Committee on Energy Resources and the Environment

NARUC Summer Policy Summit

Committee on Energy Resources & the Environment and Committee on Water

What Do Water Reuse, Wastewater treatment, and Clean Energy Have in Common? Brewing of Course.

NARUC Summer Policy Summit

WATER/ENERGY/WASTE INFRASTRUCTURE PARTNERSHIPS

Veolia is the global leader in optimized resource management: WATER ENERGY & WASTE solutions

163
years of service

$25.7
billion revenue

163,000
employees
on 5 continents

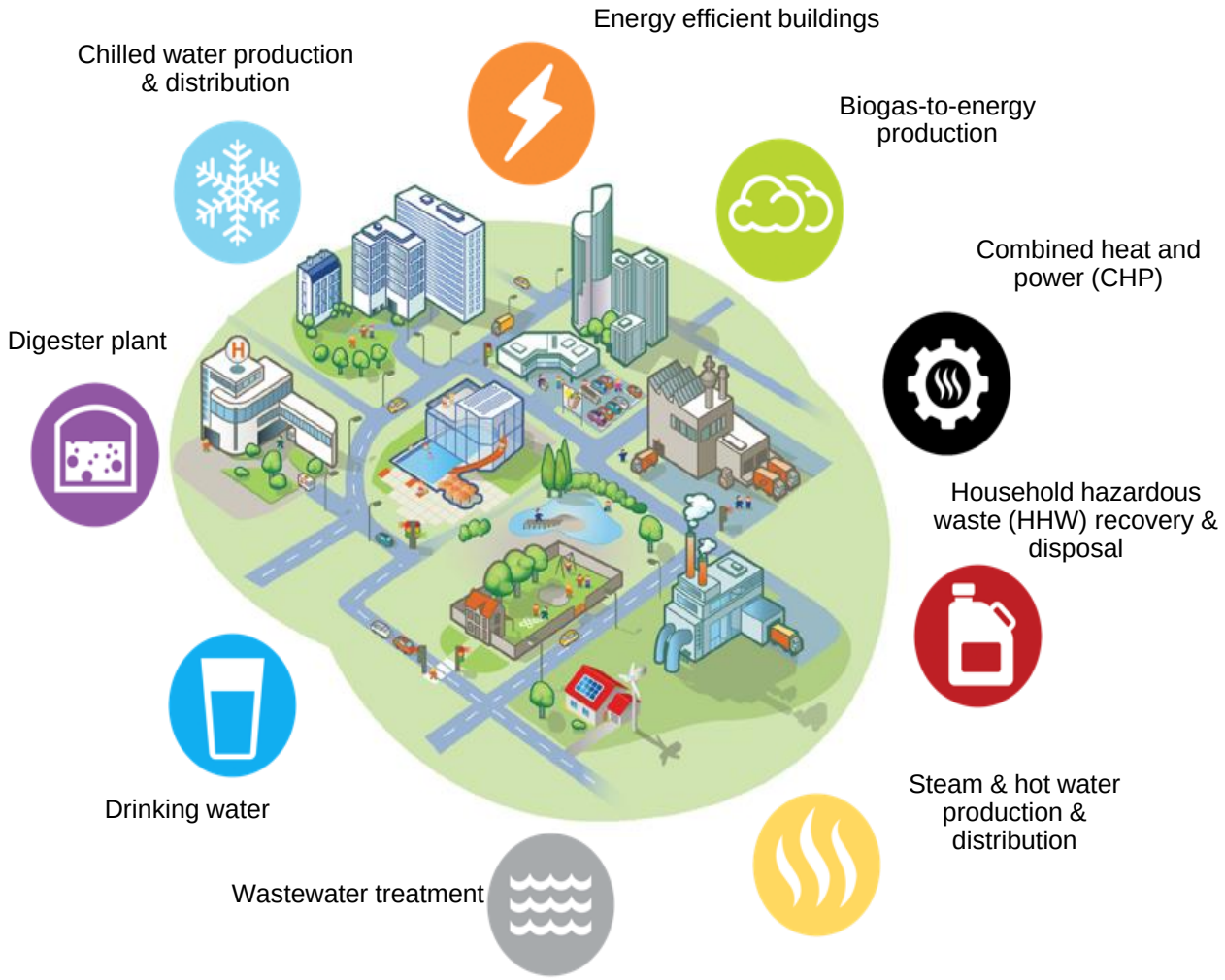
Water Company of the Year: VEOLIA

GLOBAL WATER AWARDS 2016
Recognising Excellence
19 April Emirates Palace, Abu Dhabi, UAE

