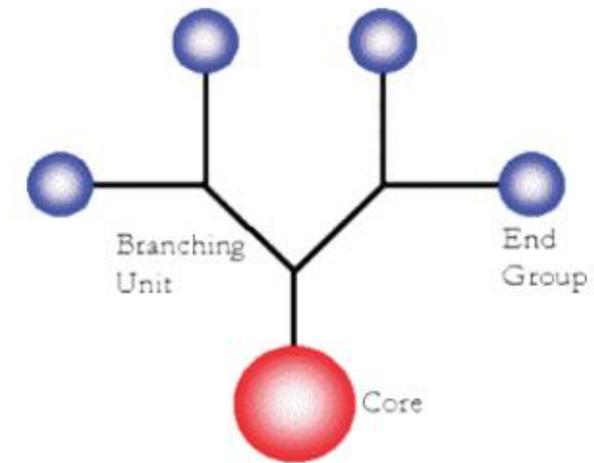
Chelation

Dendrimeric antiscalant works by attracting ions to functional groups of the molecule. These ions are trapped and are not available to form crystals.



Dispersion

Colloidal material and precipitant adhere to the molecule. Anionic charges repel each other.





Dendrimer based antiscalant

SpectraGuard™ 111 Antiscalant



Chemistry and benefits

- Dendrimer: highly branched organic polymer molecule
- Super concentrated product (x 11)
- In situ dilution or direct dosing
- NSF, Membrane **compatibility**.
- Classified as **non-hazardous**

Economic advantages

- Reduction of stock and freight by 90%
- Reduction of consumption of IBC's
- Low dosage

Environmental benefits

- 100% phosphate free formulation
- Optimization of carbon emissions
- 2 IBC's are equivalent to 1 20" container with conventional antiscalant



