Veolia Solutions Enable Customers to Achieve Sustainability Goals

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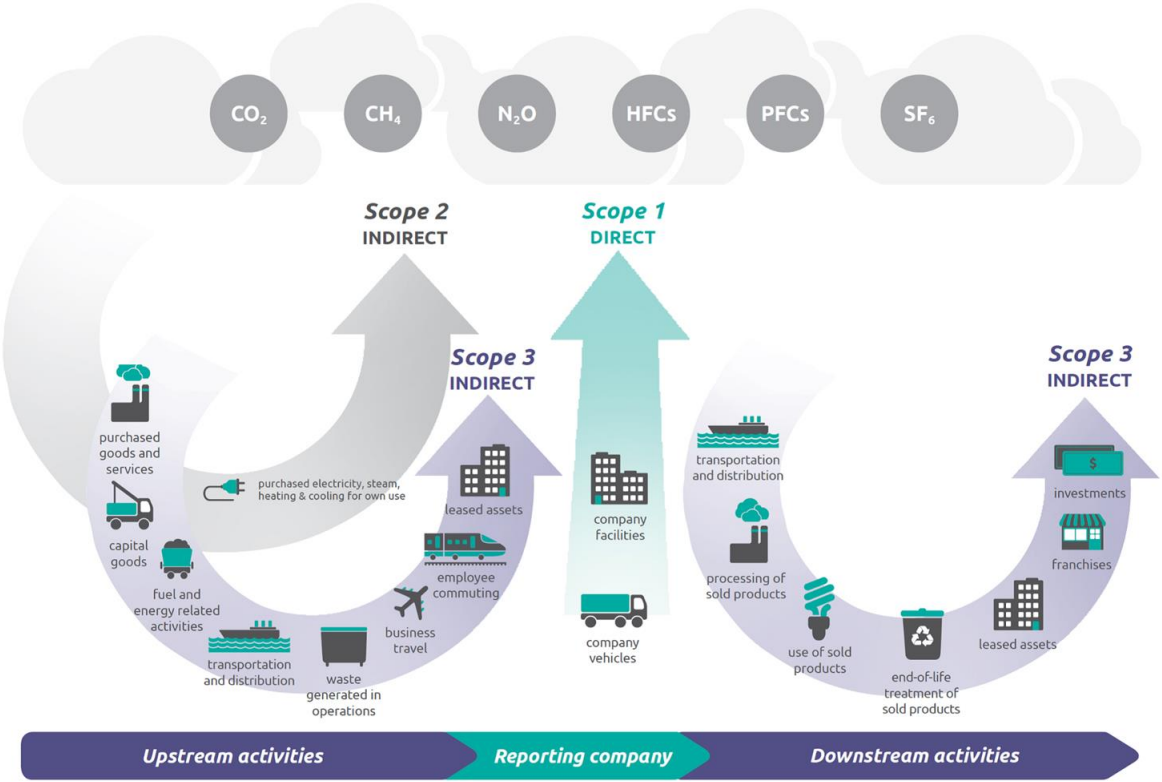
Speaker 1: Lianna van der Zalm – Veolia WTS
Speaker 2: Alex Waite – City of Santa Monica

Agenda

1. City of Santa Monica Overview – Indirect Potable Reuse Project
2. GHG Quantification Methodology
3. City of Santa Monica Project Quantification
4. Food and Beverage Water Reuse Project Quantification
5. Anaerobic Digestion Facility Project Quantification
6. Question Period

Sustainability Goals

- Interrelated Impacts:
  - Emission reduction
  - Water conservation
  - Waste reduction
- All levels of government + private sector work towards goals



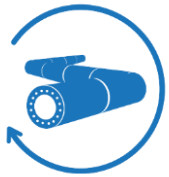
City of Santa Monica Sustainable Water Infrastructure Project

City of Santa Monica – Water Resources Division

93,000+ residents
2,700+ commercial customers

Drinking water and fire protection

groundwater (local)
surface water (MWD)



Sewer collection and recycled water

9 million gallons
of high-quality drinking water daily

14 million gallons
of wastewater captured and delivered for treatment each day

77,000 gallons
per day of recycled water

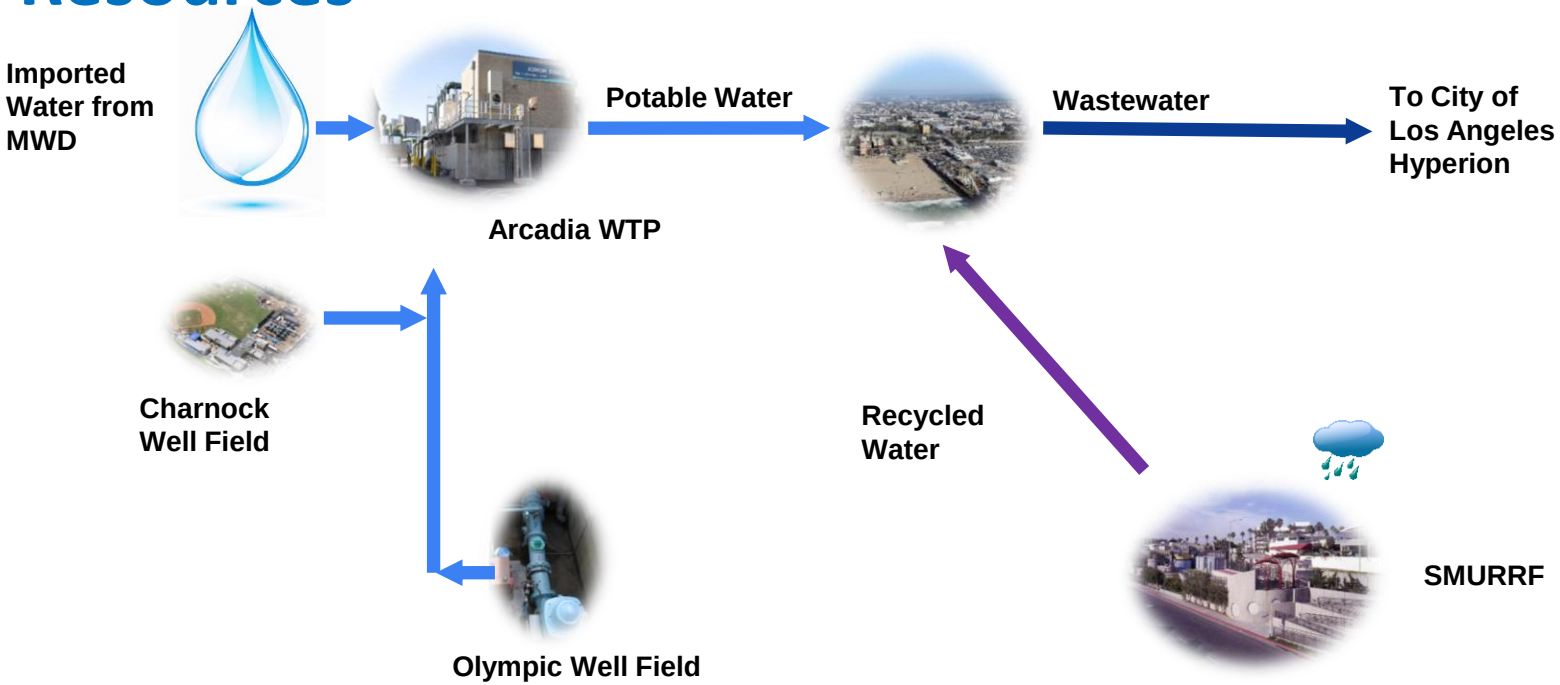
4 water storage reservoirs
totaling 40 million gallons

