



Board of Directors Special Meeting

October 24, 2017



OVERVIEW

- Carbon Accounting Basics
- Carbon Emissions from Electricity Generation
- PG&E Emissions Reporting
- Preliminary SVCE Emissions Modeling
- Carbon Accounting Standards

Carbon Accounting Basics

GHG Emissions Reporting Scopes

Scope 1 **Direct GHG:** Stationary combustion, mobile combustion, process emissions, fugitive emissions.

Scope 2 **Energy Indirect GHG:** Emissions from the consumption of purchased electricity, steam, or other sources of energy (e.g. chilled water) generated upstream from the organization.

Scope 3 **Other Indirect GHG:** Emissions that are a consequence of the operations of an organization, but are not directly owned or controlled by the organization.

Carbon Accounting Basics

Key Greenhouse Gases		Global Warming Potential (GWP) (IPCC, 100 yr.)
CO2	Carbon dioxide	1
CH4	Methane	28
N2O	Nitrous oxide	265
F-gases	Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF6), Nitrogen trifluoride	124 – 22,800

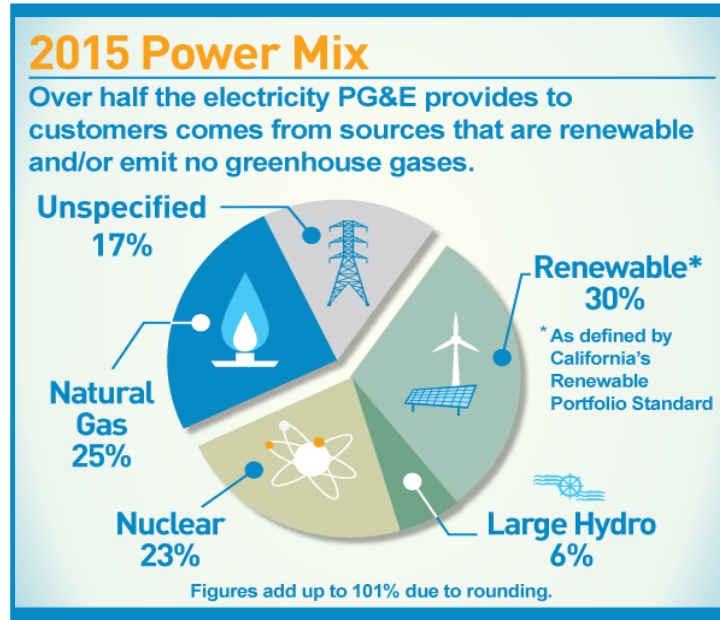
SVCE emissions factor, measured in CO2 'equivalents':

$$\text{CO}_2 + (\text{CH}_4 \times 28) + (\text{N}_2\text{O} \times 265) = \text{CO}_2\text{e (lb CO}_2\text{/MWh)}$$

PG&E Power Mix

2015 PG&E Emissions Rate: **405 lb CO₂/MWh**

Infographic: Power Mix 2015



Carbon Emissions from Electricity Generation

Source	Representative Carbon Emissions Factors (lb CO ₂ e/MWh)	Renewable?
Coal Mixed Electric Utility /Electric Power	2131	
Petroleum	1543 - 2579	
Natural Gas U.S. weighted avg.	805	
Biomass	91	Yes
Geothermal	57	Yes
Nuclear	0	
Solar PV	0	Yes
Wind	0	Yes
Large Hydro	0	

Carbon Emissions from Electricity Generation

Scope 1 and 2 emissions from Biomass:

~~CO₂~~ + CH₄ + N₂O = CO₂e (lb CO/MWh)