MORE THAN **2,000** PATENTS FILED

6 RESEARCH CENTERS
3 of them specialized

Proven Industry Leader in North America

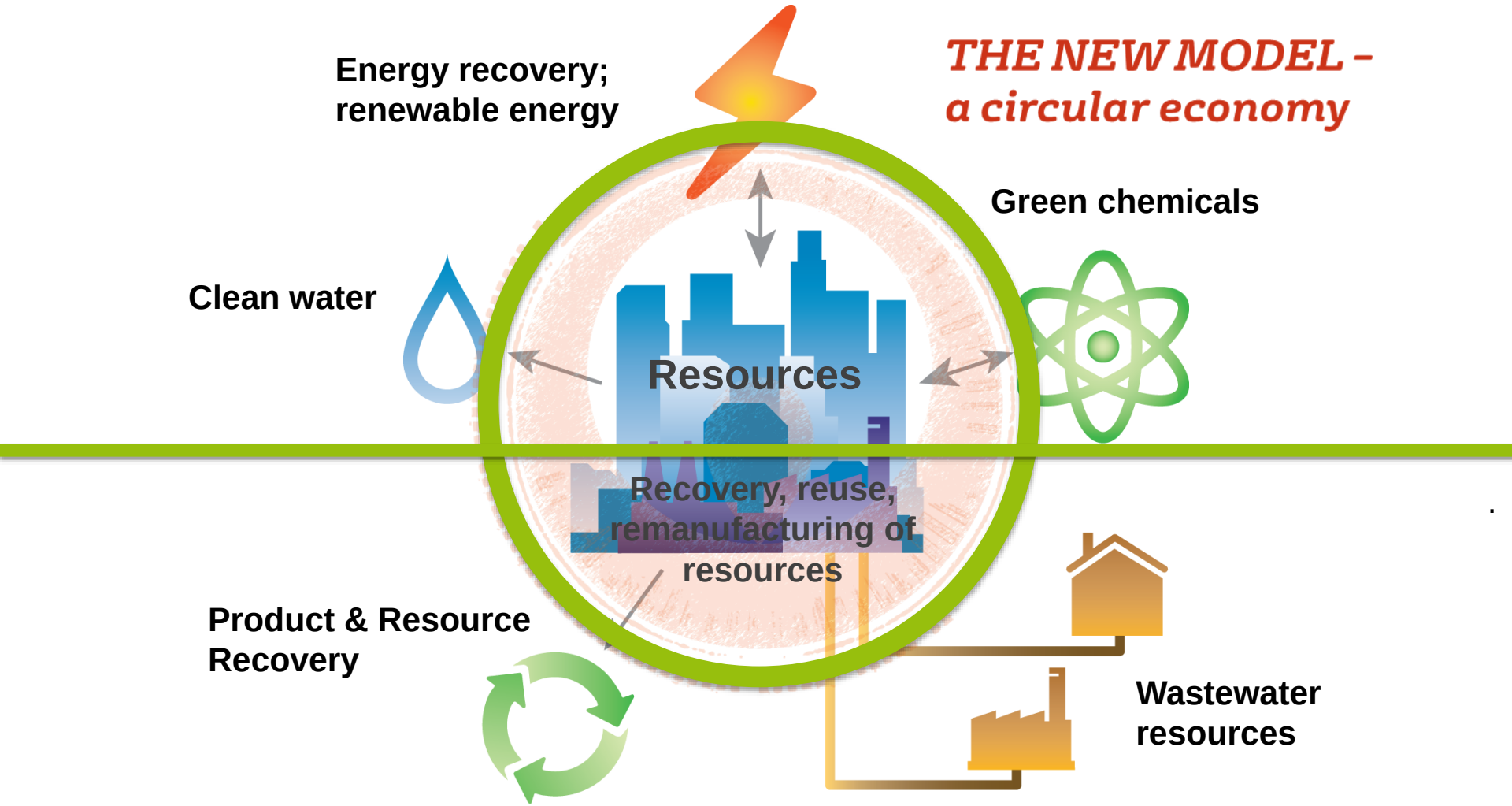


530 cities

#1 district energy portfolio

#1 water partnership company

We believe in a circular future



Veolia's Municipal Level Engagement - Facilitating the Water/Energy/Waste Nexus

Milwaukee, WI
630-MGD combined plant design flow (Veolia OM&M project since 2008)

- LFG/digester gas utilization via cogeneration
- Milorganite® pellet production – fertilizer
- Water Carbon Footprint Study
- Embarking on Resiliency Study (100 RC)

Gresham, OR
20-MGD plant design flow (Veolia OM&M project since 2005)

- Digester gas utilization in CHP
- Cogidestion of fats, oil, and grease (FOG)
- Net Zero Energy Wastewater Facility

Wilmington, DE
134-MGD plant design flow (Veolia OM&M project since 1985)

- LFG/digester gas utilization via cogeneration
- Pellet fertilizer utilizing waste heat

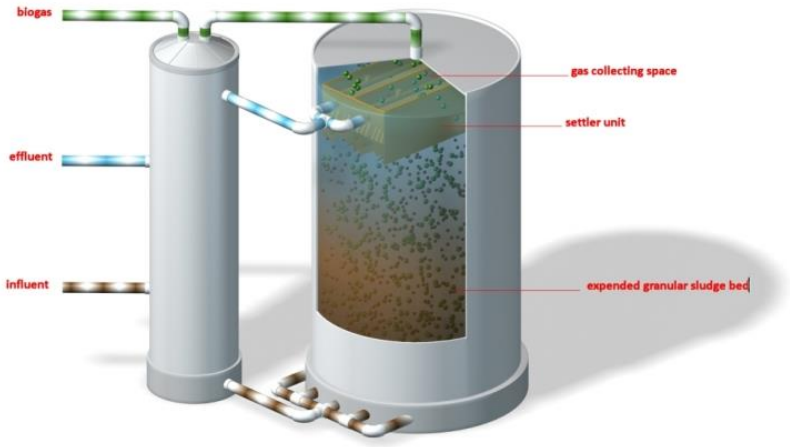
New Orleans, LA
142-MGD combined plant design flow (Veolia OM&M project since 1992)

