

**East County AWP Energy Recovery Project**  
**EPA CPRG Application**  
**GHG Emission Reductions Technical Appendix**

## **MEASURE-SPECIFIC DOCUMENTATION:**

### **1. GHG Reduction Estimate Method:**

Measure will reduce GHG through two primary mechanisms: (1) landfill-diversion of organic waste, reducing fugitive methane emissions from landfill, and (2) onsite generation of renewable heat and electricity from biogas-fueled cogeneration, reducing site demand for natural gas and grid power and associated GHG emissions.

Fugitive emissions reduction was determined using design basis volumes of organic waste to be received by the project and the EPA WARM model. The following inputs were provided to the EPA WARM model to determine avoided emissions per ton of organic waste. This avoided emissions rate was applied to the proposed annual tonnage of landfill-diverted organic material to be processed by the project.

Avoided emissions from onsite energy generation was determined as avoided emissions from grid electricity, based on San Diego regional grid carbon intensity (CI), plus avoided emissions from onsite boilers for process heat (based on design basis, equipment specifications, and published values such as emissions factors) accounting for GHG emissions associated with CHP operations (based on design basis, equipment specifications, and published values such as emissions factors).

San Diego Region Electricity Emission Rate calculation from SANDAG, provided in the attached GHG Calculations spreadsheet, includes the following assumptions:

- The emission factors are weighted average for the San Diego region, not just a single supplier
- The 2021 emission factor is weighted based on the retail sales and emission factors (as per the Power Content Label, same as the source you used) of Clean Energy Alliance (three products), San Diego Community Power (three products), and SDGE (two products).
- The 2045 renewable/zero carbon content is based on utility's RPS target, and the rest is interpolated.

Based on model outputs, design basis, equipment specifications, and published values such as emissions factors, spreadsheet calculations were performed (attached) to determine net GHG emissions. Year-over-year changes in annual emissions account for project delivery schedule, facility ramp up schedule and planned loading increases, and annual grid CI.

### **2. Models/Tools Used:**

The EPA Waste Reduction Model (WARM), version 15 was used to determine Total GHG Emissions from Baseline MSW Generation and Management (Food Waste to Landfill). The Food Waste will instead be diverted to Digesters eliminating these baseline emissions. The following inputs/assumptions were used:

- Landfill and Digesters located in California (California Regulatory Collection Scenario assumed for landfill gas collection efficiency)
- 100% Virgin feed diverted from landfill with Landfill Gas (LFG) Control System
- Feed to be wet digested, digestate to be cured, and generated methane to be recovered for energy
- National average for moisture condition assumption and associated bulk MSW decay rate
- Default transport distances for transport of materials

### **3. Measure Implementation Assumptions:**

- Operations start 2027 (project developer schedule)
- Operations ramp up plan (project developer, JPA master planning)
- Capital and O&M cost (project developer estimates)
- System sizing and operating parameters (defined with source in attached spreadsheet)

#### 4. GHG Reduction Estimate Assumptions:

- Operations start 2027 (project developer schedule)
- Operations ramp up plan (project developer, JPA master planning)
- Emissions factors (defined with source in attached spreadsheet)
  - CHP Engine CO<sub>2</sub>, CH<sub>4</sub>, NO<sub>2</sub> Emission factors
    - EPA AP-42: Compilation of Air Emissions Factors from Stationary Sources, Chapter 3: Stationary Internal Combustion Sources, Section 2: Natural Gas-fired Reciprocating Engines
  - Boiler CO<sub>2</sub>e Emission Factors
    - Emission factors for Greenhouse Gas Inventories, Stationary Combustion Emission Factors, USEPA 2015
  - CO<sub>2</sub>e Global Warming Potential Values
    - IPCC Fifth Assessment Report, 2014 (AR5)
- Capital and O&M cost (project developer estimates)
- System sizing and operating parameters (defined with source in attached spreadsheet)
- San Diego regional grid CI (SANDAG, attached)

#### 5. Reference Case Scenario (GHG Emissions or Activity Level):

Reference scenario is business as usual for GHG emission in the absence of the measure (i.e., the organic waste continues to be landfilled, and the project site does not have onsite energy generation therefore must consume natural gas to run boilers for heat, and must consume grid electricity to meet power demands). In the BAU, the grid CI will reduce over time. No non CPRG federal incentives are assumed.

#### 6. Measure-Specific Activity Data:

- *Tons of organic waste received and processed (tons)*
- *CHP power generation (MWh)*
- *CHP heat generation (MMBTU)*

#### 7. GHG Emissions Reduced:

For the period 2025-2030: 21455 MTCO<sub>2</sub>e reduction

For the period 2025-2050: 94714 MTCO<sub>2</sub>e reduction

#### 8. GHG Emission Reduction Calculations

The GHG emission reduction calculations that quantify the GHG emission reductions are included in file titled GHGCalcs\_EastCountyAWPJPA.xlsx.

#### ATTACHMENT

GHGCalcs\_EastCountyAWPJPA.xlsx