City of Santa Monica

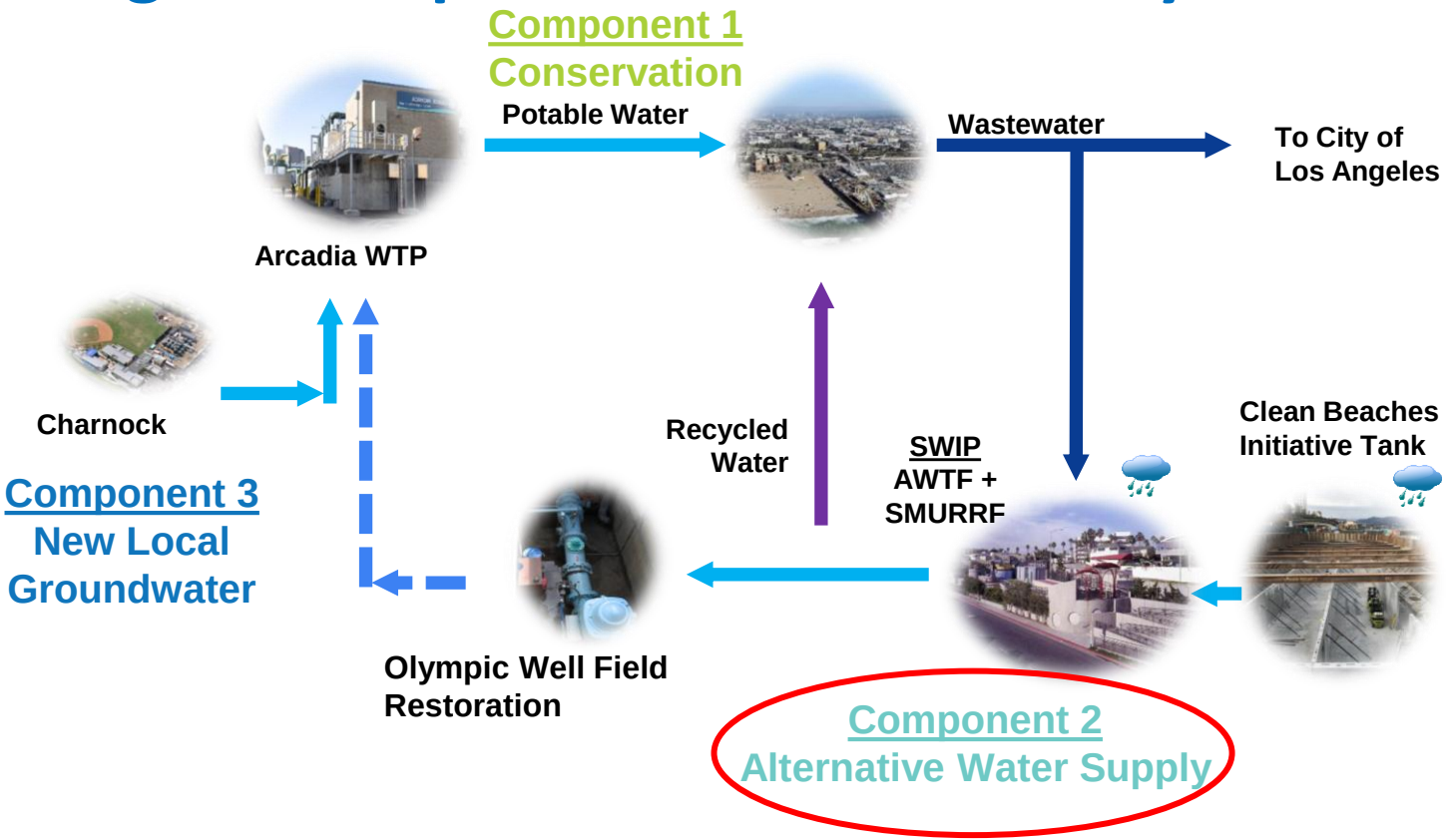
Goals of the City's Sustainable Water Master Plan

- Diverse, sustainable, & drought resilient water supply to support a sustainable community
- Reduction of energy footprint to support carbon reduction goals for the City
- Long term cost benefits for rate payers

Integrated Approach to Maximize Local Water Resources



Closing the Loop on the One-Water Cycle

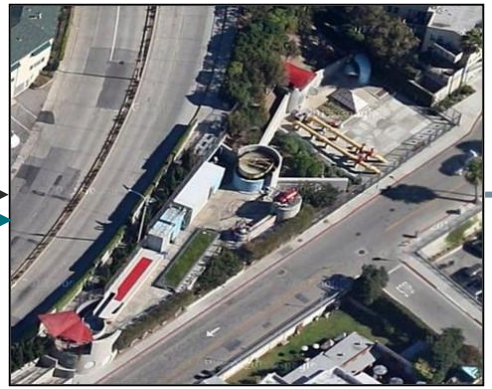


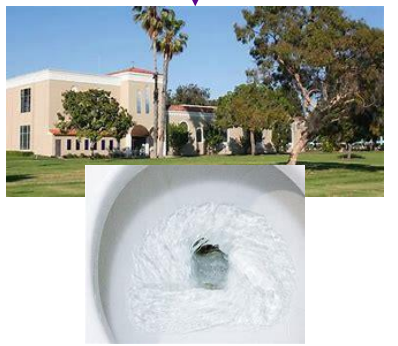
Sustainable Water Infrastructure Project (SWIP)

Advanced Water
Treatment Facility

1.5 MGD

Santa Monica Urban
Runoff Recycling Facility

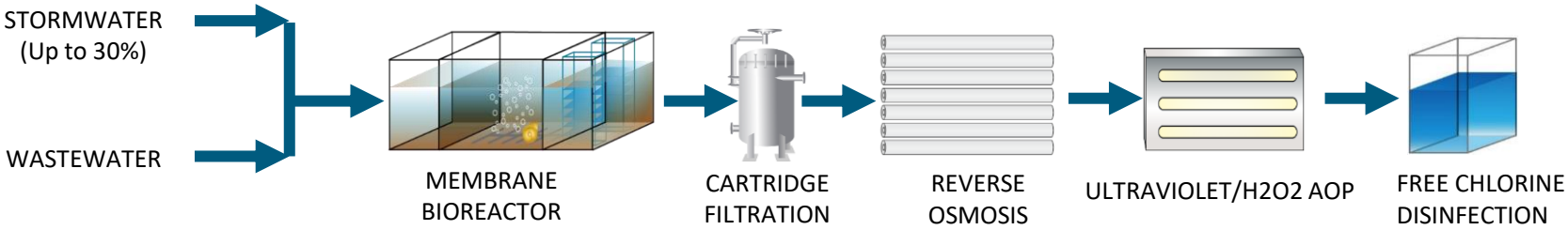




SWIP's Multiple Benefits

- Improves beach water quality
- Provides EWMP/MS4 compliance
- Drought resilient water supply
- Diversifies City's water supply portfolio
- Increases recycled water production
- Augments local groundwater supply
- Creates ~1,600 AFY of local water supply for the City

SWIP Advanced Water Treatment Facility (AWTF)

