



Orinda Photovoltaic Project

EBMUD Greenhouse Gas Inventory

Sustainability Committee

June 24, 2025

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Agenda

- Introduction
- Greenhouse Gas (GHG) Reduction in District Policy
- GHG Inventory Basics
- District GHG Data and Performance
- District GHG Goals in Future

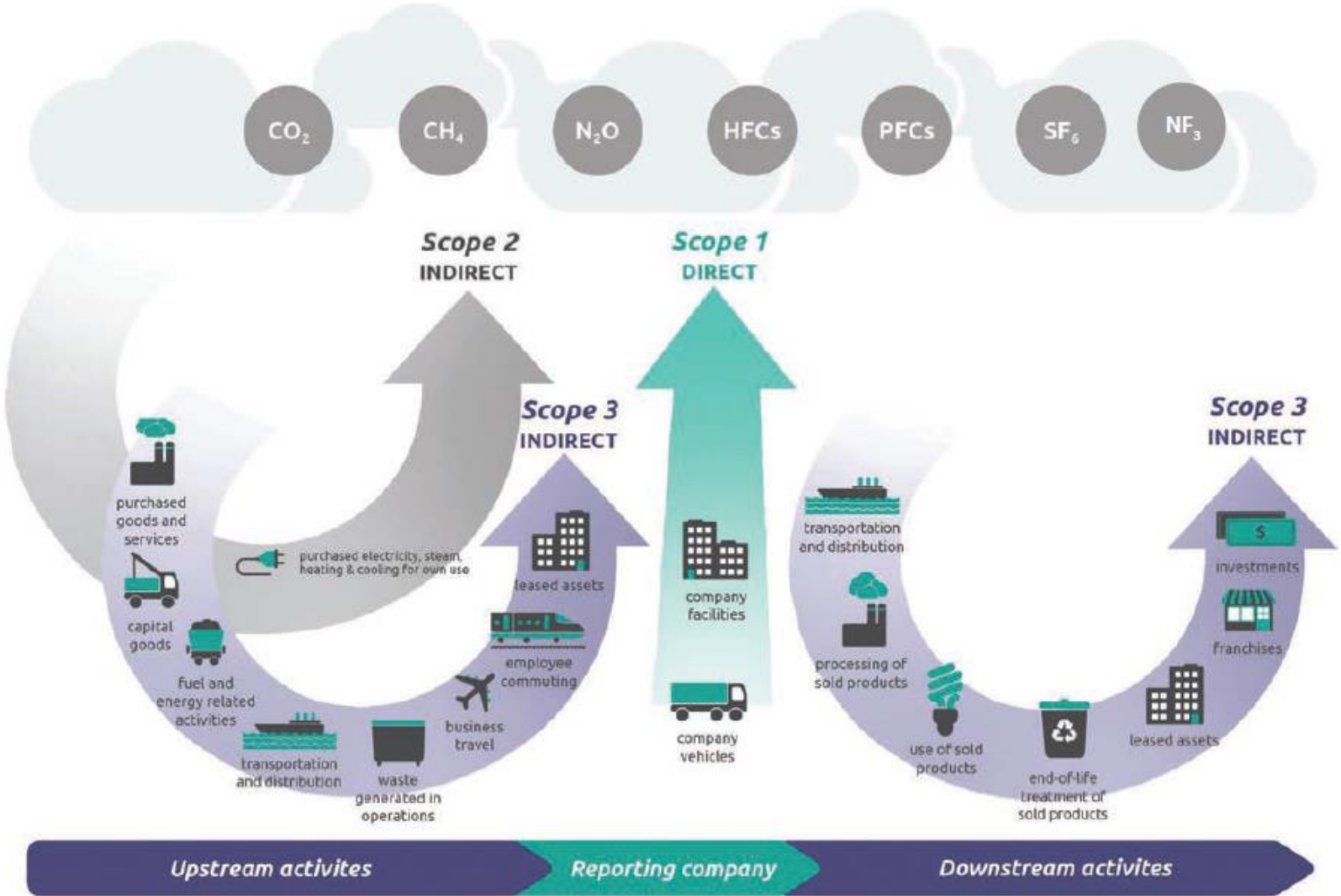
Introduction

- EBMUD has been a leader in GHG issues for 20 years
- First District Annual GHG inventory in 2005
- District joined California Climate Action Registry (CCAR) in 2006
- District joined The Climate Registry around 2010
- Staff remain active in climate change organizations
 - Water Research Foundation – Climate Change Mitigation/GHG Group
 - Bay Area Climate Adaptation Network
- District participates in studies on emerging GHG issues
 - Reservoir emissions
 - Wastewater-related emissions

GHG Reduction in District Policy

- Goals currently reside in Energy Policy 7.07 (updated September 26, 2023)
 - District goal is to be carbon neutral by 2030 for water and wastewater operations
 - Prioritize actual emission reductions
 - Purchase credits to mitigate residual emissions
 - Track wastewater process emissions but not included in goal

GHG Inventory Basics



+ Scope 1 (Direct)
+ Scope 2 (Indirect)

= Emission Inventory

Scope 3 not included

- CO2 Carbon Dioxide
- CH4 Methane
- N2O Nitrous Oxide
- HFCs Hydrofluorocarbons
- PFCs Perfluorocarbons
- SF6 Sulfur Hexafluoride
- NF3 Nitrogen Trifluoride



GHG Inventory Basics

GHGs and Global Warming Potentials (GWPs)

	GHG	Common Emission Sources	GWP*
CO ₂	Carbon Dioxide	Fossil fuel combustion, vehicles and stationary sources	1
CH ₄	Methane	Agriculture, natural gas production, waste management	28
N ₂ O	Nitrous Oxide	Agricultural soil management, wastewater treatment	265