A high-speed photograph of water splashing, creating a dynamic and textured scene with various droplets and ripples. The water is clear and bright, set against a blurred background of light and blue tones. A solid green horizontal band is overlaid across the middle of the image, containing white text.

Advantages of the Dendrimer CO₂ Savings



Shipping and Storage Benefits



**1 full shipping container
with super concentrated
product**



**= 11 shipping containers
with standard product**

Chemical Packaging & the environment

Raw Material & Production

- RM 109.22kg CO₂
- Production Process 10.4kg CO₂
- **TOTAL CO2 119.6 kg**
- **IBC = 15.2Kg Plastic**

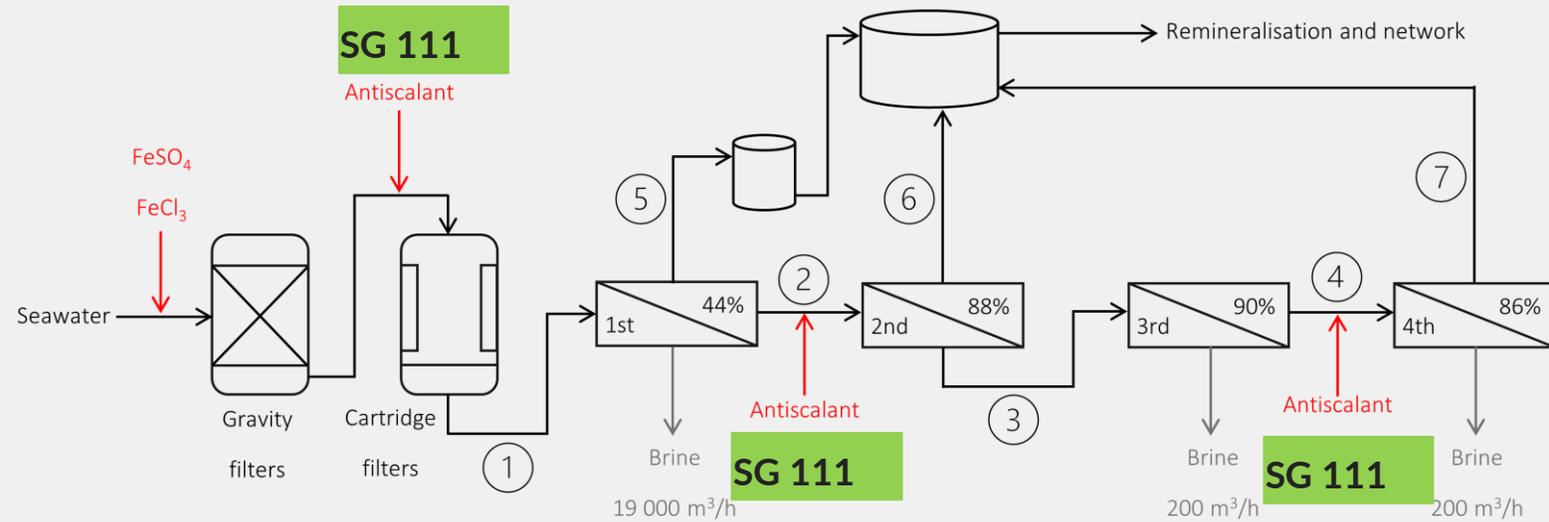
	IBC with steel pallet	Reconditioned IBC with steel pallet
Total HDPE (new)	15.20 kg	15.20 kg
Total, steel (new)	38.87 kg	0.29 kg
Corresponds to		
Carbon emissions from HDPE (new)	23.86 kg	23.86 kg
Carbon emissions from steel	85.36 kg	0.64 kg
Carbon saving from HDPE recycled material	-	- 22.09 kg
Grand Total		
Total carbon emissions from raw materials	109.22 kg	2.41 kg



