

THE CARBON WE CONSUME



A Greenhouse Gas Impacts Assessment of Consumer Demand in California

Dear Green City California Member,

As we begin to see and experience the effects of global climate change at home in our own communities, and as international and national policies to address dangerous greenhouse gas emissions fail to materialize, cities in California are continuing to lead the way towards a more sustainable future. Addressing the greenhouse gas footprint of consumable goods (ie. the stuff we buy) is a new and important area of focus for local governments seeking innovative ways to take action against climate change. Cities are hubs of culture, innovation and economic production. As such, our choices about what we buy and those which we encourage our citizens to make, have a tremendous impact on regional, national and global GHG emissions.

In 2010, the World Watch Institute published its ground-breaking State of the World Report: Transforming Cultures. The report calls on us to undertake one of the "greatest culture shifts imaginable: from cultures of consumerism to cultures of sustainability." Following this call for change and seeking to ignite action, the City of San Francisco Department of Environment, on behalf of the members of Green Cities California, commissioned a consumption-based greenhouse gas assessment for the state of California. It is my hope that the following full study and summary will help deepen our definition of what it means to take climate action, and strengthen our efforts to creatively and vigorously address the tremendous challenges we face with a rapidly destabilizing climate system.

Sincerely,
David Assmann

Deputy Director
San Francisco Department of Environment
www.sfenvironment.org



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A new and evolving approach to GHG inventories is one that measures the lifecycle emissions associated with a region's consumption of goods and services. This consumption assessment method offers a radically different way of looking at a community's contribution to global climate change.

Traditional greenhouse gas inventories evaluate the emissions associated with a diverse set of activities within a geographic area. These activities can include use of energy by the industrial, commercial and residential sectors, transportation trips that occur within, and to a community, use of electricity, and decomposition of waste in landfills. Some of these emissions – like those that come from with electricity production and waste disposal - may occur outside of the geographic area of that community. But typically, a traditional greenhouse gas inventory focuses on emissions that physically originate inside the community. While this method can be effective when analyzing the carbon content and efficiency of fuels used to move and power the community in question, it frequently understates the emissions that cities' are responsible for as hubs of final consumer demand and lifestyle trends.








A consumption assessment also involves a geographic area, but unlike the traditional geographic based inventory where emissions are assigned based on fuels and energy consumed in the community, consumption based assessments attempt to estimate all emissions - both inside and outside the community - that arise as a consequence of consumption activities within that community. Consumption in this case is defined as final demand, the stuff we buy and activities we engage in our cities, and is viewed as the root driver, or cause of the greenhouse gas emissions associated with the lifecycle carbon footprint of these goods and services.

As of 2011, relatively few consumption-based inventories have been performed, and no standard has been set for assigning emissions to different categories. The Consumption-Based Emissions Inventory (CBEI) is one methodology that calculates the 'lifecycle' or 'embedded' emissions for the consumption or final demand of goods and services. CBEI's calculation methodology is based on tracking financial flows and attributing greenhouse gases to final products sold to consumers for a particular region or city. Emissions are then calculated based on the dollars spent on goods and services purchased by households in the region and exclude goods produced within the region, but purchased elsewhere.

The main components of the CBEI calculation used in this study are the IMPLAN data for a particular region or city as well as the local natural gas, electricity, and vehicle fuel demand data for consumers. IMPLAN (Impact Analysis for Planning) is a leading economic modeling software product that includes both national, state, and county income and production accounts data as well as input-output models that estimate the allocation of indirect (intermediate or upstream materials and equipment) requirements of production, from all sectors, that are needed to produce a unit of any one industry's output. The upstream data includes estimates of both foreign imports and imports within the US, but outside of the inventory region. The CBEI calculation takes the IMPLAN data and assigns greenhouse gas emission coefficients for each good and service that is unique for the foreign, national, and domestic upstream components. The final outcome combines the upstream emission calculations with the local emissions generated through the utilization and disposal of each product or service.