HFCs	Hydrofluorocarbons	Cooling and refrigeration equipment	1,000-4,000
PFCs	Perfluorocarbons	Aluminum and semiconductor production	7,000-11,000
SF ₆	Sulfur Hexafluoride	Electrical equipment	23,500
NF ₃	Nitrogen Trifluoride	Semiconductor, liquid crystal display, solar panel production	16,100

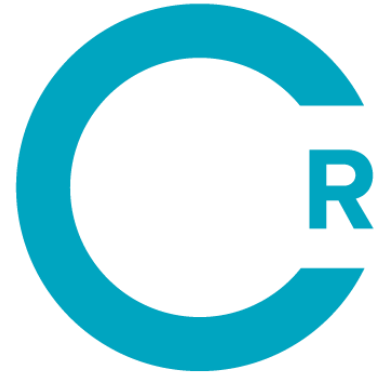
GWPs are used calculate CO₂e (carbon dioxide equivalent) in GHG inventories

*Global Warming Potentials from Intergovernmental Panel on Climate Change (IPCC), Fifth Assessment Report, 2014

GHG Inventory Basics

GHG Inventory Protocol

- Current District GHG inventory is compiled using the Water-Energy Nexus (WEN) 2.0 protocol supplemented by the General Reporting Protocol, published by The Climate Registry
 - District staff participated in WEN Advisory Committees when protocol created
- WEN 2.0 is the best available and most recognized methodology for water/wastewater utilities
- WEN 2.0 specifies reporting framework including emissions and credits to include
- Following a protocol provides credibility to the District inventory



**THE CLIMATE
REGISTRY**

GHG Inventory Basics

Common Protocol Reporting Framework

- Protocol Framework (EBMUD implementation)
 - Define inventory boundary (Operational Control)
 - Establish baseline emission year (2000)
 - Report on all GHGs or list exclusions (All GHGs)
 - Define GWPs being used (IPCC 5th Assessment Report, 2014)
 - Determine if any optional Scope 3 emissions will be included (None)
 - Note miniscule source exemptions (BBQ gases, fire extinguishers, propane-operated forklifts)
- Adopt new versions of protocols as science evolves
- Biogenic GHG emissions are reported separately within inventory
 - Include CO₂ emissions related to natural carbon cycle