- RC 100 Resiliency Study
- 60 day response to Hurricane Katrina
- Continue to help City to implement Resiliency Projects

Veolia's Industry Level Engagement – Facilitating the Water/Energy/Waste Nexus

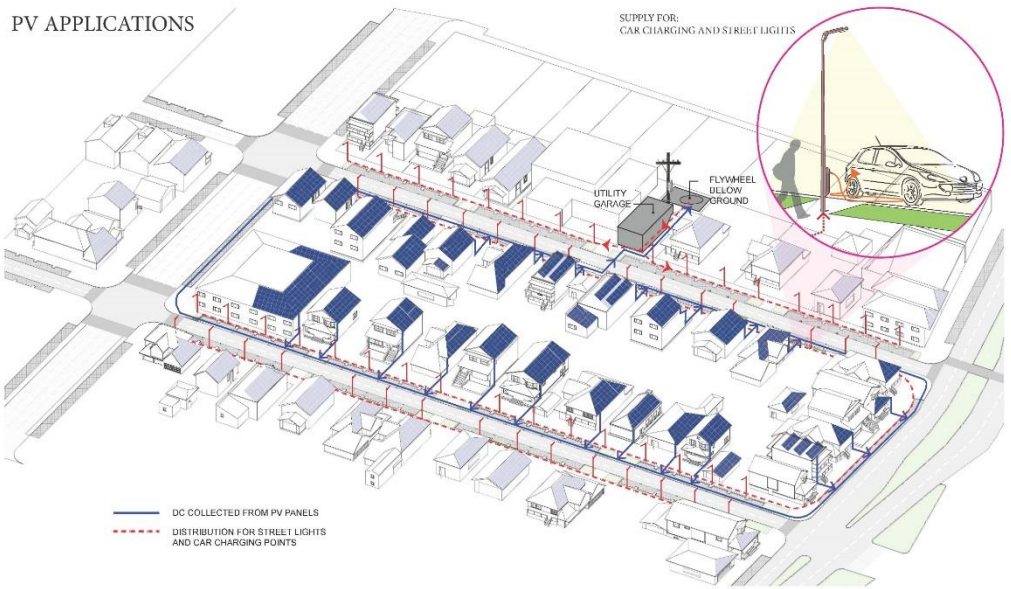
- Biothane digestion technology and wastewater treatment applied in over 100 breweries globally.
- Example of distributed approach creating energy for the brewery while reducing wastewater impacts on centralized infrastructure.

BIOBED® ADVANCED EGSB



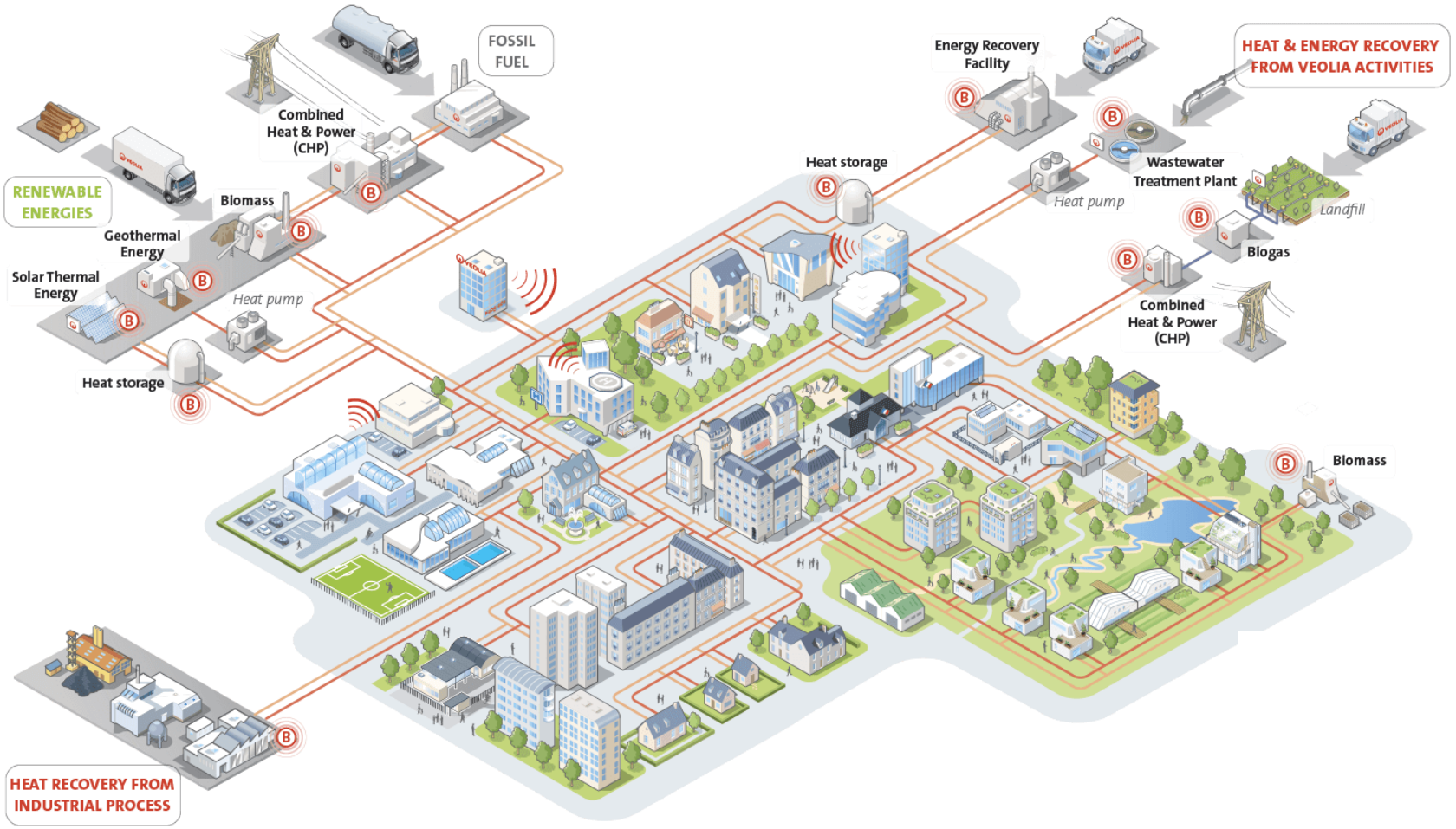
Example of Distributed Water/Energy/Waste Nexus Integration at the Neighborhood Level - ECOBLOCK