Case study

Ashkelon Desalination plant – Israel - 326,144 m³/day

4 Passes



Dosage and Savings:

- Only on the 1st Pass
- Temperature: 16 – 34°C
- Dose Rates SWRO 0.03 – 0.05 ppm (SG 111). Dilution in situ

Using a conventional antiscalant

Annual consumption per year
aprox:

128 IBC

Using a super concentrated dendrimer

Annual consumption per year aprox:

11 IBC



Savings:

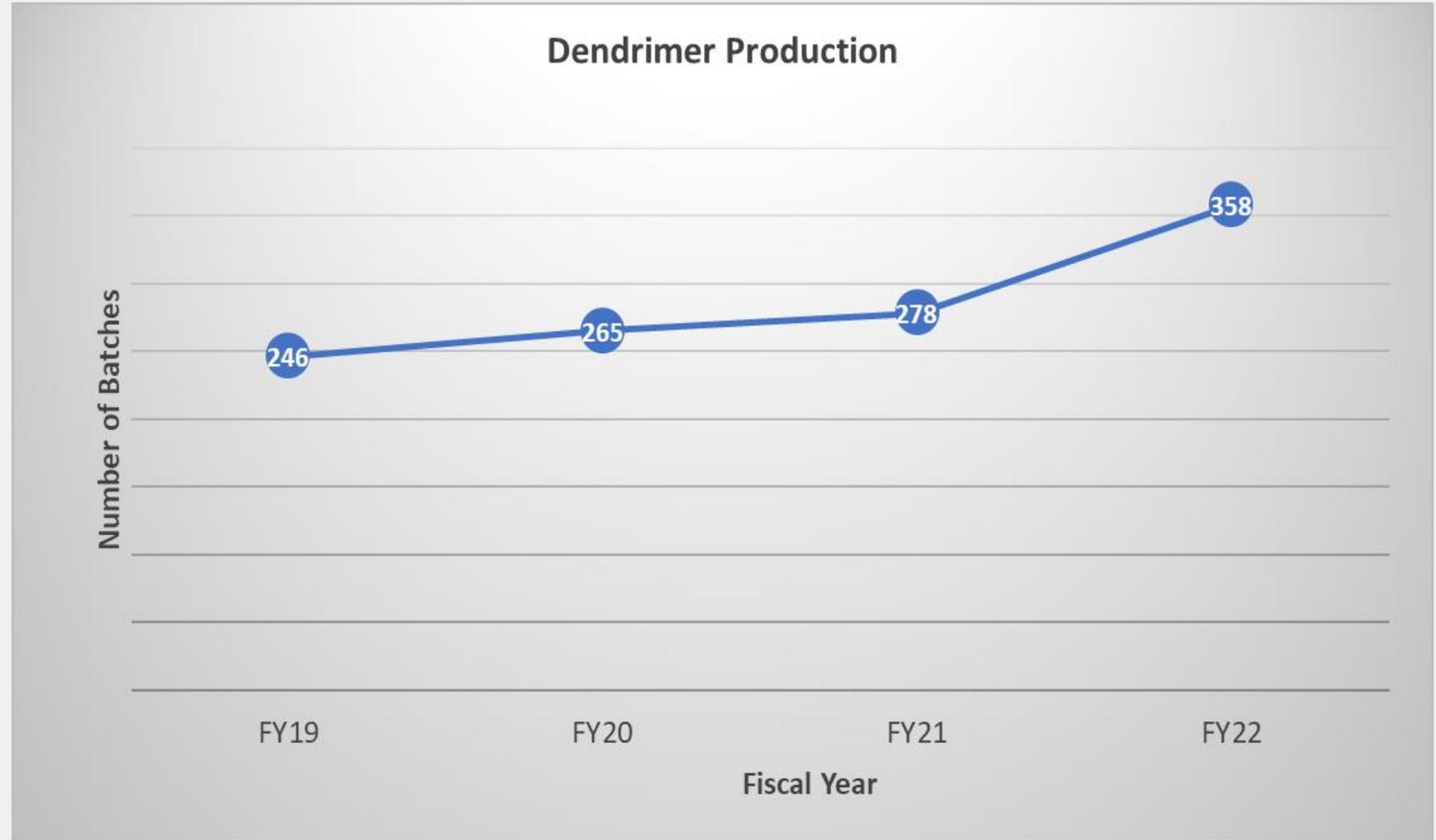
From 7 FCL 20" to 1 per year

CO₂ → 3.51 ton per year

Plastic → 1.7 ton per year



Since 2019... Apart from Covid



Talking about MEGA PLANTS

Every story has a beginning



Targeting Key Regional Accounts

Distributor Symposium 2019 - Dubai

Daniela Vidal Nazar

Regional Sales Manager



Megaplants - Desalination



DOES SIZE MATTER?

- 1) Ras Al Khair, Saudi Arabia: 1,036,000 m³/day
- 2) Taweelah, UAE - 909,200 m³/day
- 3) Shuaiba 3, Saudi Arabia - 880,000 m³/day
- 4) Sorek, Israel - 624,000 m³/day
- 5) Rabigh 3 IWP, Saudi Arabia - 600,000 m³/day
- 6) Fujairah 2, United Arab Emirates - 591,000 m³/day

Impressive contracts and consumptions



A high-speed, close-up photograph of water splashing, creating intricate patterns of droplets and ripples. The water is a deep, clear blue. A solid green horizontal band is overlaid across the middle of the image, containing white text. The background is a soft-focus bokeh of light blue and white.