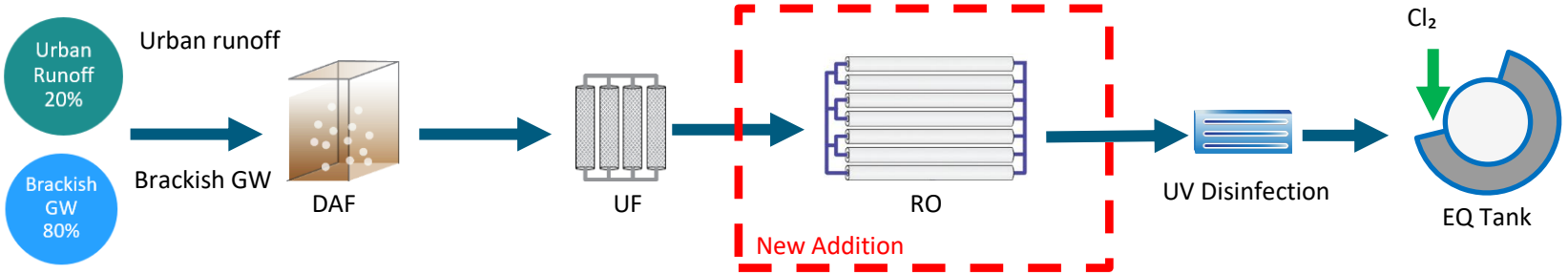


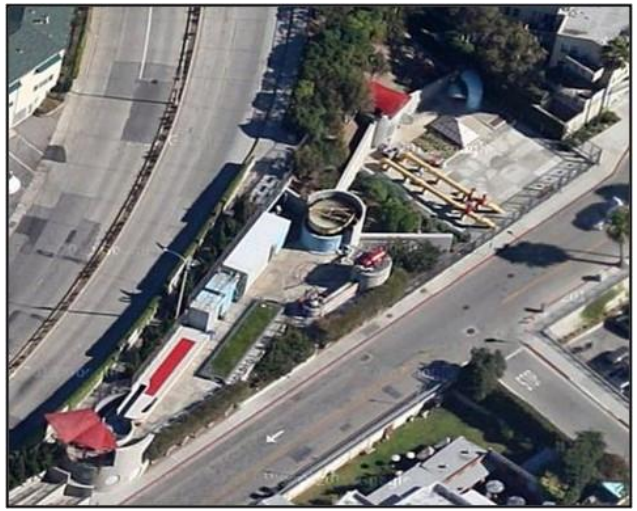
Process	Virus	Cryptosporidium	Giardia
MBR	1.0	2.5	2.5
Cartridge Filters	-	2.0	2.5
RO	1.5	1.5	1.5
UV-AOP	6.0	6.0	6.0
Chlorine	5.0	-	-
Total	**13.5**	**12.0**	**12.5**
Required for Title 22 GRRP	**12.0**	**10.0**	**10.0**

First MBR and CF Granted LRVs in CA!

City of Santa Monica

Santa Monica Urban Runoff Recycling Facility (SMURRF)





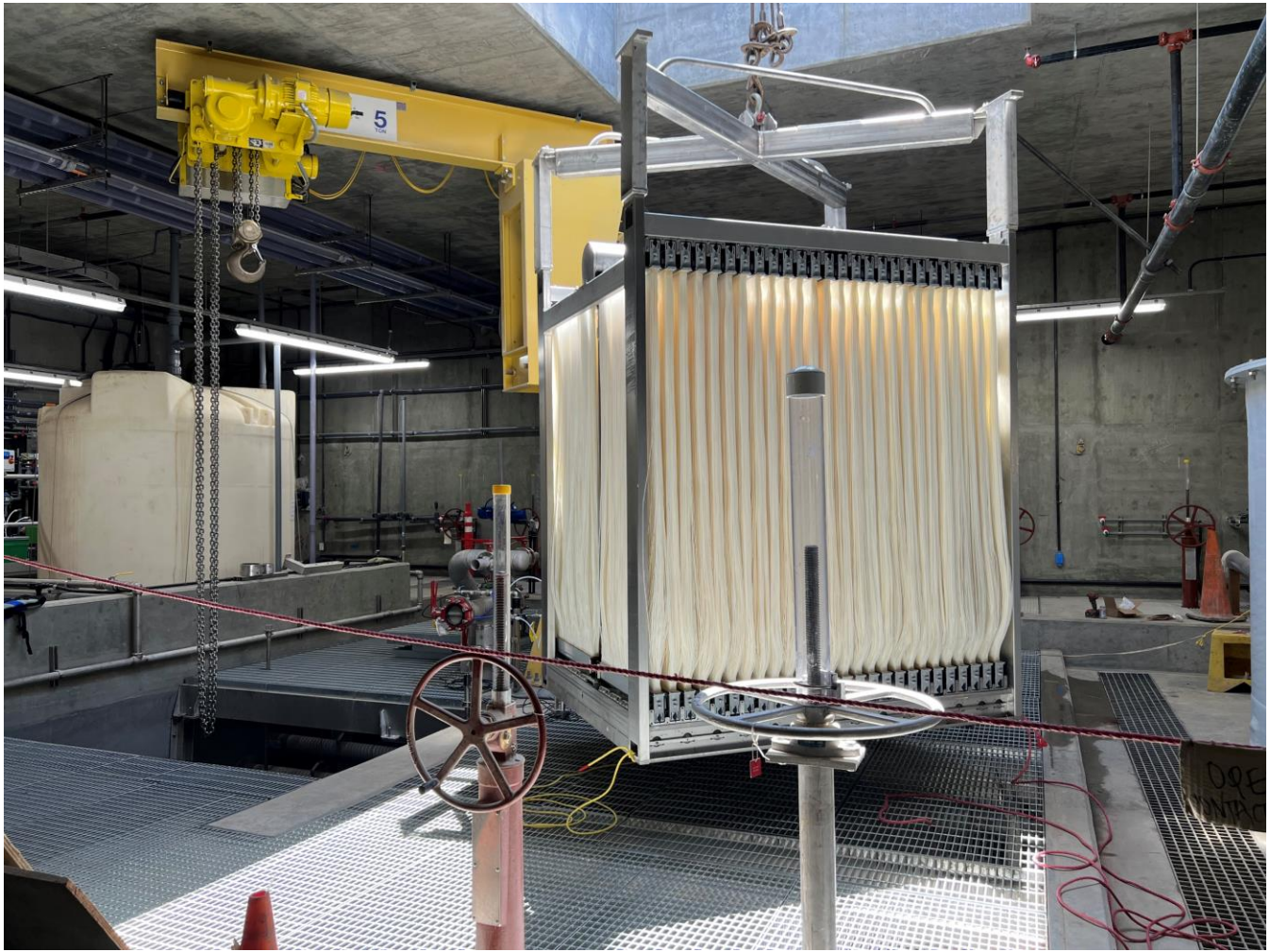
- Originally constructed in 2000 as stormwater BMP
- Provides pollution control for MS4 and EWMP compliance
- Produces up to 500 AFY of Title 22 diluent water pending WDR/WRR permit amendment for GRRP

First stormwater direct injection project in CA!

City of Santa Monica


First underground AWTF in CA!