- UC Berkley led demonstration project: deep-energy/water neighborhood retrofits.
- Phase 1: CEC – EPIC Grant and corporate/pro-bono support $2.8 M.
- Phase 2: $10M D/B prototype EcoBlock and pending CEC approval early 2018.
- Model can be applied to urban planning across CA, the US, and the World.



Veolia's Integration of Resource Recovery

Distributed and Centralized Resource Recovery Integration



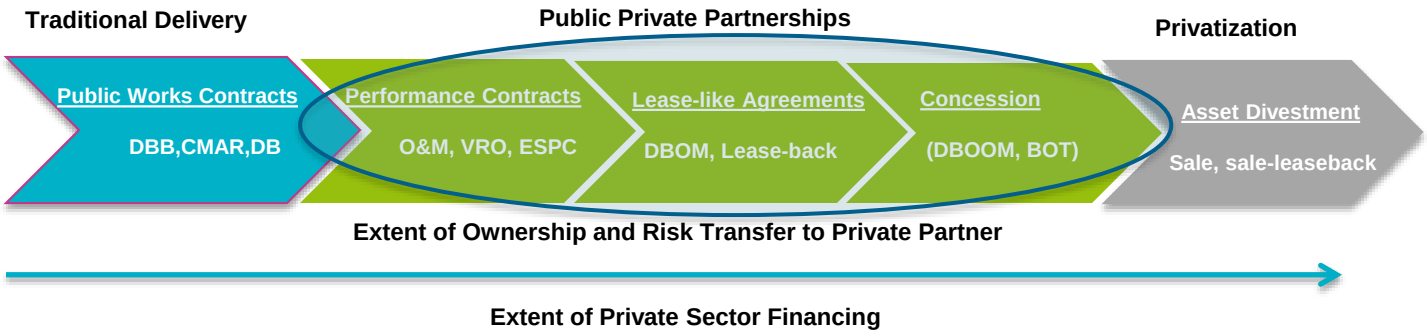
P3's Role in this Sustainable Infrastructure

Primary Benefits of a P3:

- Accelerate delivery of public infrastructure projects
- Risk Management Optimization
- Ratepayer Cost Certainty
- Leverage Private Sector Innovation
- Ensure asset life-cycle management
- Optimize project financing; whether public or private or combination

Considerations for selecting a Private Party as a P3 Partner:

- Aligned with objective to efficiently deliver projects get to commercial operations
- Experienced private partners guides process with a focus life-cycle management approach.








Thank You







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Stone Brewing, Co.

Water and Energy Sustainability

National Association of

Regulatory Utility Commissioners

July 17, 2017

Agenda

- History and Background
- Production Plans
- Sustainability Drivers
- Water Sustainability and Partnering
- Energy Sustainability and Partnering

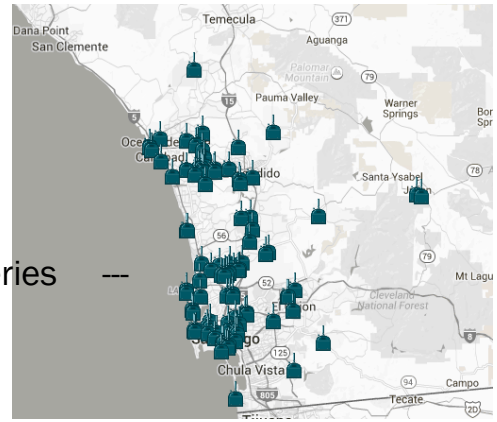
History and Background

- Founded in 1996 by Greg Koch and Steve Wagner
- In San Marcos, CA; Northern San Diego County
- Relocated to Escondido in 2005
- Stone Brewing World Bistro and Gardens opened in 2006

History and Background

- Packaging Hall built in 2014
- 2016 annual revenue ~ $220 million
- Substantial part of the $600 million economic impact craft breweries provide to the SD region

~ 130 Breweries ---
>



Background

- Seven year-round beers
- Multiple “Special Release” beers each year
- Regular collaboration releases annually in support of craft beer camaraderie
- ~1,200 employees
- Stone Beers are available in 50 states, 17 countries in Europe, 28 countries total
- 9th largest craft brewery in the US and one of the fastest growing craft breweries in the US