Dendrimer Technology

Some References

References: Dendrimer Technology

Taweelah desalination plant

Largest plant in the World

909,000 m³/day

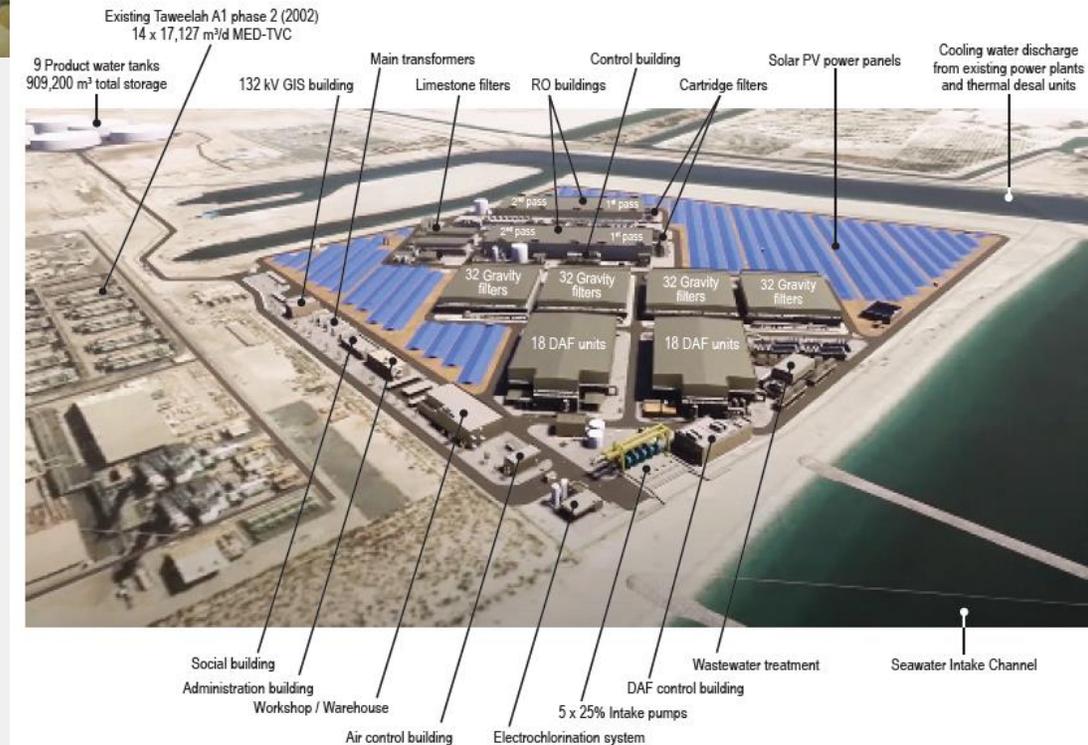
The plant is in the United Arab Emirates.

Operated by ACWA Power



Other suppliers, and the equipment they supplied, include Toray's SWRO membranes, Harbin ROPV's membrane pressure vessels, H2O Innovation's specialty chemicals, SafBon/KWI's DAFs, Piedmont's cartridge filter housings, ERI's energy recovery devices, Flowserve's pumps, and ABB's motors, VFDs and switchgear.

Water Desalination Report



References: Dendrimer Technology

Sea Water: Djerba Desalination Plant Tunisia

- Sea water plant in Djerba
- Production: 50.000 m³/day
- Recovery: 45%
- Customer: Sonede
- Antiscalant: Dendrimer
- Since 2019



References: Dendrimer Technology

Qingdao Desalination Plant;

- 100,000 m³/d SWRO
- Largest in its in China, serving a population of 500,000 people



Qingdao Paper

References: Dendrimer Technology

Honaine Desalination plant – Algeria

SWRO - 200,000 m³/day



References: Dendrimer Technology

TUAS 2&3 – PUB

Singapore
460,000 m³/day

2 Passes



References: Dendrimer Technology

Umm Al Houl- Qatar

The plant is operated by ACCIONA
2 Passes, working from 15°C - 35°C

- 1st Pass production aprox: 315,000 m³/day – recovery 45%
- 2nd Pass production aprox: 282,000 m³/day – recovery 90%, working in a pH range between 9.6 – 10.2



Decarbonization of the Economy: Antiscalants

- Reduction of CO₂ emissions by up to 90%
- Reduced Inventory
- Shipping savings up to 11 times
- Phosphorus free
- Potential emissions savings 450,000 T/year in the world
- ESG Criteria, Zero Emissions by 2060
- Savings in Taweelah, 50,000 kg CO₂ and 2,500 kg of plastic per year
- Equivalent to about 12 trips around the world by car

