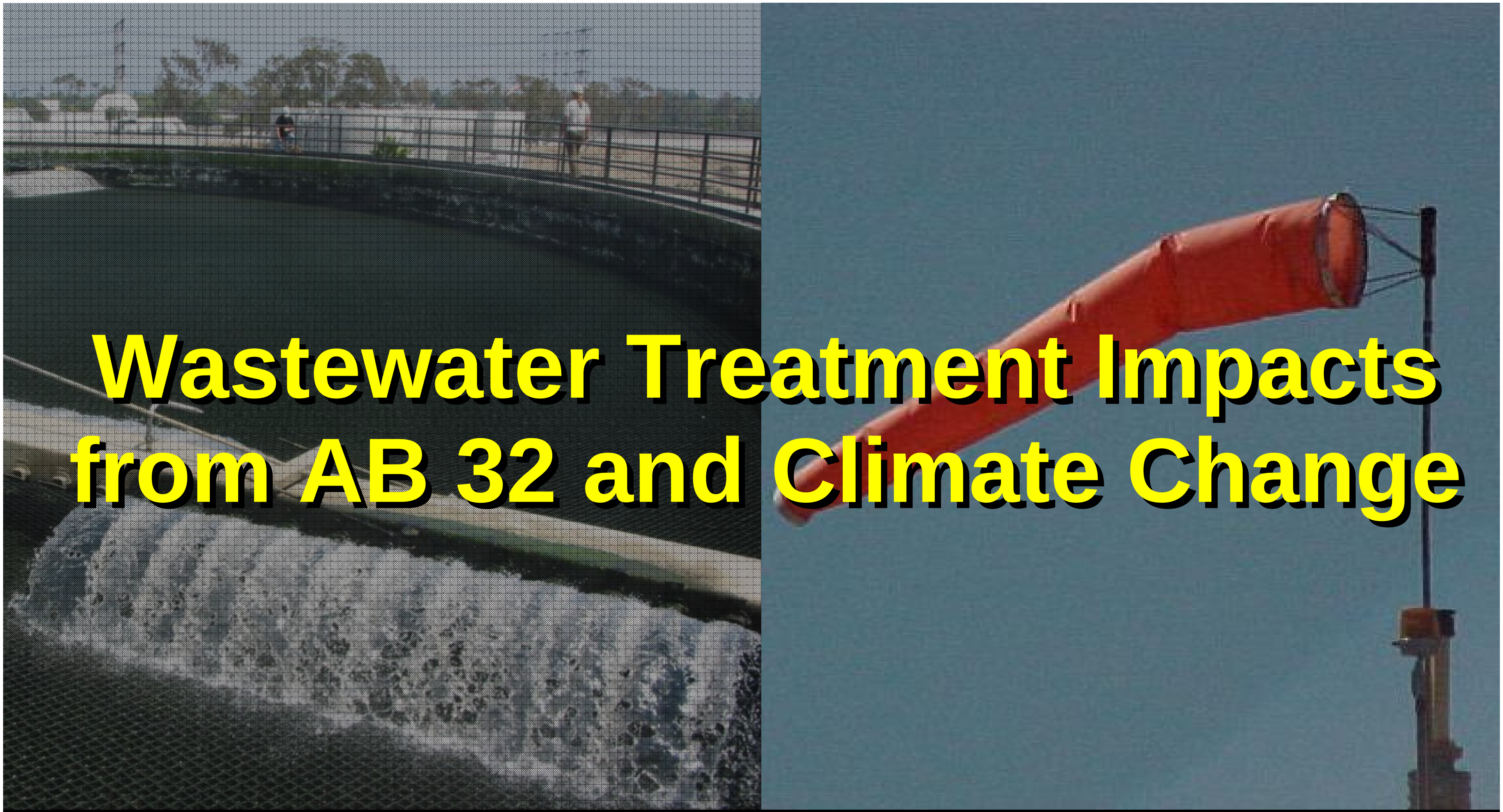