Escondido Production

- 2015 - 330,000 barrels of beer packaged or 10 million gallons (MG) or 31 acre-feet
- 2016 – 305 kbbls
- 2017 - ~250 kbbls
- Anticipate around 10% increases moving forward

Global Production Plans

- New breweries opened in 2016
  - Richmond, VA capacity 800,000 barrels per year – 100 kbbls in 2017
  - Berlin capacity 50,000 barrels per year – 20 kbbls in 2017

Sustainability and Drivers

- Stone's commitment – a path of continuous improvement to deliver craft beer with progressively less negative impact to Earth's resources
- Stress on water/energy supplies

  - Long term - resource savings allows more regional development => more beer drinkers
  - Branding

Stone and Sustainability

- Stone recycles 50% of its wastewater in Escondido

- All spent grains in US are repurposed for cattle feed
  - ~ 70-130 tons per day
- 15% of electricity used in Escondido is generated from solar panels – also use VFDs everywhere
- Brewing by-product is used at Richmond, VA WWTP to meet effluent discharge requirements for nitrogen
- Working w/several local WWTPs to utilize our brewing by-products for use in generating electricity

Water Sustainability

- Stone recycles ~ 50% of its brewing wastewater in a day
- ~ 40 kgal/day of recycled water is used for boiler operations, cooling towers and cleaning
- Recycled water cost is ~ $0.08/gal
- Expensive when tap water cost is ~$0.006/gal
- Received ~ $65k from Metropolitan Water District of Southern CA under WSIP

Partnering for Sustainability Stone and City of San Diego

- Stone is committed to promoting and encouraging sustainability at all levels
- Stone and City partnered to brew Full Circle Pale Ale
- Very high quality treated water from City's Pure Water Project
- Water quality was so good we added minerals for the brew

SD Pure Water San Diego

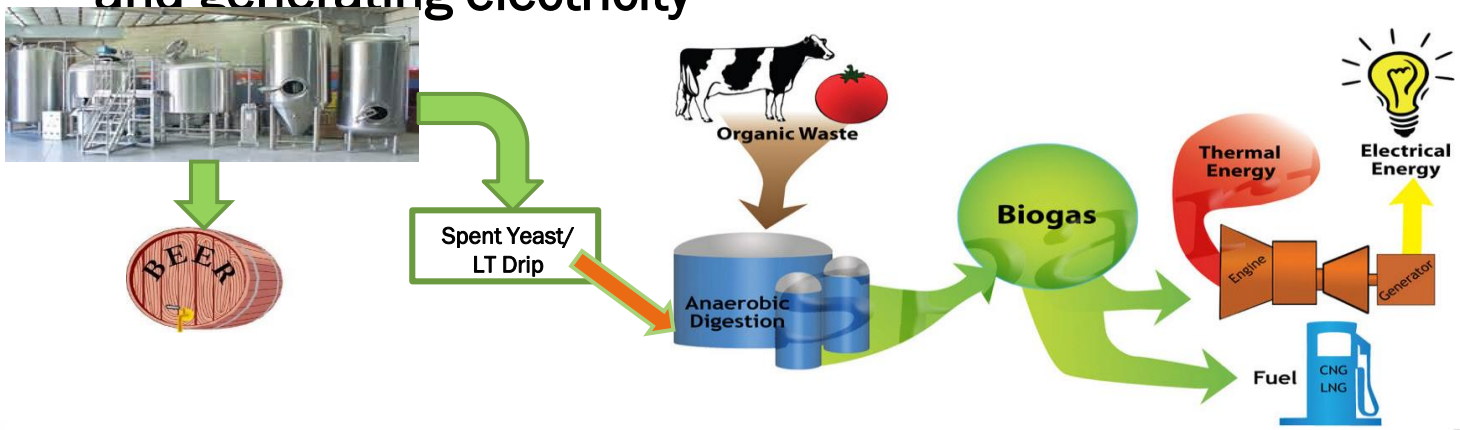
Partnering for Sustainability Stone and City of Richmond

- Beneficial use of Stone by-product waste to off-set use of other resource
- Stone supplying City high strength residual by-product
- Commodity chemical substitute for improving WWTP discharge to James River
- Discounted below commodity chemical so saves City and Stone $
- Eliminates conventional treatment costs

Energy Sustainability Efforts

- Electricity
  - Over 3000 solar panels
    - Accounts for ~ 15% electricity used in Escondido
  - Over 100 variable frequency drives installed
  - SDG&E approved high efficiency process equipment

- Evaluating anaerobic digestion of high-strength by-products and generating electricity



Energy Sustainability Partnering

- Stone is actively seeking WWTPs interested in using by-products for energy generation
- WWTPs have infrastructure to easily implement
- Stone has infrastructure to easily implement
- Eliminates WWTP capacity/energy to treat aerobically
- Allows deferral of potential future WWTP expansion
- Aids in compliance with recycling regulations
- Excess energy generation – sell back to grid ($0.18/kw-hr)
- Grant funding

Economic Analysis

- Byproduct collection/AD feed facility ~$1 million
- Electricity Cost $0.16/kw-hr