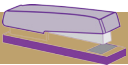
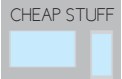




CALIFORNIA'S 2008 CONSUMPTION-BASED EMISSIONS BY LIFE-CYCLE PHASE

This table reports California's 2008 consumption-based emissions by life-cycle phase totaling 834 million metric tons CO₂-e. Production-phase emissions account for 56 percent of the total; pre-purchase transportation, 6 percent; wholesale and retail, 2 percent; use, 31 percent; and post-consumer disposal less than 5 percent.

	Production
California Total Emissions (million mT CO ₂ -e)	467.891
Appliances, HVAC 	0.454
Appliances, other 	3.930
Clothing 	18.995
Concrete, cement and lime 	0.050
Construction 	48.060
Electronics 	36.331
Food and beverages 	96.465

Pre-Purchase Transportation	Wholesale/ Retail	Use	Post-Consumer Disposal	Total Emissions
50.988	17.958	257.917	38.886	833.639
0.030	0.002	72.673	0.004	73.163
0.149	0.009	47.532	0.065	51.685
0.097	0.013	0.000	0.065	19.171
0.001	0.000	0.000	0.003	0.054
3.944	0.579	0.000	5.368	57.952
1.141	0.256	12.222	0.190	50.140
6.022	0.372	0.000	12.913	115.774

CALIFORNIA'S 2008 CONSUMPTION-BASED EMISSIONS BY LIFE-CYCLE PHASE CONT.

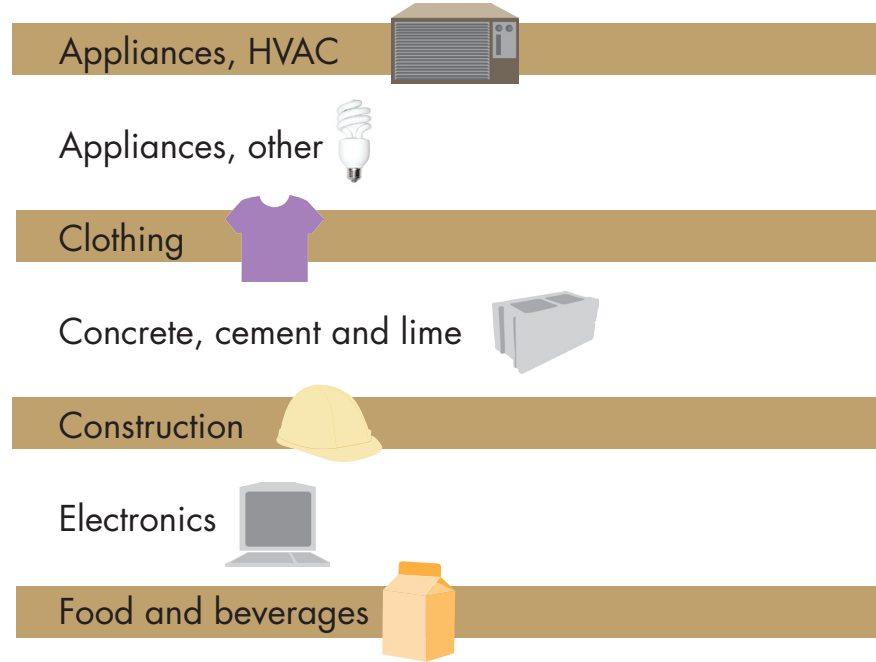
	Production	Pre-Purchase Transportation
Forest products 	4.560	0.308
Fuel, utilities, waste 	2.127	0.152
Healthcare 	45.578	2.272
Home, yard, office 	23.923	1.123
Retailer and wholesale 	19.688	1.730
Services 	72.683	3.222
Transportation services 	7.376	26.756
Vehicles and vehicle parts 	28.268	1.745
Other 	59.394	2.295

Wholesale/ Retail	Use	Post-Consumer Disposal	Total Emissions
0.012	0.000	11.002	15.833
0.011	0.000	0.035	2.325
0.298	0.000	0.484	48.632
0.078	0.000	3.567	28.691
15.690	0.000	0.34741	37.482
0.219	0.000	3.936	80.010
0.069	0.000	0.052	34.252
0.103	125.490	0.340	155.945
0.246	0.000	0.487	62.432

CALIFORNIA'S 2008 CONSUMPTION-BASED EMISSIONS BY CONSUMER TYPE




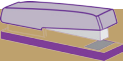
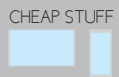




This table reports California's 2008 consumption-based emissions by type of consumer. Household emissions account for 76 percent of the total; business investment and government, 12 percent each.