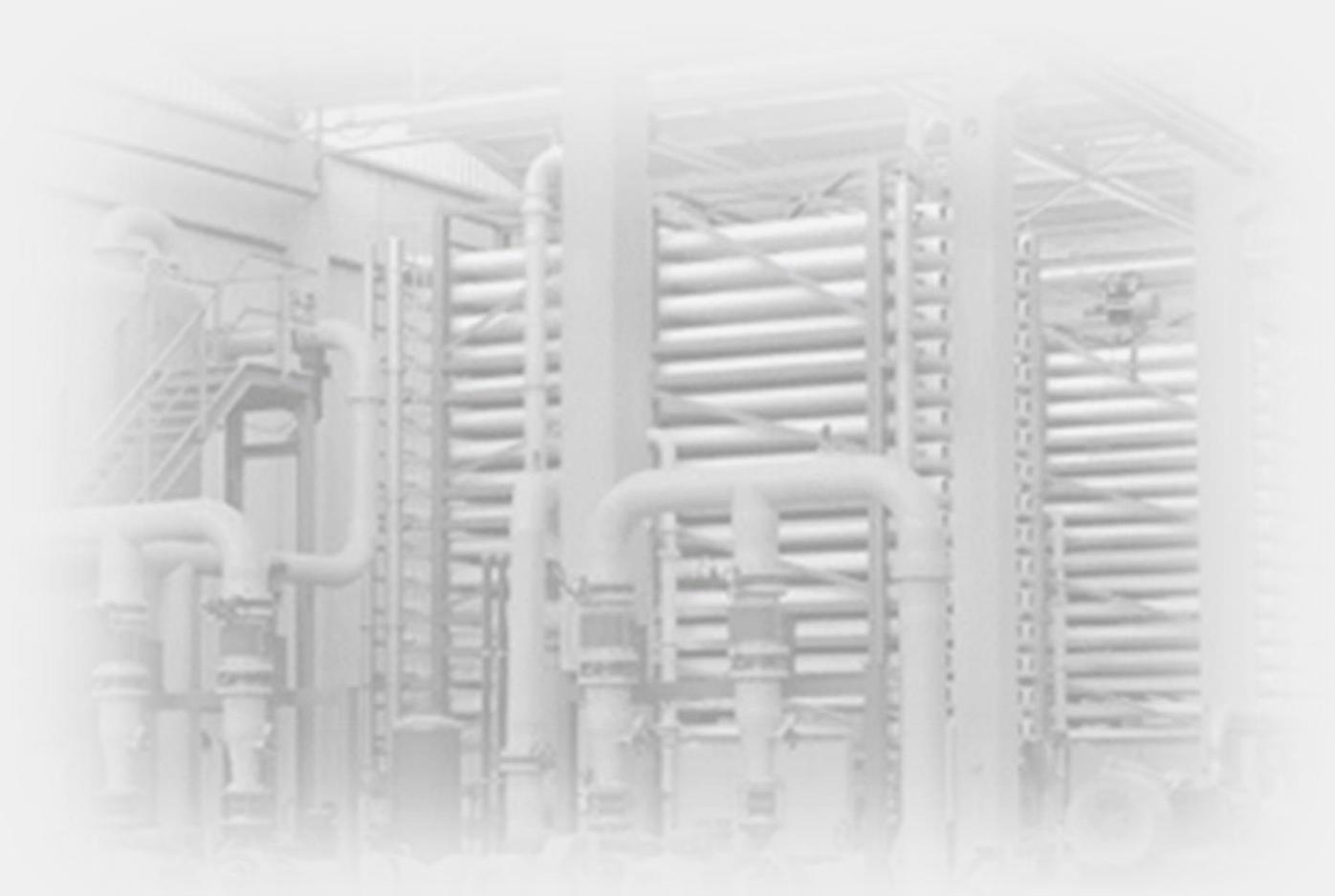


So far...

3,270,500 m³/day treated
in MEGA DESAL PLANTS
with **SG 111**

Savings:

- 180 tons of CO₂ per year
- 9,000 Kg of plastic per year



EventMobi

1. Is the legislation in your Country including also **NON-PHOSPHONATE** products?
2. Is **SUSTAINABILITY** a **DRIVER** for your business?
3. Will **SG 111** also help with **organics**?
4. Can **SG 111** be **dosed directly** (no dilution)?
5. Could we **dilute** the product **directly** at the plant?



h₂O innovation[®]

Piedmont  PWT[™]

WATER COMPANY
OF THE YEAR 2020