City of Santa Monica

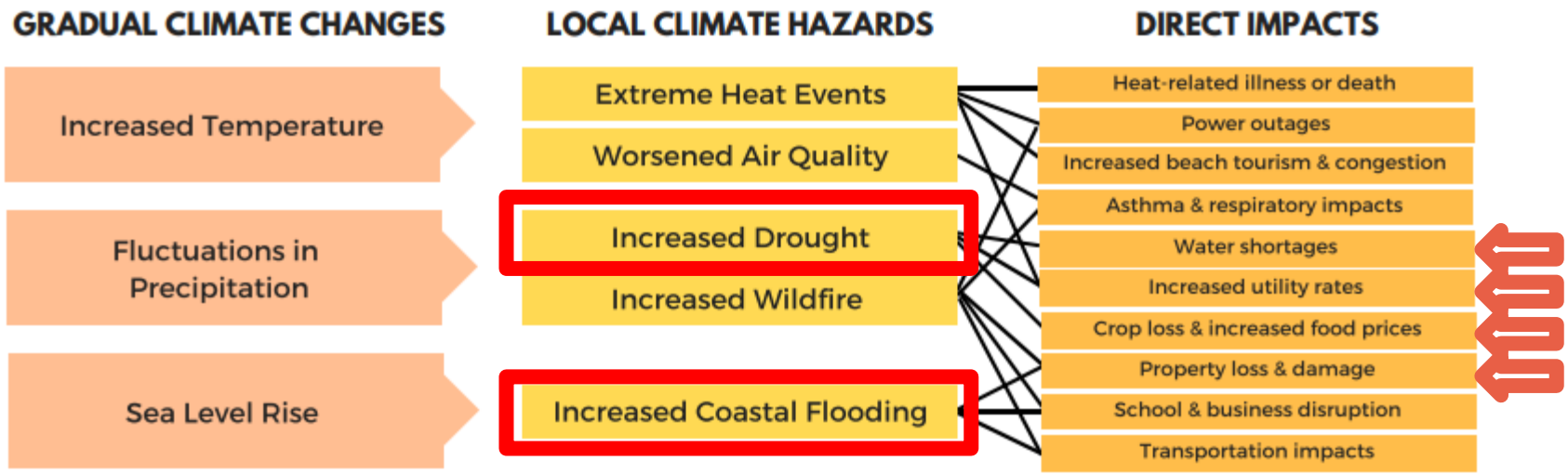


City of Santa Monica


City of
Santa
Monica

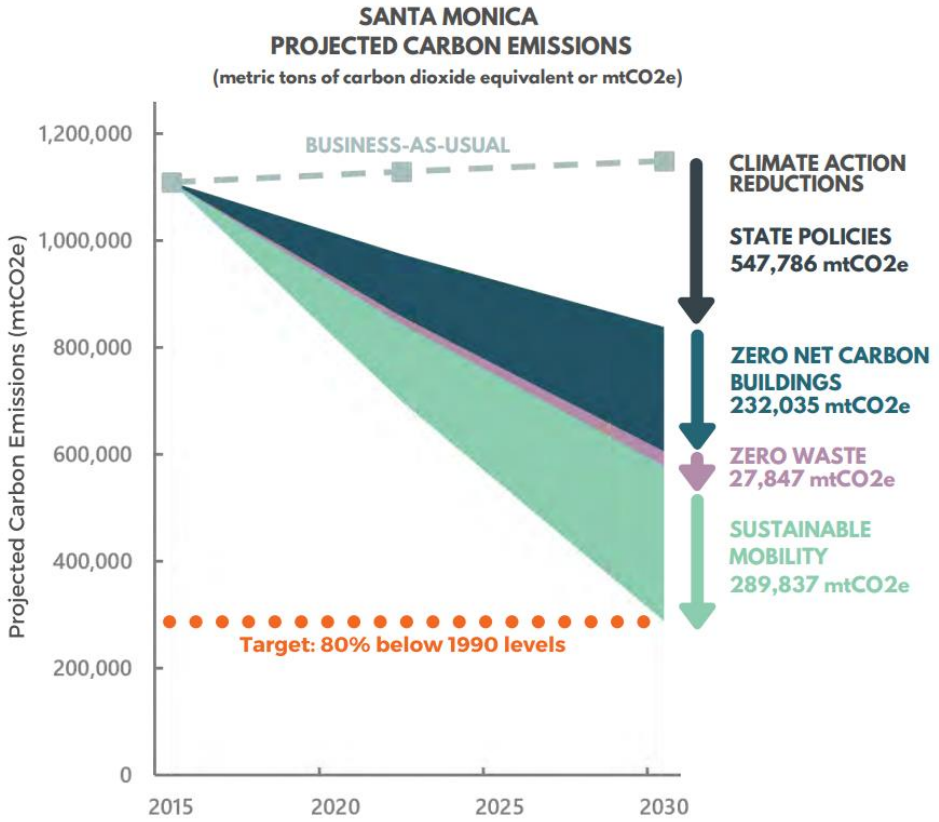
Greenhouse Gas Assessments

Climate Change: Local Impacts



Greenhouse Gas Reduction Targets

- Regulatory/compliance + voluntary action on climate change
- Municipalities can set procurement targets to match policy goals
- **GHG quantification lets us measure and track progress**



Quantification Methodology
Step-by-Step

Base Case: status quo, current practice
Project Case: new project, process change

01
Identify Project and Base Case Scenarios

New vs. Pre-existing Solution

02
List Project and Base Case Emissions

e.g., Electricity use, Chemical use, Haulage/Diesel use

03
Emission Factor Retrieval

Converts all units to TCO_2eq

04
Emission Calculation

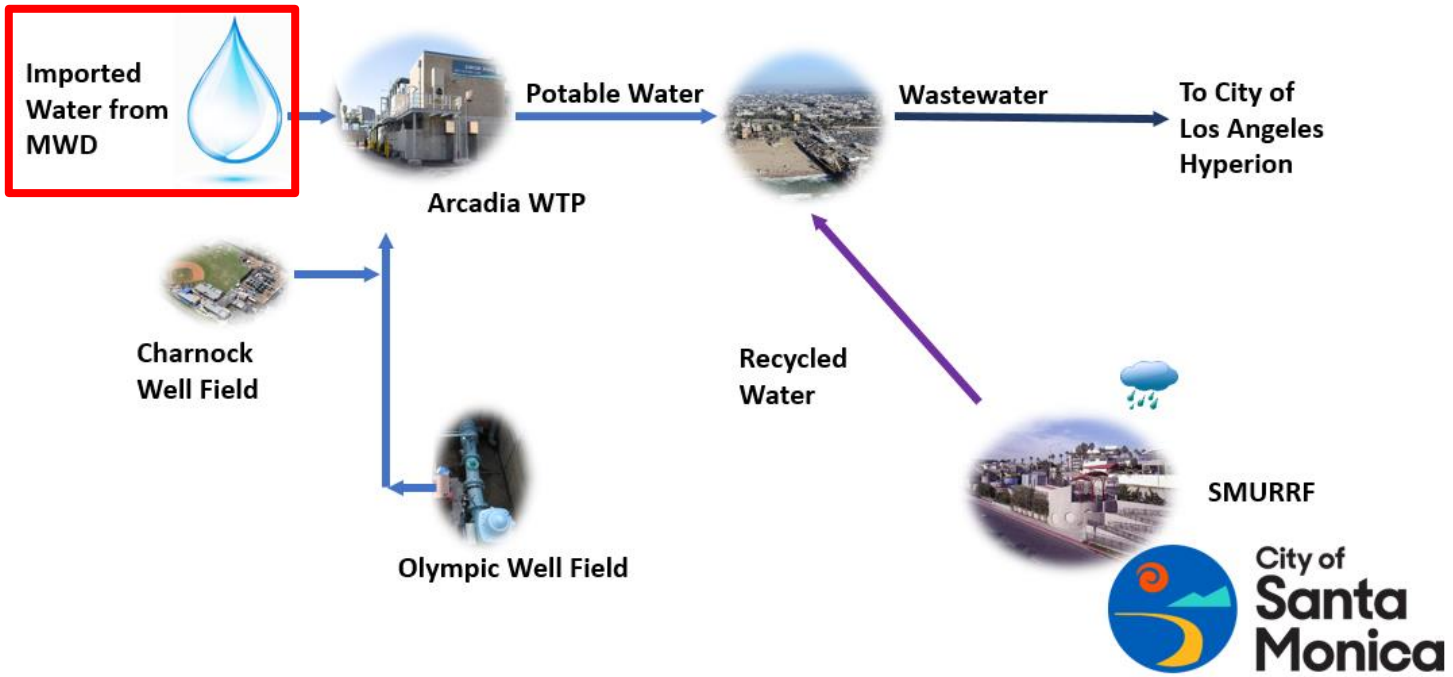
Positive or negative net emissions, ***WHY?***