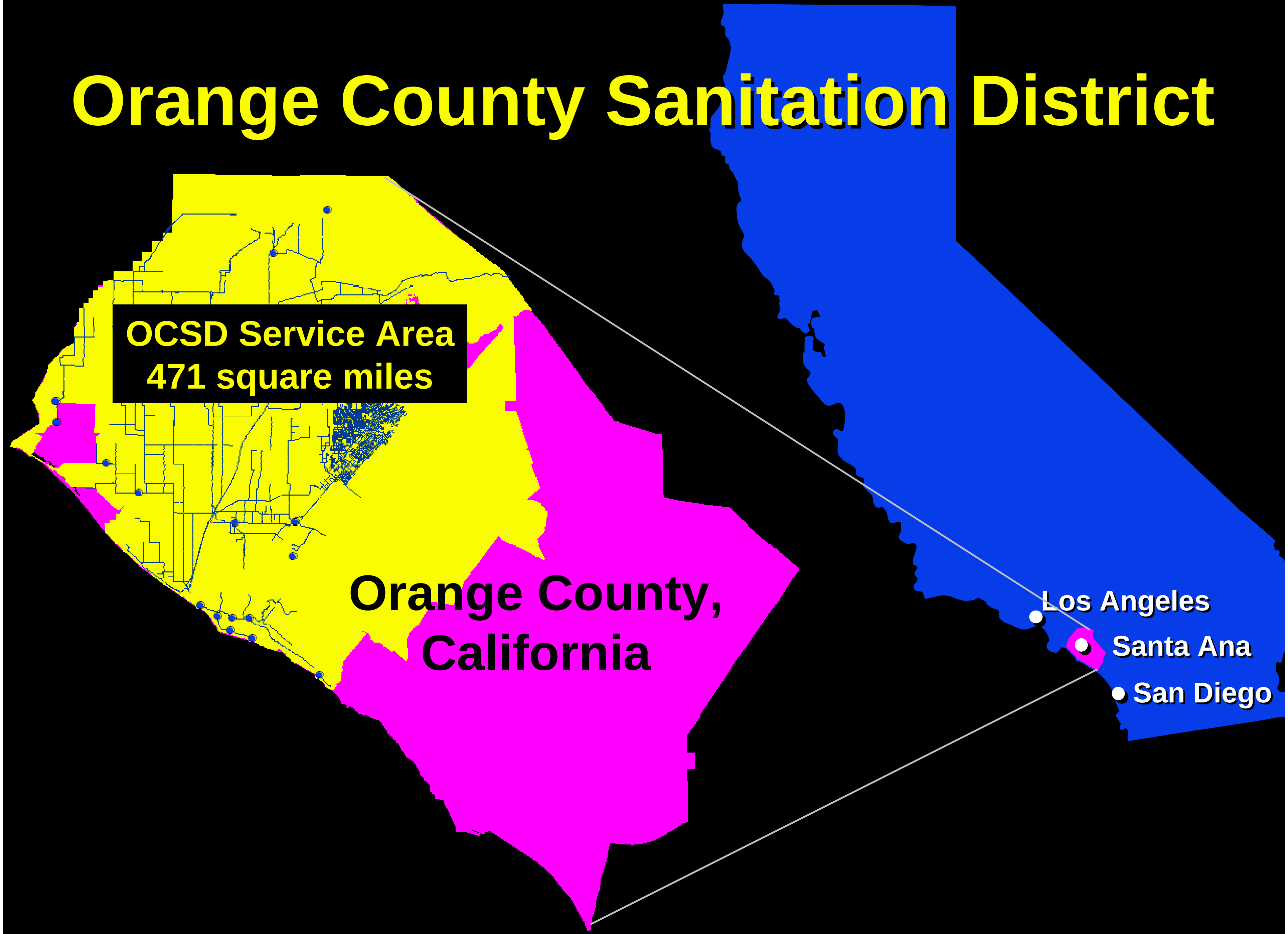