Item	Cost per day	Assumptions
City Amortized Capital	($145)	5.5% int; 30 year bond
City O&M	($240)	Electricity, labor, maintenance, heating
City Total Costs	**($385)**	
City Energy Value	$630	8000 gal each LT Drip @ 45,000 mg/L COD, 8000 gallons per day SY 130,000 mg/L COD; 0.3 liters CH4/g COD; 600 BTU/CF methane; 3412 kw-hr/BTU and CE is 40% efficient
City Net Income	**$245**	$61,000 per year in energy savings
Stone Amortized Capital	($50)	
Stone O&M	($300)	Chemicals, electricity, labor (assumes pipeline install)
Stone Total Costs	**($350)**	**($1,350)** if trucking is required

Questions

Public Utilities Department

Commitment to Sustainability

J. Brent Eidson
Deputy Director, External Affairs
Public Utilities Department

The City of SAN DIEGO

By the Numbers

Recycling and Reusing water

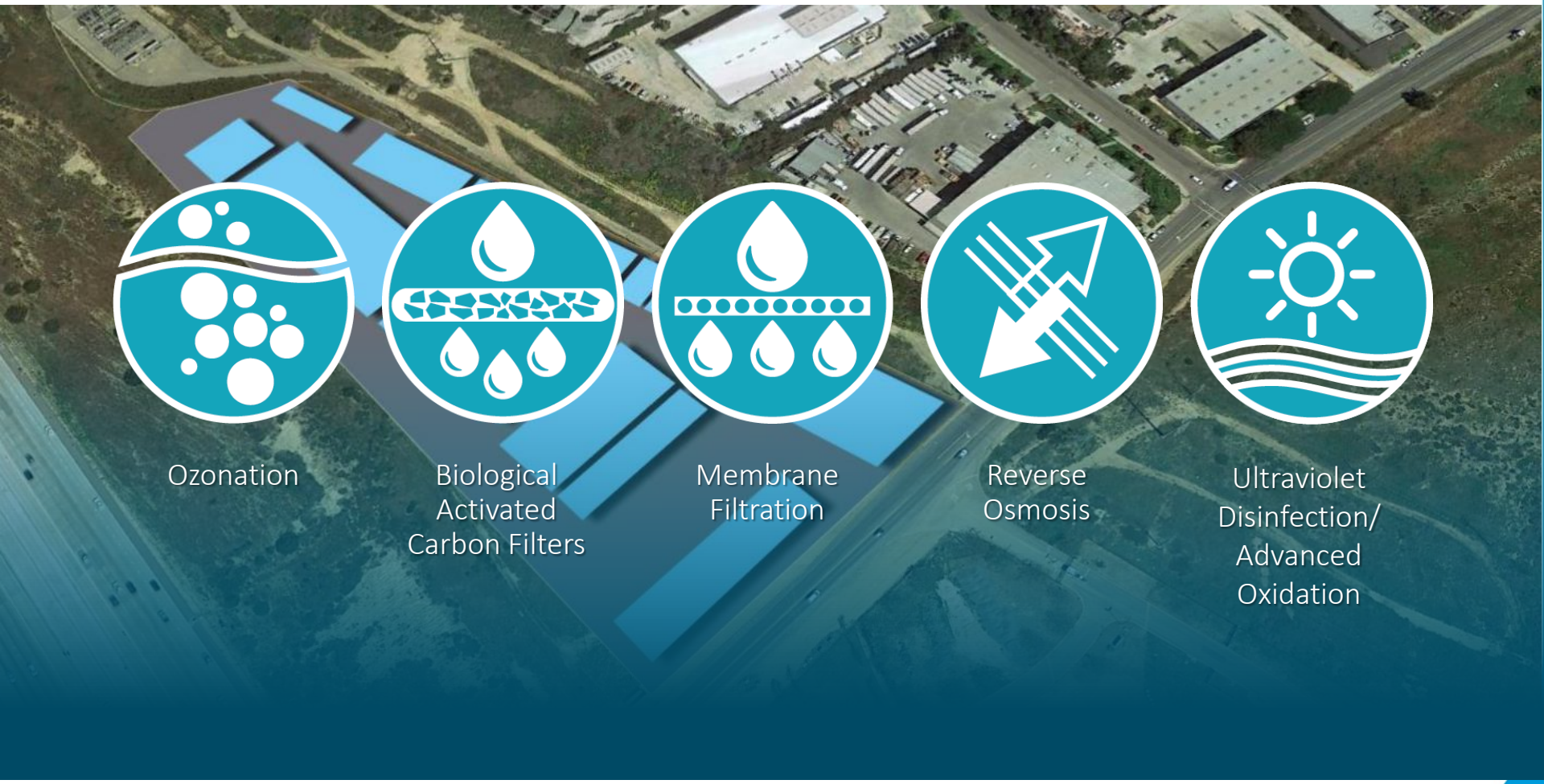
Producing renewable energy

Reducing water use and ocean discharge

Provides a:

- Safe
- Reliable
- Cost-effective

Water Supply through Potable Reuse


Ozonation
Biological Activated Carbon Filters
Membrane Filtration
Reverse Osmosis
Ultraviolet Disinfection/ Advanced Oxidation