Project 1 – Santa Monica Project Quantification

Project 1 – Santa Monica: Indirect Potable Reuse for Aquifer Recharge

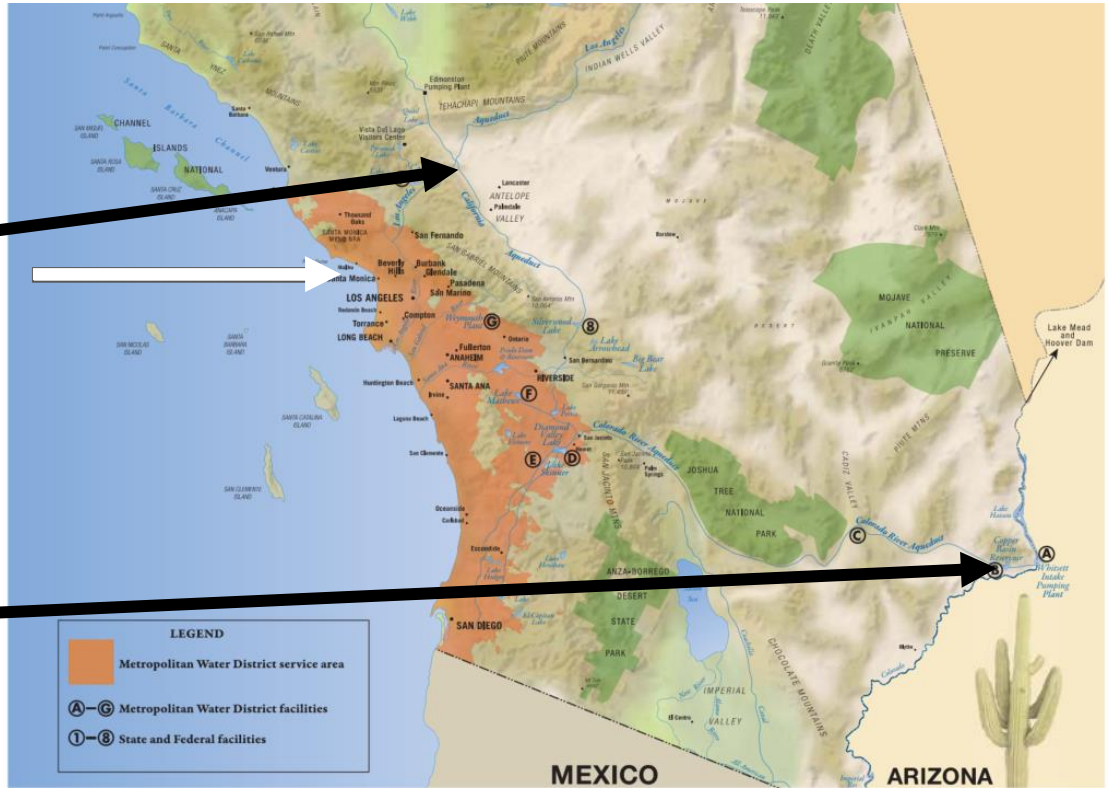
Base Case

- Relies on well water and imported freshwater for potable water
- Importing water emits ~0.8 TCO_2eq per million litres, city uses ~10 billion litres per year



Project 1 – Santa Monica: Indirect Potable Reuse for Aquifer Recharge

Project Case



Project 1 – Santa Monica: Indirect Potable Reuse for Aquifer Recharge

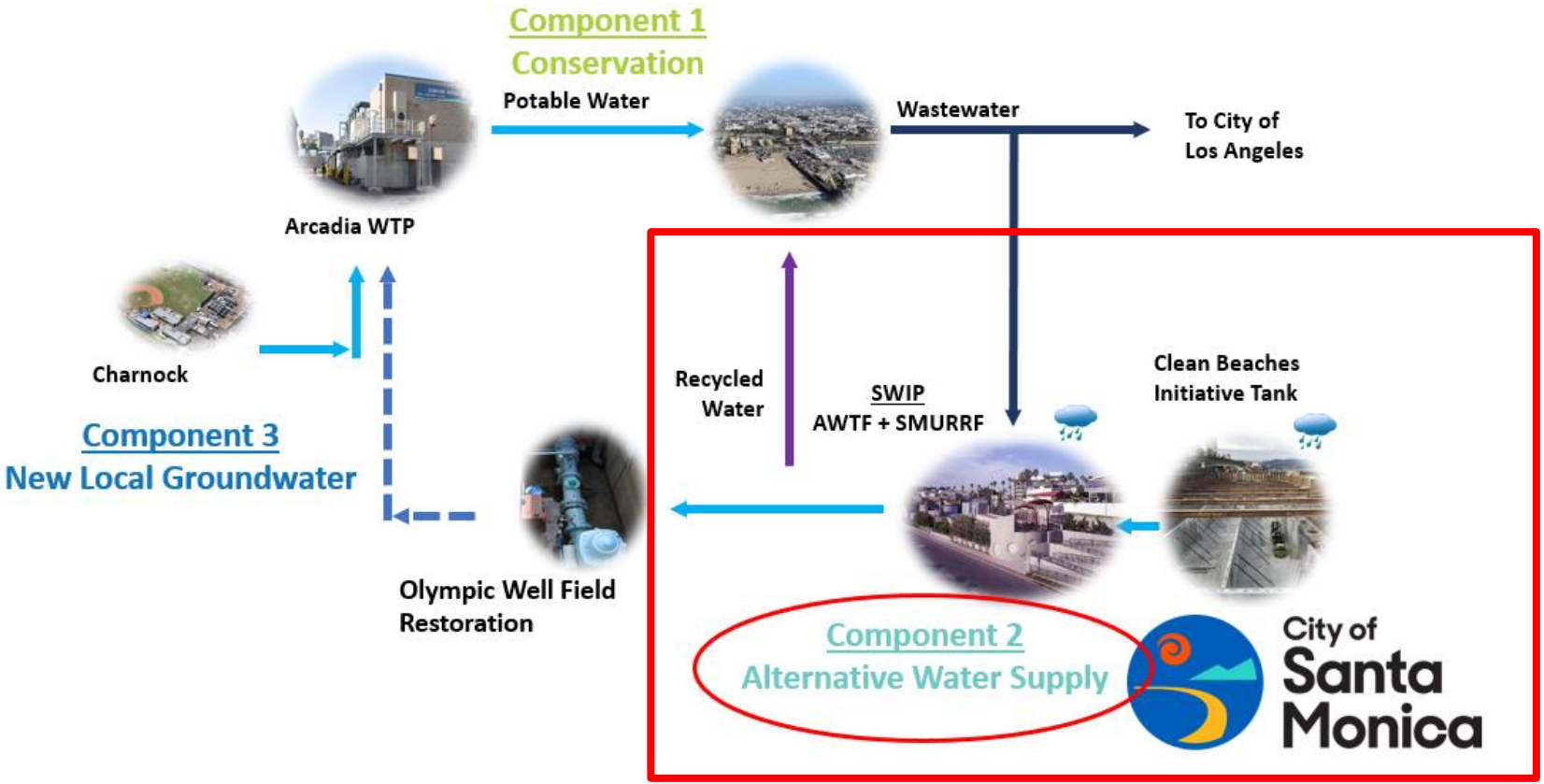
Imported Water Emission Factor

- Emissions from imported water are tied to electricity primarily (pumping, treatment)
- Emission factors are projected to decrease over time (state energy policy - decarbonize)

Scope	2017	
	GHG Emissions (MT of CO_2e)	Percent of Total Emissions
Scope 1	**8,875**	**4%**
Stationary Combustion	1,918	1%
Fugitive Emissions	71	<1%
Mobile Combustion	6,886	3%
Scope 2	**194,480**	**86%**
Electricity Consumption	192,511	85%
T&D Losses	1,969	1%
Scope 3	**10,598**	**5%**
Water and Wastewater	184	<1%
Waste Generation	3,157	1%
Employee Commute	7,257	3%
Scope 3 Construction	**12,081**	**5%**
Construction Emissions	12,081	5%
Total Emissions	**226,036**	**100%**

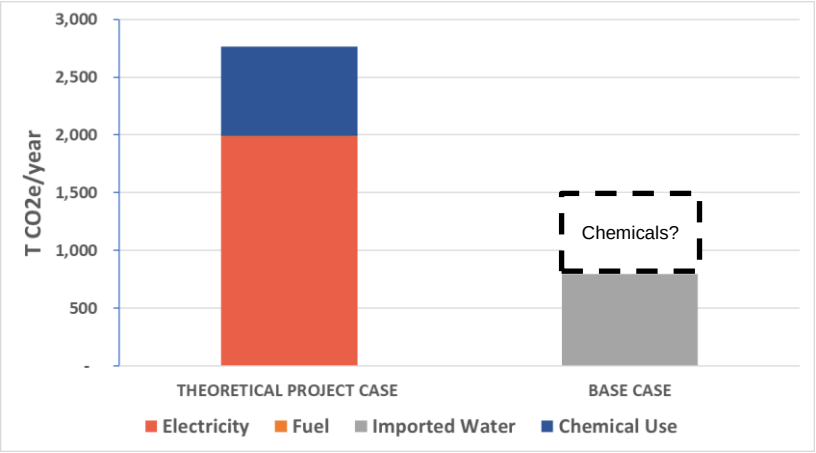
Project 1 – Santa Monica: Indirect Potable Reuse for Aquifer Recharge

Project Case



Project 1 – Santa Monica: Indirect Potable Reuse for Aquifer Recharge
Comparison

	tCO2eq/yr	
	Project Case (no Electricity Offsets)	Base Case
Electricity	1984	0
Fuel	5	0
Imported Water	0	793
Chemical Use	775	0
Totals	**2765**	**793**