GHG Inventory Basics

Activity Data Gathered for District Inventory

- Fuel consumption (Scope 1)
 - Gasoline, diesel, natural gas, biogas
 - Used in vehicles, stationary equipment, and portable equipment
- Electricity usage (Scope 2)
 - Retailer bills and emission factors for power supplied
 - Western Area Power Administration (WAPA)
- Refrigerant leaks (Scope 1)
 - Annual inventory of equipment updated for GHG estimate
- Unique sources
 - Wastewater treatment and discharge

GHG Inventory Basics

Emission Factors Gathered for Inventory

- Fuels
 - Fixed values based on fuel type
 - Use published values by credible organizations
- Electricity
 - Use best available data
 - California Energy Commission Power Content Labels
 - Regional averages

2023 POWER CONTENT LABEL										
Pacific Gas and Electric Company										
www.pge.com/billinserts										
Greenhouse Gas Emissions Intensity (lbs CO ₂ e/MWh)					Energy Resources					
Base Plan	50% Solar Choice	100% Solar Choice	Green Saver	2023 CA Utility Average	Base Plan	50% Solar Choice	100% Solar Choice	Green Saver	2023 CA Power Mix	
12	6	0	0	373	Eligible Renewable ¹	32.8%	65.5%	100.0%	100.0%	36.9%
					Biomass & Biowaste	3.4%	1.8%	0.0%	0.0%	2.1%
					Geothermal	0.3%	0.2%	0.0%	0.0%	4.8%
					Eligible Hydroelectric	2.5%	1.3%	0.0%	0.0%	1.8%
					Solar	20.2%	59.0%	100.0%	100.0%	17.0%
					Wind	6.3%	3.2%	0.0%	0.0%	11.2%
					Coal	0.0%	0.0%	0.0%	0.0%	1.8%
					Large Hydroelectric	13.8%	7.1%	0.0%	0.0%	11.7%
					Natural Gas	0.0%	0.0%	0.0%	0.0%	36.6%
					Nuclear	53.4%	27.4%	0.0%	0.0%	9.3%
					Other	0.0%	0.0%	0.0%	0.0%	0.1%
Unspecified Power ²	0.0%	0.0%	0.0%	0.0%	3.7%					
					TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%
					Percentage of Retail Sales Covered by Retired Unbundled RECs ³ :					
					5%	0%	0%	0%		
<p>¹The eligible renewable percentage above does not reflect RPS compliance, which is determined using a different methodology.</p> <p>²Unspecified power is electricity that has been purchased through open market transactions and is not traceable to a specific generation source.</p> <p>³Renewable energy credits (RECs) are tracking instruments issued for renewable generation. Unbundled renewable energy credits (RECs) represent renewable generation that was not delivered to serve retail sales. Unbundled RECs are not reflected in the power mix or GHG emissions intensities above.</p>										
For specific information about this electricity portfolio, contact:					Pacific Gas and Electric Company 1-800-743-5000					
For general information about the Power Content Label, visit:					https://www.energy.ca.gov/programs-and-topics/programs/power-source-disclosure-program					