Wastewater Treatment Impacts from AB 32 and Climate Change

Michael D. Moore
Environmental and Regulatory Affairs Manager
Orange County Sanitation District

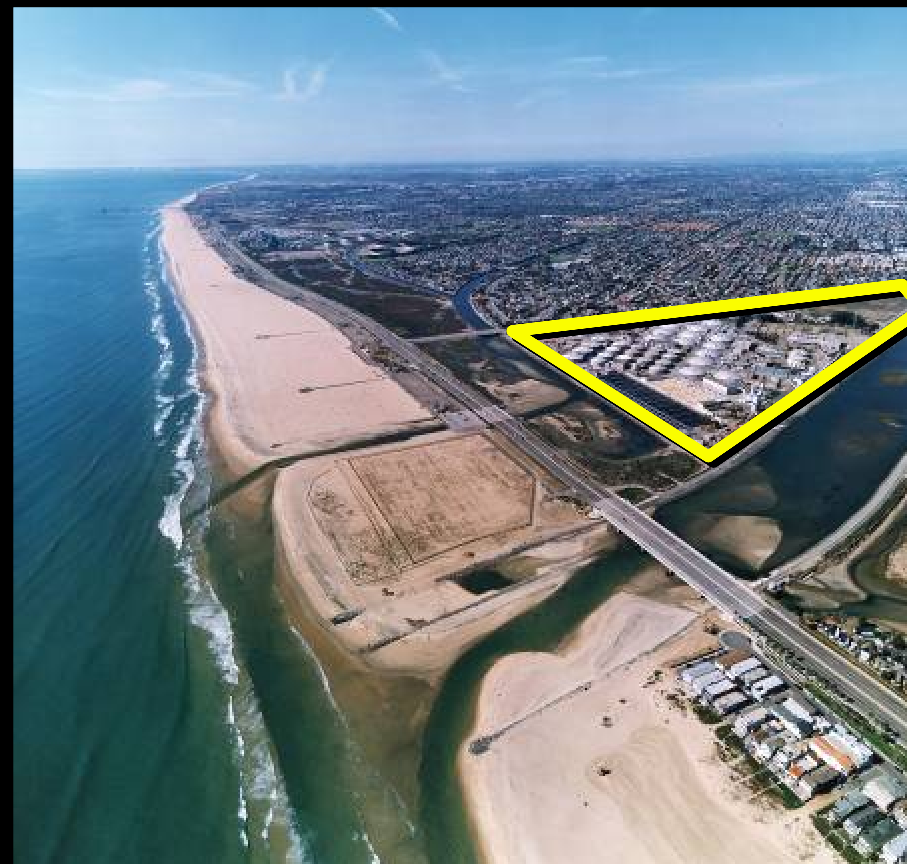
Orange County Sanitation District



Orange County Sanitation District

5th Largest WWTP in USA

Reclamation Plant No. 1
Fountain Valley