- Main cause of emissions is from the electricity usage
- Residual waste from the AWTF and SMURRF are sent to wastewater treatment, would go there in the base case also
- Chemical consumption is not regularly tracked or included in GHG assessments for existing facilities

Project 1 – Santa Monica: Indirect Potable Reuse for Aquifer Recharge
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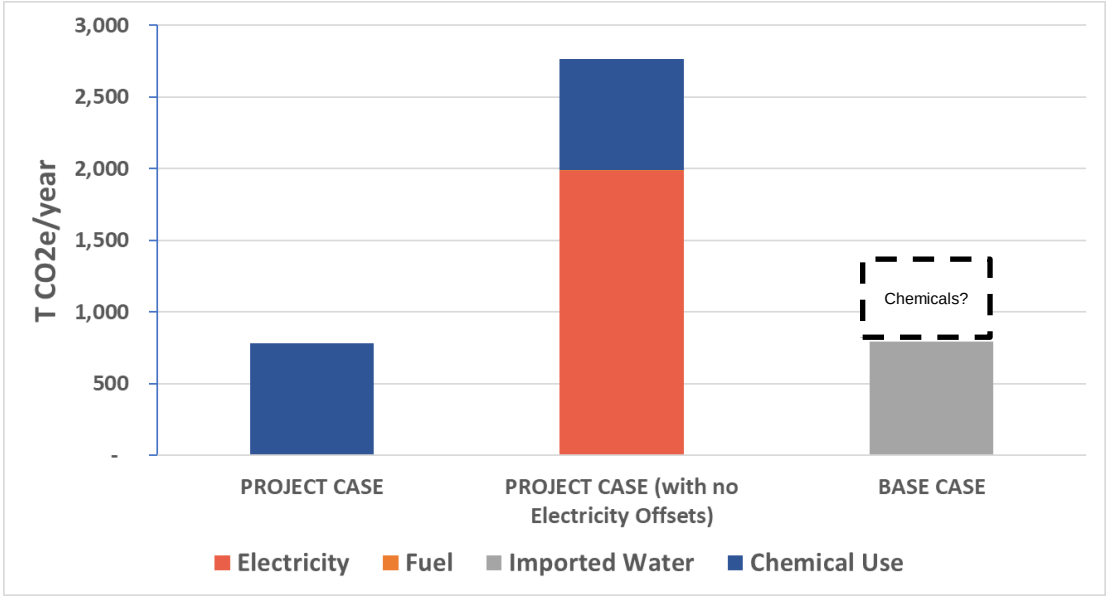


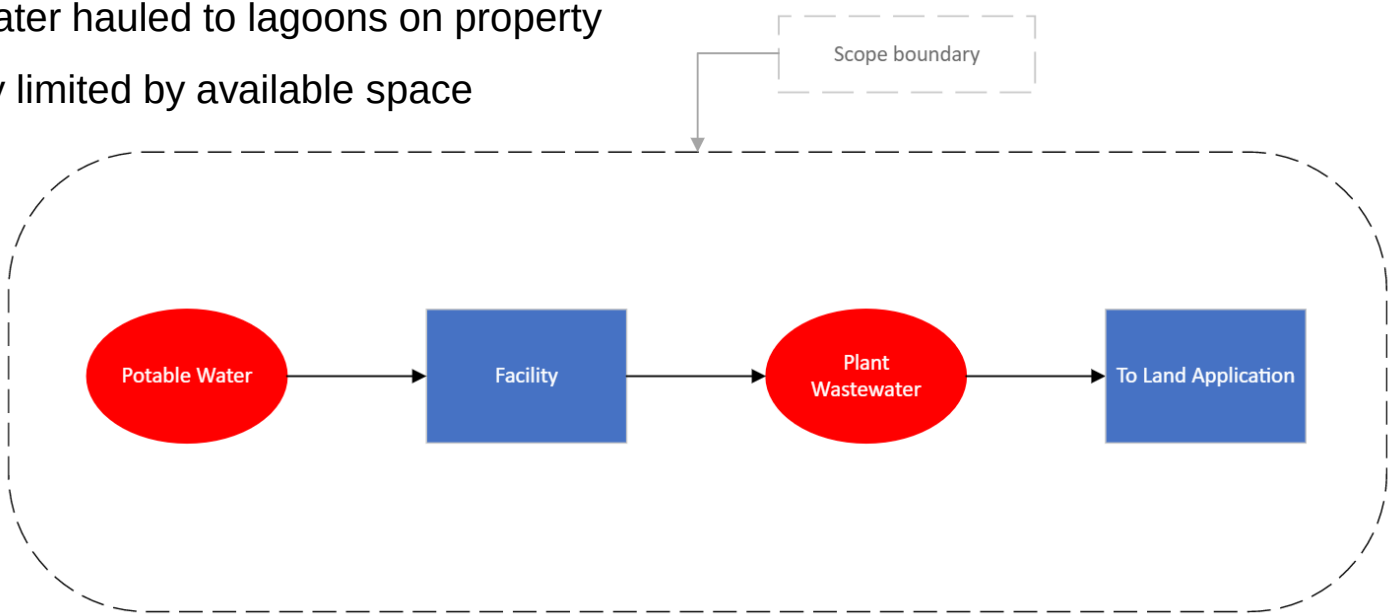
- Electricity is all renewable for the AWTF and SMURRF process
- Southern California Edison: Clean Power Alliance

Project 2 – Food & Beverage Water Reuse System

Project 2 – Food & Beverage Water Reuse System

Base Case (No Reuse)

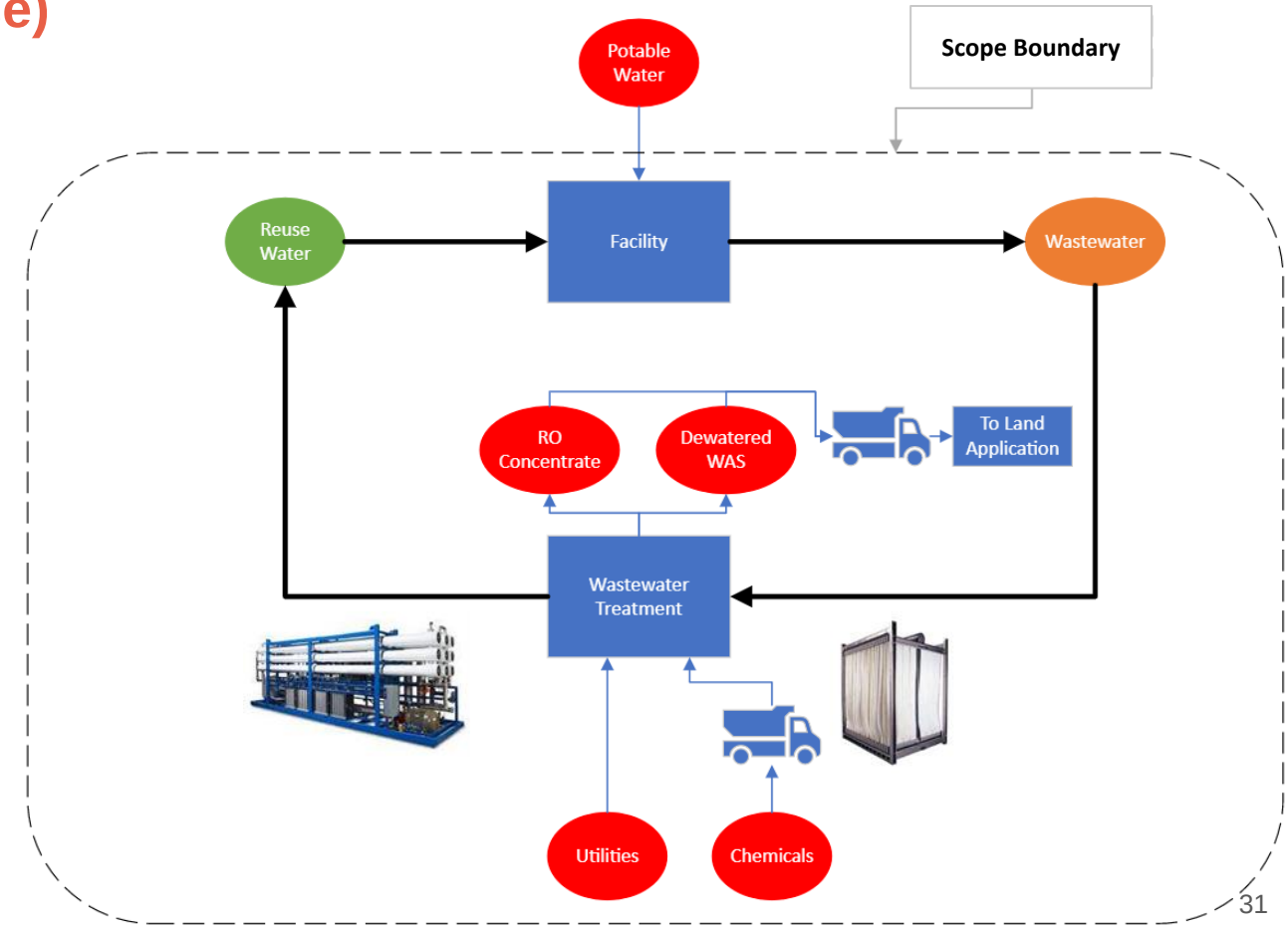
- Pre-existing F&B plant with plans for expansion
- Basis of 2.2 million gallons per day (MGD) potable water use
- Produces low strength, low solids wastewater
  - Wastewater hauled to lagoons on property
  - Capacity limited by available space