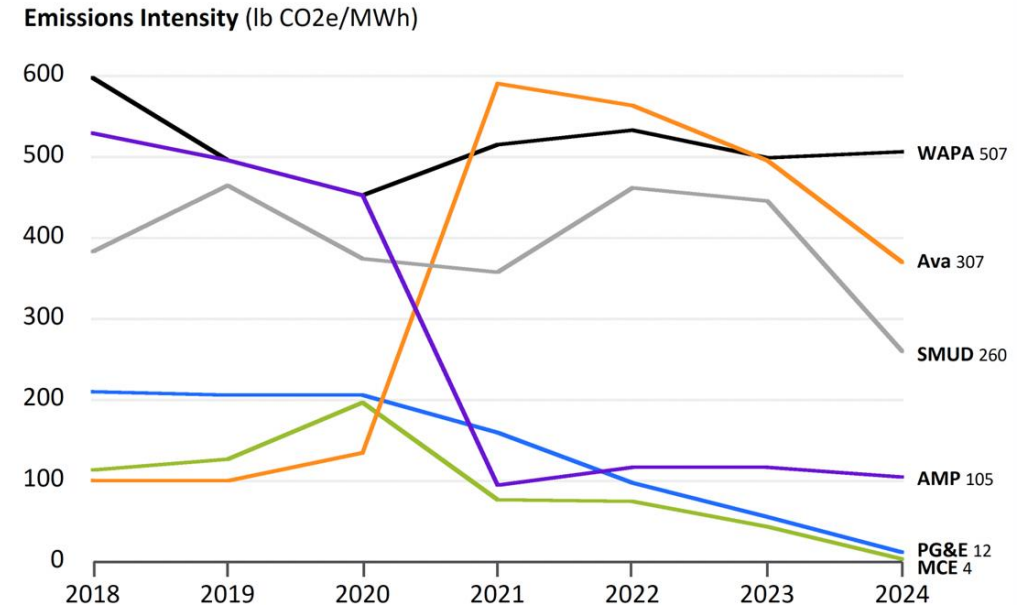
PG&E 2023
12 lbs CO₂e/MWh (base plan)

GHG Inventory Basics

Electrical Emission Factors Vary

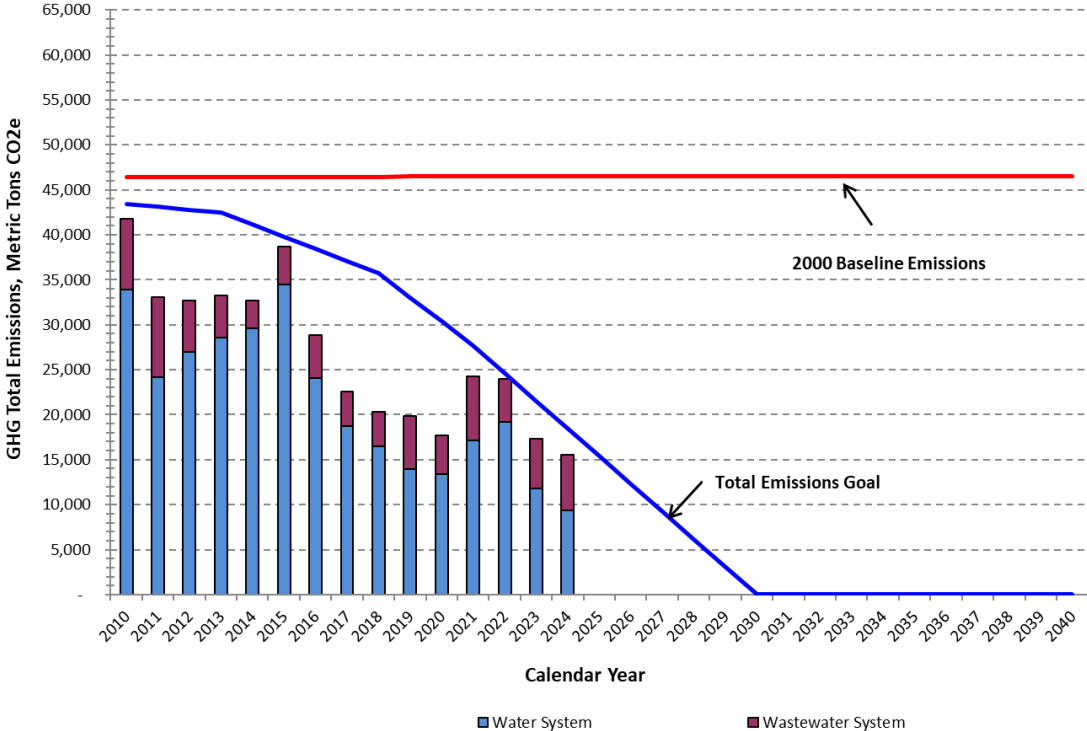
- Emission factors typically lag reporting year by one year (energy providers need time to compile their own data)
- Emission factors have been somewhat unpredictable
- SB100 requires in-State retailers to have green energy (0 emissions) by 2045
 - WAPA not under SB100
- Nuclear energy is emission free and a large portion of PG&E energy
 - Diablo Canyon status after 2030 uncertain