Treatment Plant No. 2
Huntington Beach

Overview

Climate Change Regulations and Implementation

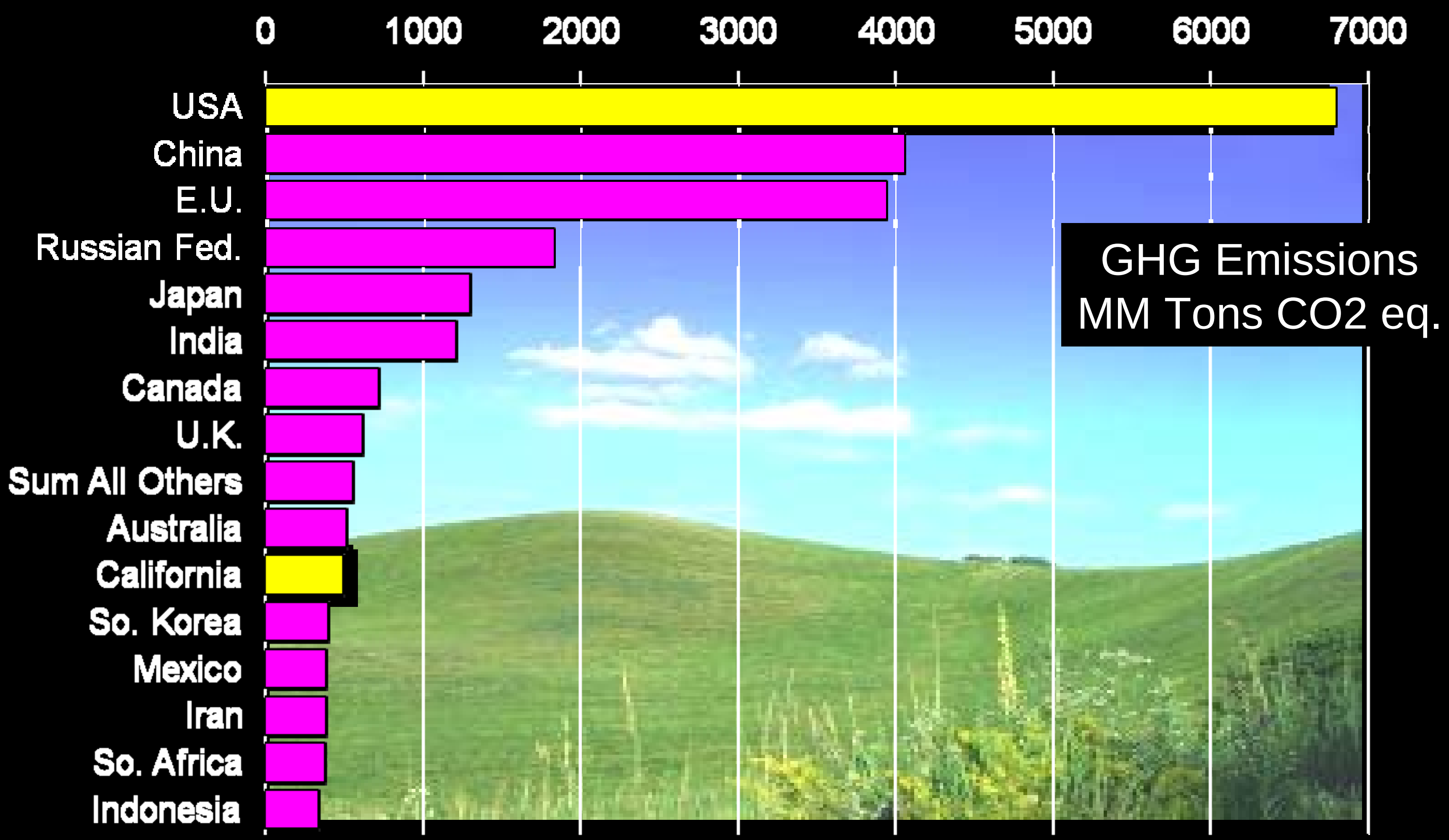
Wastewater Treatment and Greenhouse Gas Emissions

Practical Steps Forward


Climate Change
Regulations and Implementation

Why is air first?

Greenhouse Gases can make the other climate change symptoms worse.