Project 2 – Food & Beverage Water Reuse System

Project Case (Reuse)

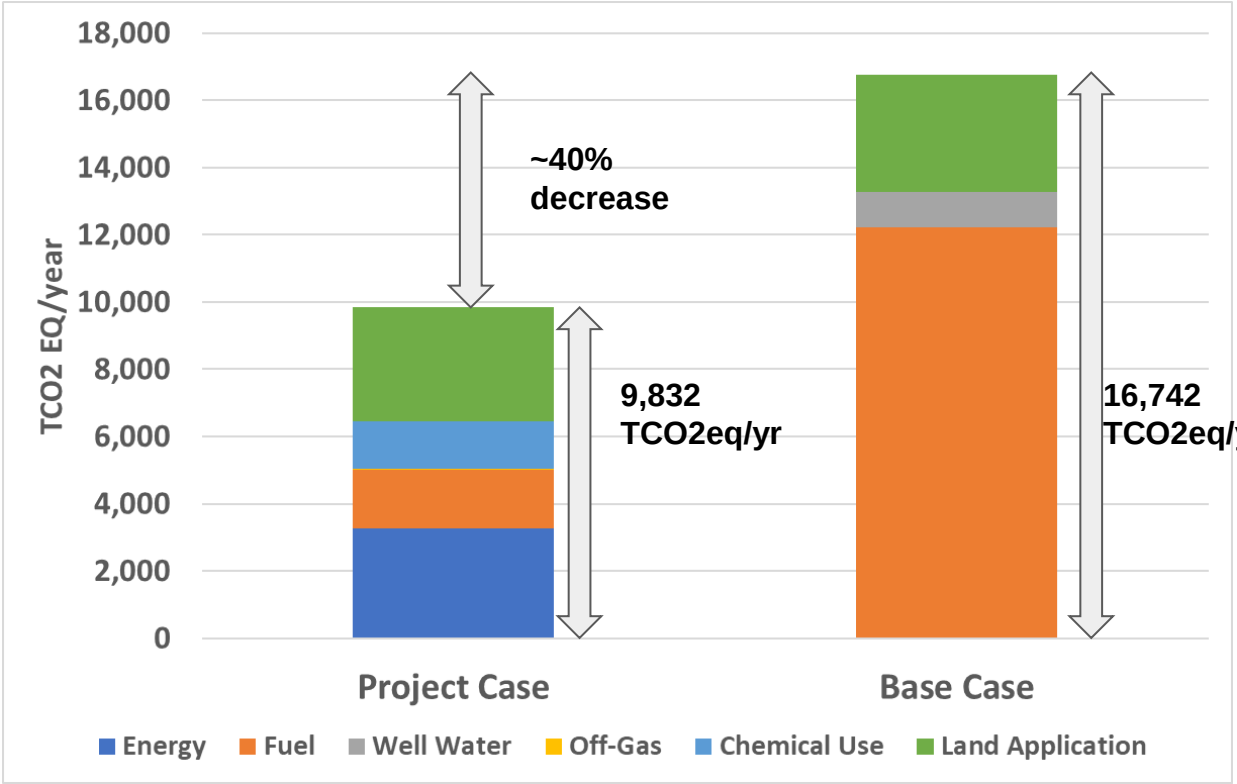
- MBR/RO treatment
- 1.7 MGD water reuse
  - Reduces potable water use
- Decreases WW to land application
  - Reduces Haulage
- Allows for plant expansion



Project 2 – Food & Beverage Water Reuse System

Project Comparison

- Emissions from MBR/RO process offset by haulage reduction
- **Haulage emissions are key**
  - Reuse reduces haulage by ~6,500 tonnes/day & ~7,000 TCO2eq/yr
- >70% Renewable energy grid