Electricity Emission Factors



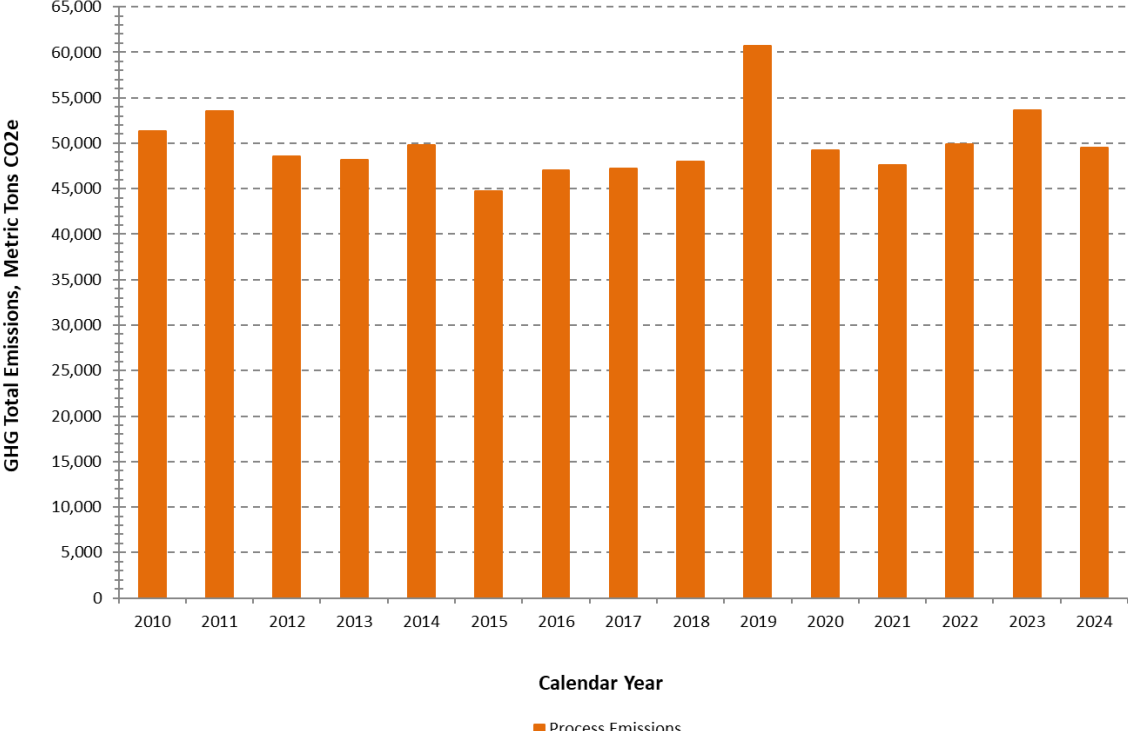
District GHG Data and Performance

Annual GHG Total Emissions vs Goal



Note:
 2024 total is 15,583 MT CO2e
 2025 goal is 15,382 MT CO2e

Process Emissions

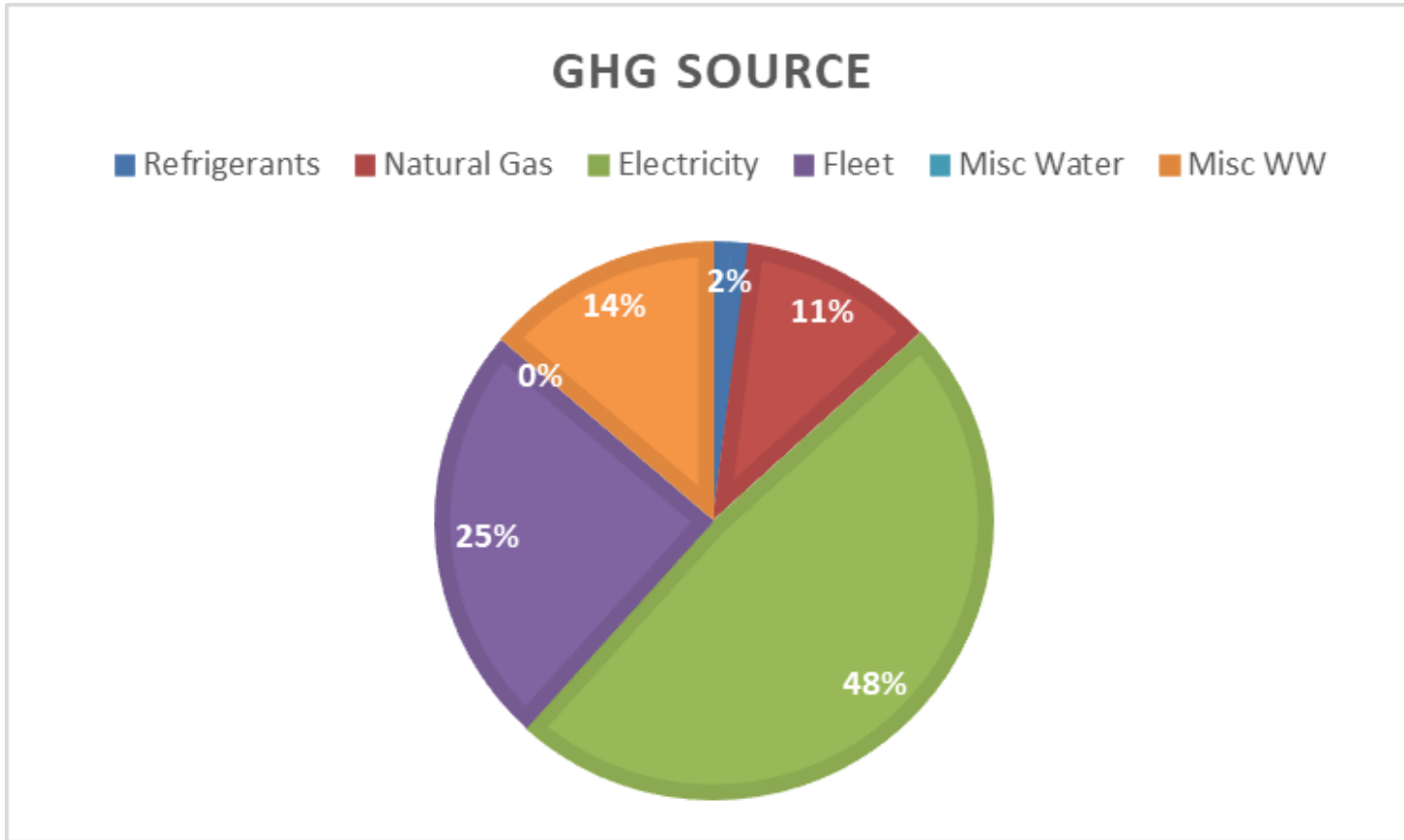


2024 Inventory will be finalized and presented at October 2025 Sustainability Committee meeting



District GHG Data and Performance

GHG By Source (2024 Data)



Source	GHG MT CO ₂ e
Electricity	7,545
Fleet	3,823
Misc WW	2,141
Natural Gas	1,749
Refrigerants	318
Misc Water	6

District GHG Goals in Future

- As GHG program and science evolves, District Goals may require updates
- Any changes will be included in District Policy with input from Board
- Final 2024 inventory results will be presented in fall 2025



Questions?