SOURCE: US EPA

California Regulations

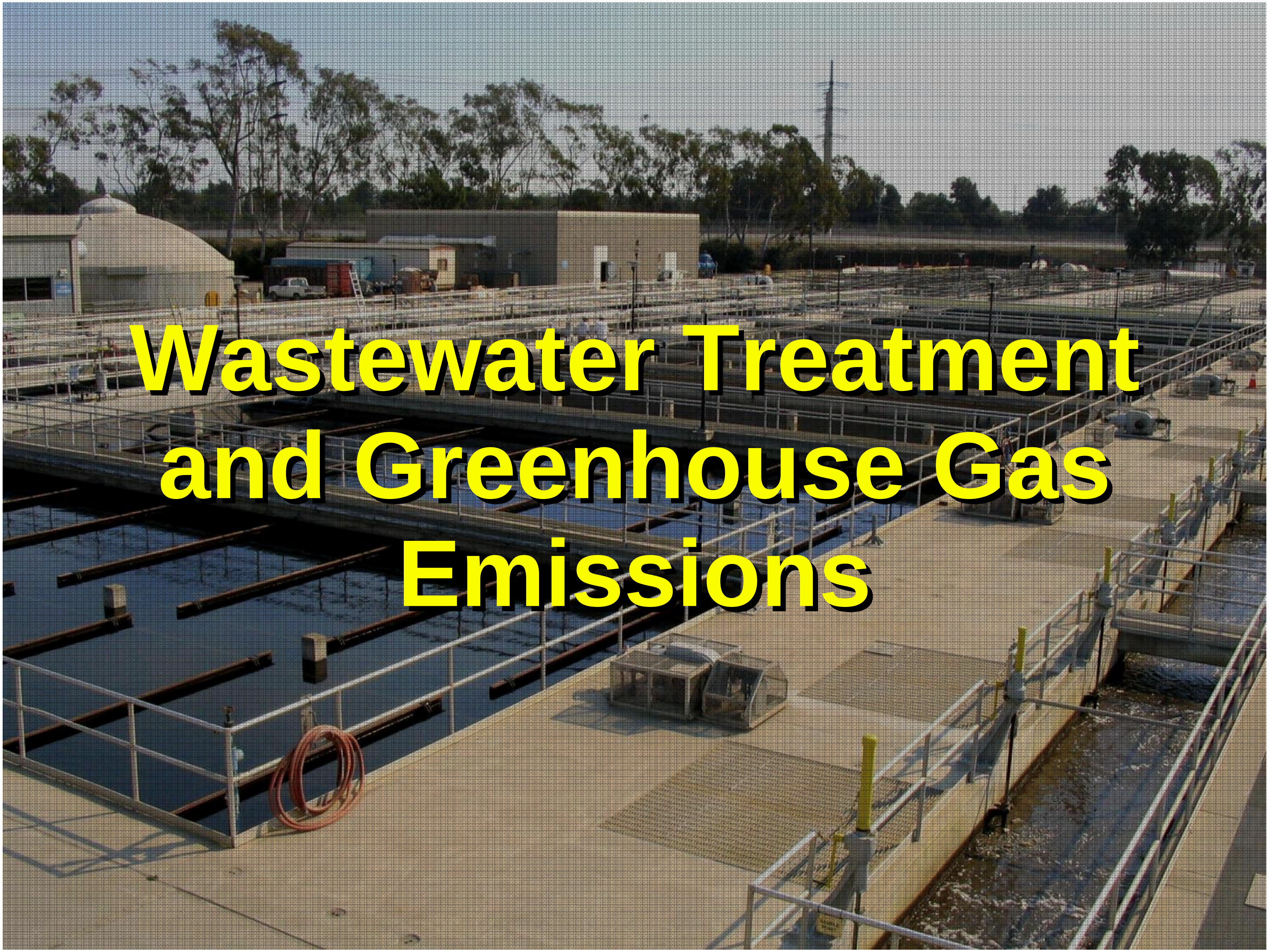
- 2006 California Global Warming Solutions Act (AB 32)
  - 1990 Greenhouse Gas (GHG) levels by 2020
  - 80% GHG levels by 2050
- California Environmental Quality Act (CEQA)
  - 10+ options to disclose GHG for construction projects
- Local Air Board
  - Several rules for CH4, CO, NOX, SOX, CO2

Early Action Items

- Large facility mandatory emissions reporting
- Low carbon fuel standard
- More restrictions on refrigerants
- Landfill methane capture
- Sulfur hexafluoride (SF_6) reductions in non-electric sector

Early Action Items (continued)

- Reduce GHGs in consumer products
- Reduction of PFCs from semiconductor industry
- Other items aimed at energy efficiency and fuels