Considers non-Biogenic vs. Biogenic emissions

Source: TCR, IPCC

	Biomass
CO ₂ (lb CO ₂ /MWh)	0
CH ₄ (lb CO ₂ e/MWh)	39
N ₂ O (lb CO ₂ e/MWh)	52

Biomass = **91 lb CO₂e/MWh**

Preliminary SVCE Emissions Modeling

Source	GreenStart (%)	Emissions Factor (lb CO ₂ /MWh)	GreenPrime (%)	Emissions Factor (lb CO ₂ /MWh)
Solar	5	0	20	0
Wind	30	0	80	0
Biomass	15	14	-	-
Large Hydro	50	0	-	-
TOTAL	100	14	100	0

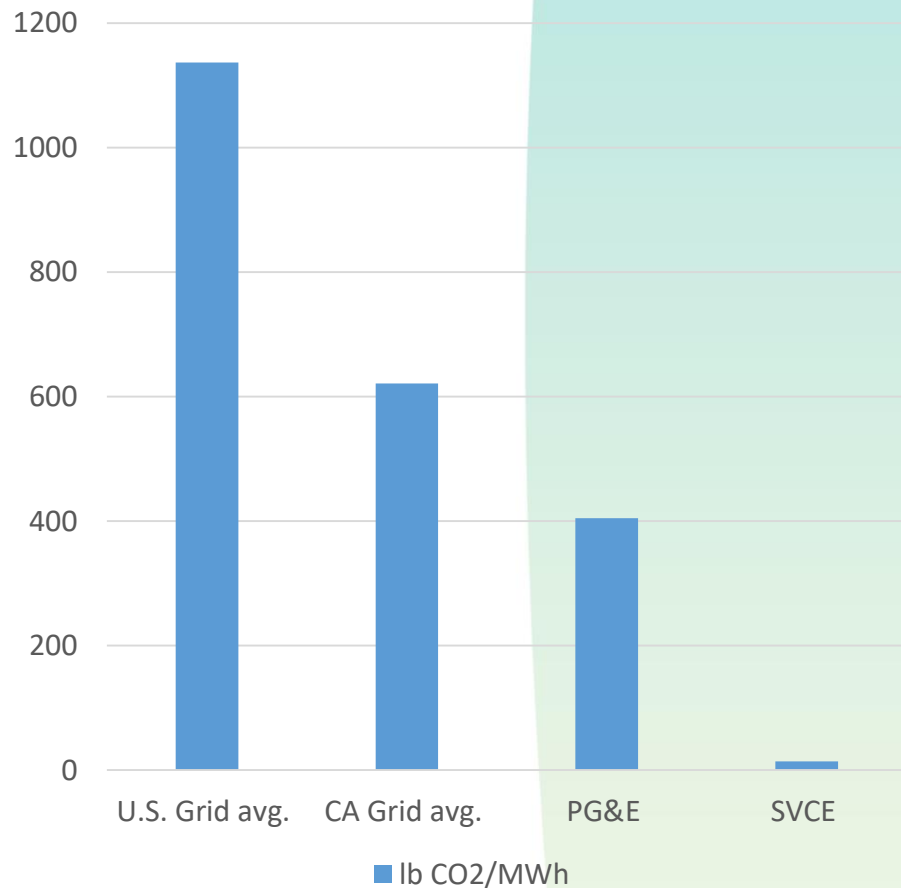
SVCE GreenStart: **14 lbs CO₂e/MWh**

SVCE GreenPrime: **0 lbs CO₂e/MWh**

SVCE Messaging

- U.S. Grid average: **1,137 lbs.**
- CA Grid average: **601 lbs.**
- PG&E emissions rate: **405 lbs.**
- SVCE est. emissions rate: **14 lbs.**

Emissions Rate Comparison



Carbon Reporting Standards

- The Climate Registry (TCR) – voluntary carbon emissions reporting
 - Leading national repository
 - Public database
 - IPCC
 - Utilized by SCP, MCE, & PG&E
- Carbon emissions and renewables reporting are related but distinct
 - Annual Product Content Label (PCL) required by state law for sources of electricity
 - Large emitters must report carbon emissions to CARB & EPA
 - Other emissions reporting voluntary, e.g. Green-e certification for GreenPrime (CRS)