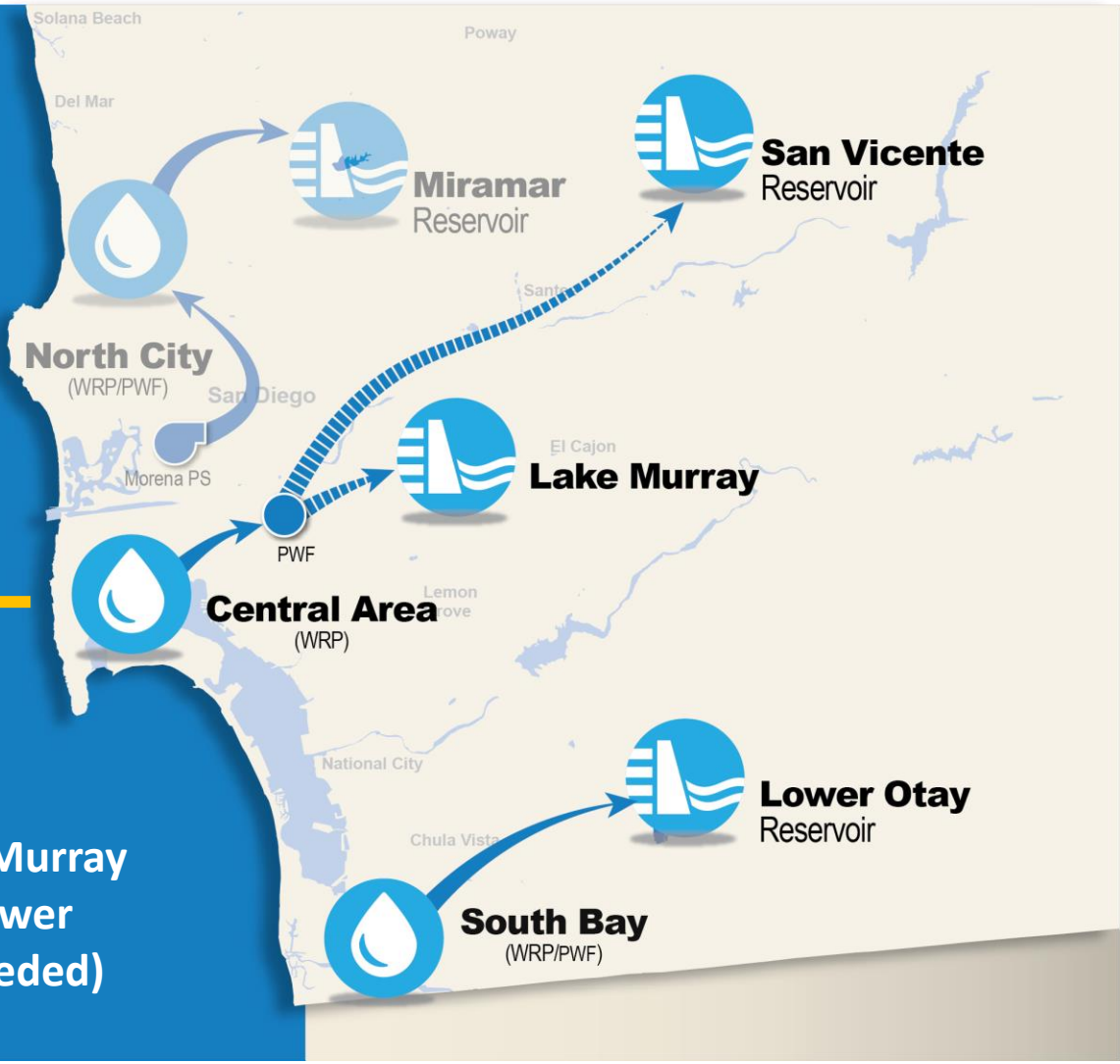
Pure Water
will produce

1/3

of your water
locally

Phases 2 & 3

- **2035 Completion**
- **53 mgd**
- **Central Area PWF to San Vicente or Lake Murray**
- **South Bay PWF to Lower Otay Reservoir (if needed)**



Pure Water Program: Exceeding Our Goals

- Completed Programmatic EIR
- Finished Phase I pre-design
- Advancing Final Design
- Developed Renewable Energy Project