Wastewater Treatment and Greenhouse Gas Emissions

Expected Direct GHG Emissions for WWTP Processes

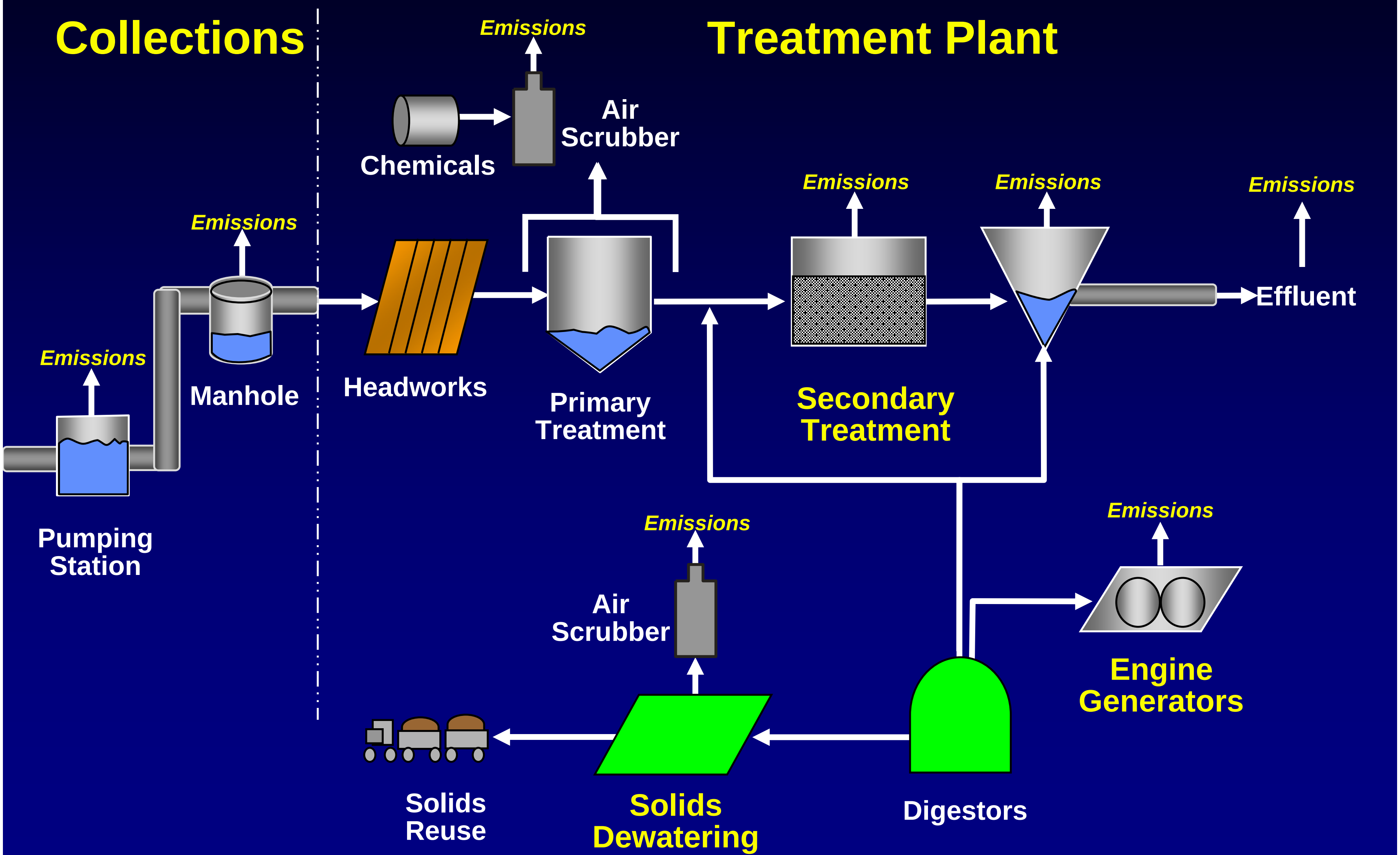
Primary	None
Secondary	CH_4, from anaerobic treatment processes (i.e., lagoons)
Advanced	N_2O, from NDN process
Solids Handling	CH_4, from sludge handling such as digestion (may be considered *de minimus*) or from incomplete combustion of digester gas and emissions from offsite operations
Effluent Discharge	N_2O, from denitrification of nitrogen species originating from wastewater effluent in receiving water

Local Air Resources Board Emissions Inventory
(in MM tons of CO2 eq.)

Domestic Wastewater Treatment Baseline	2.83
California State Total for 1990	427
2020 "Business as Usual"	600

SOURCE: US EPA and Intergovernmental Panel on Climate Change (IPCC)

