

**Imperial Beach Library Project
Summary of Greenhouse Gas Emissions
Proposed Project**

| Source | CO ₂ E (Mtons/yr) | Percent of Total |
|------------------------|---------------------------------|---------------------|
| Motor Vehicles | 404 | 88.9% |
| Area Sources | | |
| Natural Gas Combustion | 24 | 5.4% |
| Landscaping | 0 | 0.0% |
| Electrical Generation | 15 | 3.2% |
| Water Supply | 0 | 0.0% |
| Solid Waste | 11 | 2.5% |
| Total | 455 | 100.0% |

Source:

1. Motor vehicle emissions reduced by 39.71%
2. Natural gas combustion emissions reduced by 9.54%
3. Electrical generation emissions reduced by 26.22%
4. Water supply emissions reduced by 35.30%

| | |
|------------------------|--------|
| Motor vehicles | 39.71% |
| Natural gas combustion | 9.54% |
| Electrical generation | 26.22% |
| Water supply | 15.30% |

**Imperial Beach Library Project
CO₂-to-CO₂ Equivalent Factors**

| | Source | Units | CO₂ | CH₄ | N₂O | CO₂E/CO₂ |
|--------------------------|---------------|--------------|-----------------------|-----------------------|-----------------------|---------------------------------------|
| Global Warming Potential | | | 1 | 21 | 310 | |
| Diesel Equipment | 1 | kg/gal | 10.15 | 0.00058 | 0.00026 | 1.009 |
| Diesel Trucks | 2 | g/mi | 1,450.00 | 0.0051 | 0.0048 | 1.001 |
| Passenger Vehicles | 3 | | | | | 1.053 |
| Electrical Generation | 4 | lb/MWh | 739.05 | 0.0302 | 0.0081 | 1.004 |
| Natural Gas Combustion | 5 | kg/MMBtu | 53.06 | 0.005 | 0.0001 | 1.003 |
| Wood Combustion | 5 | kg/MMBtu | 93.87 | 0.316 | 0.0042 | 1.085 |

Serving Utility: SDG&E

1. California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*, Version 3.1, Tables C.6 and C.7.
2. California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*, Version 3.1, Tables C.3 and C.4.
3. US EPA, Office of Transportation and Air Quality. 2005. *Greenhouse Gas Emissions from a Typical Passenger Vehicle* (EPA420-F-05-004), p. 4.
4. San Diego Gas & Electric. 2010. Annual Entity Emissions: Electric Power Generation/Electric Utility Sector. [http://www.climateregistry.org/CarrotDocs/35/2009/2008_SDGE_PUP\(March 26\).xls](http://www.climateregistry.org/CarrotDocs/35/2009/2008_SDGE_PUP(March 26).xls) and California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*, Version 3.1, Table C.2.
5. California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*, Version 3.1, Tables C.7 and C.8.

**Imperial Beach Library Project
Construction Emissions**

| | CO₂ (tons/yr) | CO₂E (Mtons/yr) |
|---|-------------------------------------|---------------------------------------|
| 2014 | | |
| Off-Road Diesel | 15.06 | 13.79 |
| On-Road Diesel | - | - |
| Worker Trips | 2.20 | 2.10 |
| Total for 2014 | 17.26 | 15.89 |
| 2015 | | |
| Off-Road Diesel | 156.72 | 143.48 |
| On-Road Diesel | 0.58 | 0.53 |
| Worker Trips | 14.53 | 13.88 |
| Total for 2015 | 171.83 | 157.88 |
| 2016 | | |
| Off-Road Diesel | 89.48 | 81.92 |
| On-Road Diesel | 0.10 | 0.09 |
| Worker Trips | 12.84 | 12.26 |
| Total for 2016 | 102.42 | 94.27 |
| SUMMARY | | |
| Total Construction Emissions | | 268.04 |
| Amortized Annual Construction Emissions (| | 8.93 |

**Imperial Beach Library Project
Motor Vehicle and Area Source Operational Emissions**

| | CO₂ (tons/yr)¹ | CO₂E (Mtons/yr) |
|------------------------|---|---------------------------------------|
| Motor Vehicles | 702.55 | 670.89 |
| Area Sources | 29.89 | 27.19 |
| Natural Gas Combustion | 29.64 | 26.96 |
| Landscape | 0.25 | 0.23 |
| Total Operational | 732.44 | 698.08 |

Source:

1. URBEMIS Output

Notes:

CO₂E

Carbon dioxide equivalent

Mtons

metric tons (= 1.1023 tons)