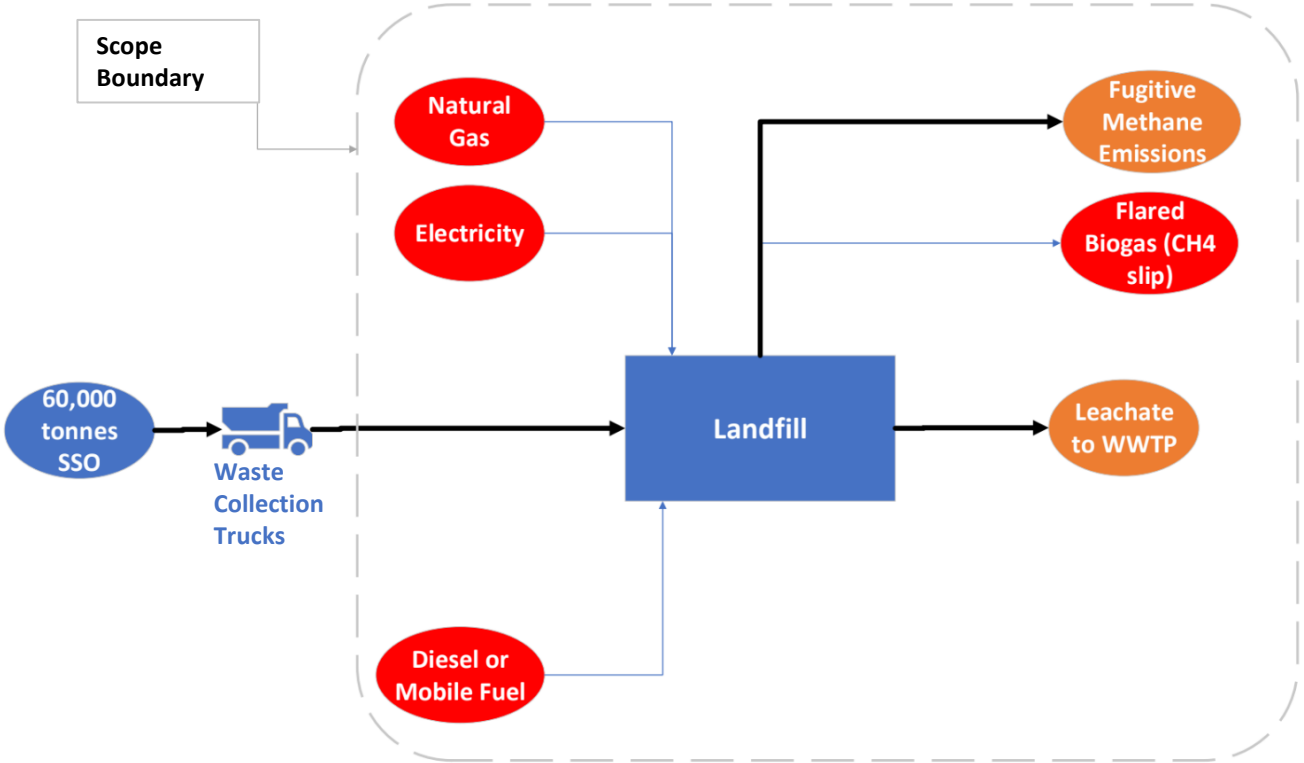


Project 3 – Anaerobic Digestion Facility

Project 3 – Anaerobic Digestion Facility

Base Case - 60,000 tonnes/year to landfill

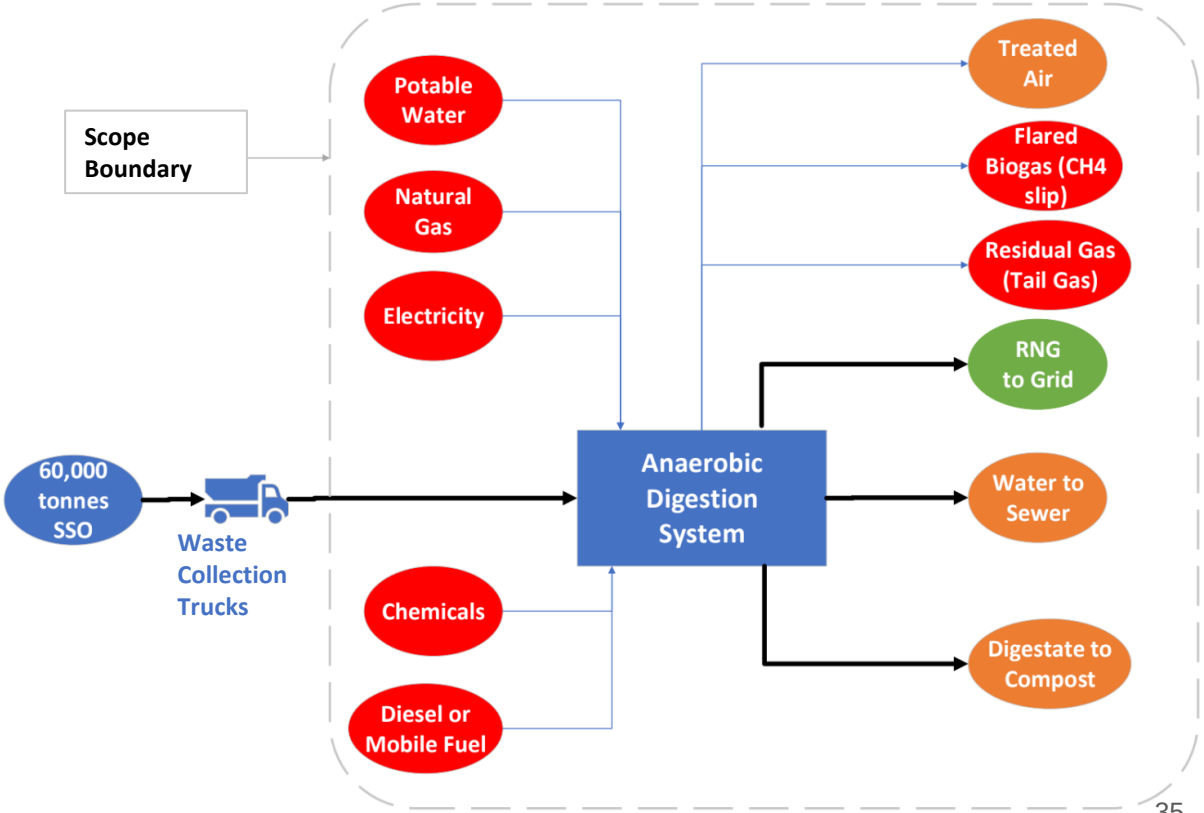
- 60,000 tonnes/year organics mixed into garbage collection
- Sent to landfill
- Emits large amounts of uncaptured methane
- **<u>25x higher</u>** global warming potential (GWP) than CO2



Project 3 – Anaerobic Digestion Facility

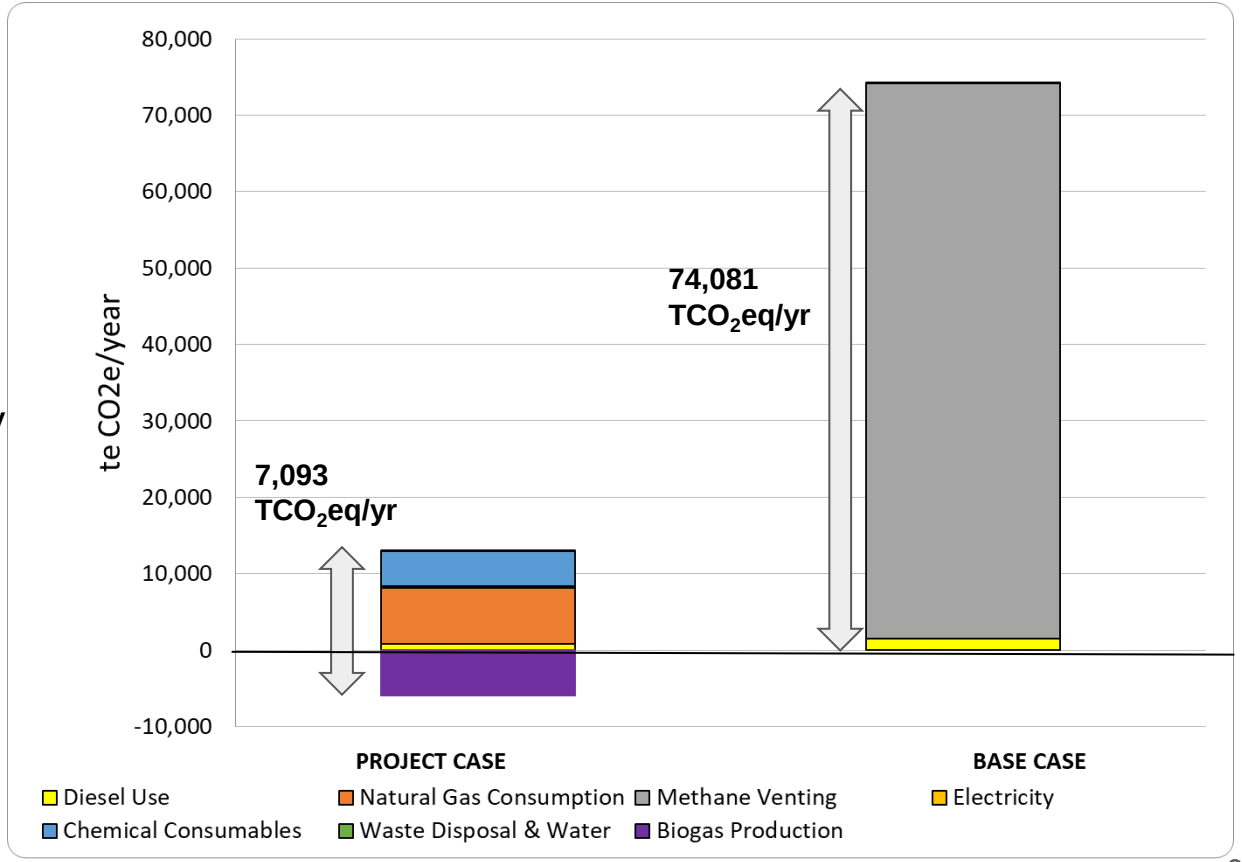
Project Case - 60,000 Tonnes/year to AD facility

- 60,000 tonnes/year SSO sent to AD facility
- Captures, processes, and repurposes methane emissions as RNG
- Treatment requires additional energy & chemicals
- However, <u>avoids methane emissions</u>



Project 3 – Anaerobic Digestion Facility
Project Comparison

- Net emissions impact
  - -66,987 TCO_2eq/yr
- **Methane venting emissions need to be avoided!**
- >95% renewable electricity grid for the region
  - Lowers emissions for electricity use



Key Takeaways

- As climate change is more prevalent in everyday life, need for change is a must
- All levels of both private and public sector groups need to establish sustainability goals
- Focus on apparent local hazards (i.e. shortage of water) and direct changes
- GHG emission calculations can help determine key issues and potential improvements
- By using multiple factors in facility design/changes, can establish a well-balanced project

Questions?

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