Potential GHG Emission Sources

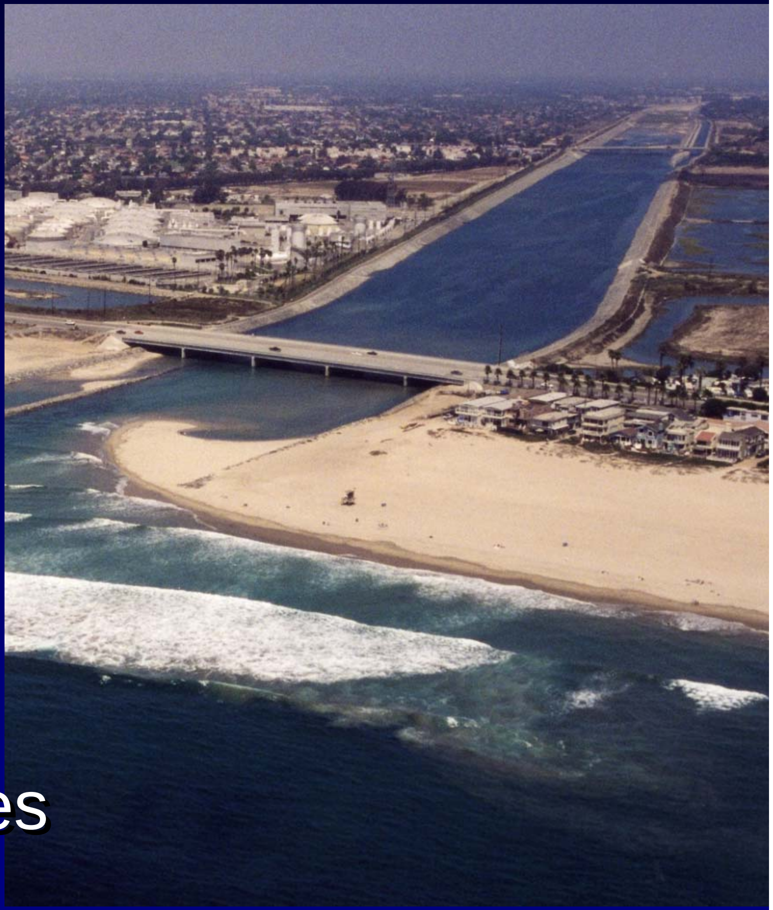


Impact of AB 32

on Wastewater Agencies

Changes in Air and Water Temperature

- Impact air quality / odors
- Increase in sea water level and relocation of facilities
- Impact of wastewater quality
- Need to accommodate existing and new industry
- Need to adjust discharge permit and pollution control program
- Need to review effluent guidelines
- Need to adapt NPDES permit



Changes In Weather

- Impact of increase rainfalls
- Impact on wastewater operations
- Challenges in accommodating high flows and low flows

Engineering Challenges

- AB 32 require facility to be more energy efficient
- Need emission and reporting protocol for wastewater industry
- Must increase energy production
- Need funds to adapt to climate research
- Need funds to conduct research related to climate change
- Need better estimate of regional impacts

Practical Steps Forward

California Wastewater Climate Change Group (CWCCG)

over 40 POTWS

Industries

Develop acceptable GHG emission protocols for POTWs

State Agencies

National Agencies

Develop Strategies for Future

- Work together to present a consistent message based on good science
- Identify agency approach for climate change
- Discuss other issues besides emissions
  - Reliability, protecting public health
  - Long-term sustainable operations
  - Mitigating risks to facilities / agencies

Immediate Climate Change Steps for POTWs

- Volatile rain period impacts (peak and dry periods)
- Increased power cost as power industry is regulated
- Expansion needs for septic systems (GHG and volatile rain failures)
- Emergency preparedness
- Design parameters sensitivities

Immediate Climate Change Steps for POTWs (continued)

- Equipment ranges (dry, peak)
- Process design parameters (higher BOD, NH4, TSS)
- Flood protection (rising seas)
- Future air quality regulations
- Future space considerations
- Lifecycle costs (land, power)
- Discuss with Stakeholders (elected & customers)

Other Issues for POTWs

- Limited control of sewers
- Public wants existing taxes to solve new problems
- POTWs could be considered a natural anthropogenic process
- We don't have the option to go "out-of-business"

OCSD's Research Efforts

- Emission controls technologies
- Deep well injection of biosolids (sludge)
- Characterizing influents (e.g., NH_4 increases)
- Alternative treatment technologies with lower energy use or increased power production potential
- Add calculation of carbon footprint

Conclusions

- Climate change issues will effect the design and operation of POTWs
- Need to look at other risks outside normal risks
- Need to do sensitivities on life cycle costs that climate change could impact
- Need to calculate ecological footprint

Acknowledgements

WMO
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE
UNEP

NACWA
A Clear Commitment to America's Waters

CALIFORNIA Climate ACTION Registry

NASA

Cal/EPA
California Environmental Protection Agency

CH2MHILL

CDM

Water Environment Federation®
Preserving & Enhancing the Global Water Environment

California Environmental Protection Agency
AIR RESOURCES BOARD

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