**Imperial Beach Library Project
Greenhouse Gas Emissions from Project Electrical Demand**

| Land Use | Units | Electrical Demand Factor¹ (kW-hr/unit/yr) | Electric Demand² (kW-hr/yr) | CO₂E Emission Factor³ (lbs CO₂E/kW-hr) | Annual CO₂E Emissions (Mtons CO₂E/yr) |
|-----------------|--------------|---|---|--|--|
| Library | 14 ksf | 3,242.00 | 58,605 | 0.742 | 19.73 |

Utility Region: SDGE

Sources:

1. KEMA-XENERGY. 2006. *California Statewide Residential Appliance Saturation Study Update to Air-Conditioning Unit Energy Consumption Estimates Using 2004 Billing Data*. Prepared for California Energy Commission, CEC-400-2006-009. June.
2. City of Imperial Beach. 2013. Utility Manager Pro Data Estimates. Monthly Electricity Use for Imperial Beach Library. November.
3. Itron, Inc. 2006. *California Commercial End-Use Survey*. Prepared for California Energy Commission, CEC-400-2006-005. March.
4. San Diego Gas & Electric. 2010. Annual Entity Emissions: Electric Power Generation/Electric Utility Sector. [http://www.climateregistry.org/CarrotDocs/35/2009/2008_SDGE_PUP\(March 26\).xls](http://www.climateregistry.org/CarrotDocs/35/2009/2008_SDGE_PUP(March 26).xls) and California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*, Version 3.1, Table C.2.

Notes:

CO₂E Carbon dioxide equivalent
 kW-hr kilowatt-hour
 MT metric tons (= 2,204.623 lbs)

**Imperial Beach Library Project
Greenhouse Gas Emissions from Project Water Supply**

| Land Use | Units | Acre-Feet per Year¹ | Electrical Demand Factor² (kW-hr/AF) | Electric Demand (kW-hr/yr) | CO₂E Emission Factor³ (lbs CO₂E/kW-hr) | Annual CO₂E Emissions (Mtons CO₂E/yr) |
|-----------------|--------------|---|--|---|--|--|
| Library | 14 ksf | 0.00 | 11,110 | 13 | 0.742 | 0.00 |

Sources:

1. City of Imperial Beach. 2013. Utility Manager Pro Data Estimates. Monthly Water Use for Imperial Beach Library. November.
2. California Energy Commission. 2006. *Refining Estimates of Water Related Energy Use in California*.
<http://www.energy.ca.gov/2006publications/CEC-500-2006-118/CEC-500-2006-118.PDF>

Notes:

CO₂E Carbon dioxide equivalent
 kW-hr kilowatt-hour
 Mtons metric tons (= 2,204.62 lbs)

**Imperial Beach Library Project
Greenhouse Gas Emissions from Solid Waste**

| Land Use | Estimated Solid Waste Generation Per Year (tons) ¹ | Annual CO ₂ E Emissions (Mtons CO ₂ E/yr) ² |
|----------------------|---|--|
| Public/Institutional | 17.89 | 11.45 |

Sources:

1. California Department of Resources Recycling and Recovery Waste Generation Factors - Public/Institutional 0.007 lb/sf/day
2. Bay Area Air Quality Management District (BAAQMD). 2010. Greenhouse Gas Model (BGM). Version 1.1.9 Beta.

Notes:

| | |
|-------------------|-------------------------------|
| CO ₂ E | Carbon dioxide equivalent |
| MT | metric tons (= 2,204.623 lbs) |

**Imperial Beach Library Project
Greenhouse Gas Emissions Reductions - CARB Scoping Plan Measures
Project-Specific % Reductions**

| | Estimated Reduction | 2020 Forecast | % Reduction |
|--|---------------------|---------------|---------------|
| Transportation | | | |
| CA Light-Duty Vehicle GHG Standards (Pavley) | 31.7 | 160.8 | 19.71% |
| <i>Subtotal</i> | | | 19.71% |
| Energy Consumption | | | |
| Energy Efficiency (Electricity) | 15.2 | 139.2 | 10.92% |
| Renewable Portfolio Standard (RPS) | 21.3 | 139.2 | 15.30% |
| <i>Subtotal</i> | | | 26.22% |
| Natural Gas | | | |
| Residential & Commercial (Natural Gas) | 4.4 | 46.1 | 9.54% |
| Water Supply | | | |
| Renewable Portfolio Standard (RPS) | 21.3 | 139.2 | 15.30% |

SOURCE: CARB. 2008. Climate Change Scoping Plan