Recycling and Reusing water

Reducing water use and ocean discharge

Producing renewable energy

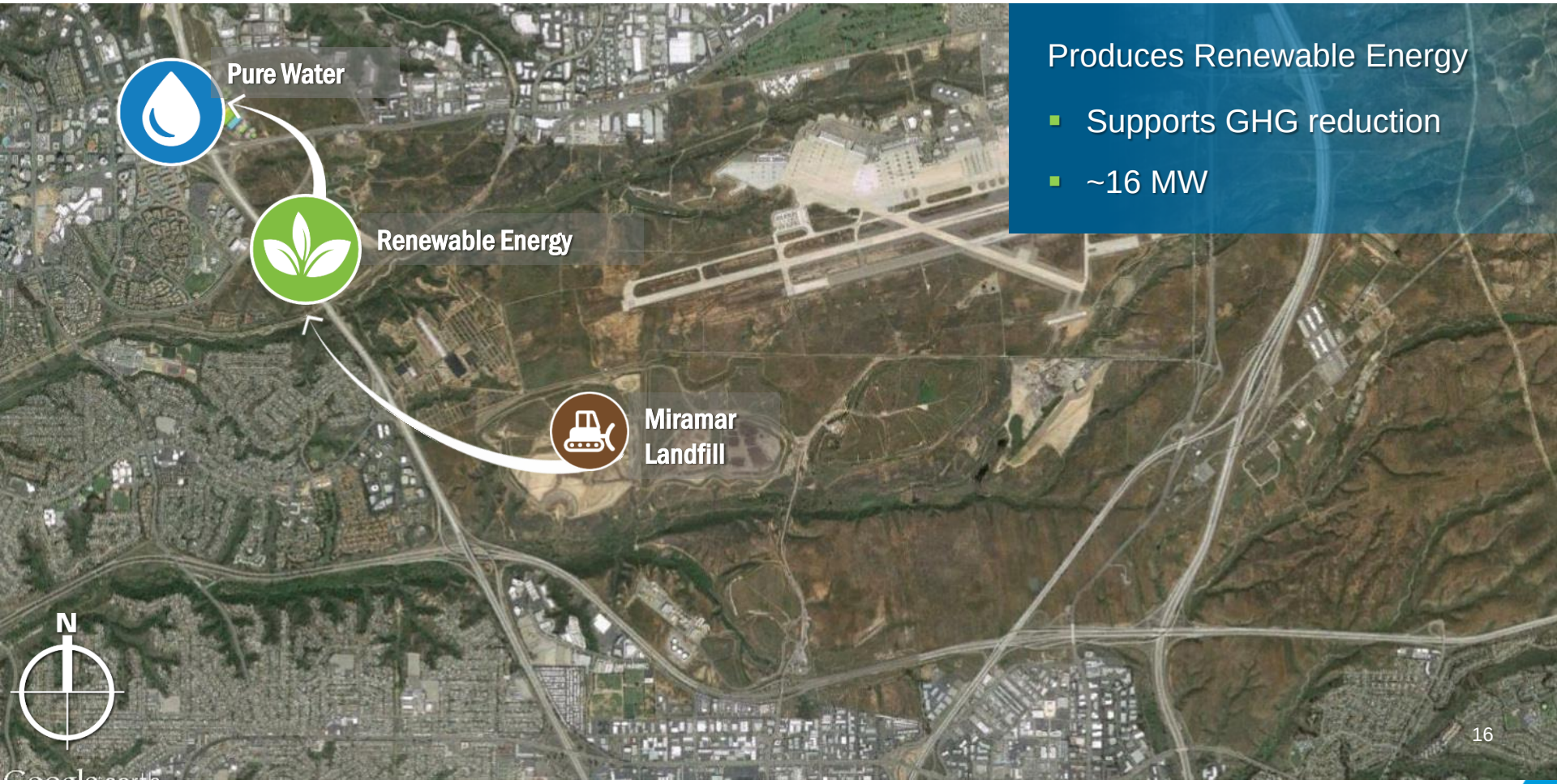
Current Renewable Energy Production

24MW

Energy Produced

$10M+

Annual Savings



Produces Renewable Energy

- Supports GHG reduction
- ~16 MW

Future Renewable Energy Production

40MW

Equivalent Power to Supply Energy to ~29,600 Homes

Recycling and Reusing water

Producing renewable energy from a sustainable source

Reducing water use and ocean discharge

17.8%

Population **increase** since 1994

20.1%

Water use **decrease** since 1994

2016

~23%

Due to Water Conservation & Recycled Water

2035

~68%

Due to Pure Water, Water Conservation & Recycled Water

Community Presentations

Community Events

Stakeholder Interviews

More than **12,000** people have toured the Pure Water Facility.

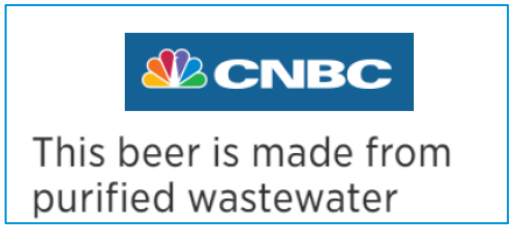
- **400+** attendees
- **347** snow cones enjoyed
- **300+** succulents planted

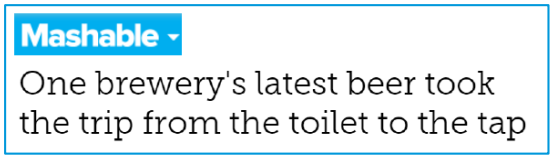
- 200+ attendees
- Stone Full Circle Pale Ale brewed with San Diego's Pure Water
- First commercial brewery to brew beer with 100% advanced-treated recycled water

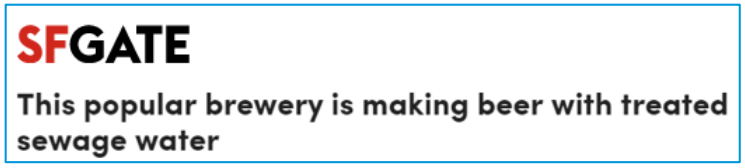
- Mayor Faulconer and Stone Brewing COO, Pat Tiernan, poured first pints of beer
- "Pure Stone Day" Proclamation
- Video testimonials, selfie frame and informational booth


28,000 tests
Ozonation
Biological
Membra


Follow Us
Pure Water
San Diego
lots of likes
Did you know we're on social? Connect with us!
@purewatersd #PureWaterSD #PureTaste #SanDiego #CityofSanDiego







- Over 80 pieces of local, national and international coverage!

www.purewatersd.org

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