California Total Emissions (million mT CO₂-e)



Household	Government	Investment	Total
636.810	98.200	98.628	833.639
62.631	10.388	0.144	73.163
39.914	11.500	0.271	51.685
18.818	0.351	0.001	19.171
0.022	0.032	0.000	0.054
5.998	17.188	34.765	57.952
18.171	6.834	25.135	50.140
111.678	3.821	0.272	115.771

CALIFORNIA'S 2008 CONSUMPTION-BASED EMISSIONS BY CONSUMER TYPE CONT.

	Household	Government
Forest products 	10.121	.5760
Fuel, utilities, waste 	1.075	0.337
Healthcare 	44.619	1.354
Home, yard, office 	24.866	1.643
Retailer and wholesale 	34.466	0.633
Services 	69.714	9.604
Transportation services 	28.686	4.170
Vehicles and vehicle parts 	136.215	15.260
Other 	29.817	9.294

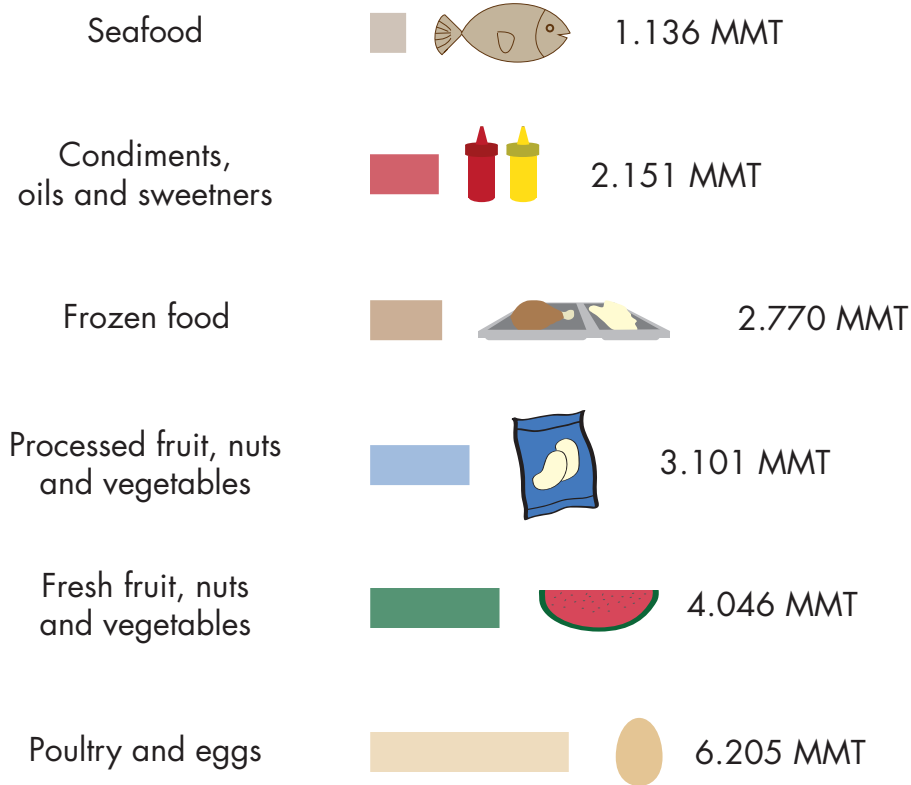
Investment	Total
0.002	15.833
0.913	2.325
2.659	48.632
2.182	28.691
2.354	37.482
0.751	80.070
1.397	34.252
4.470	155.945
23.311	62.432

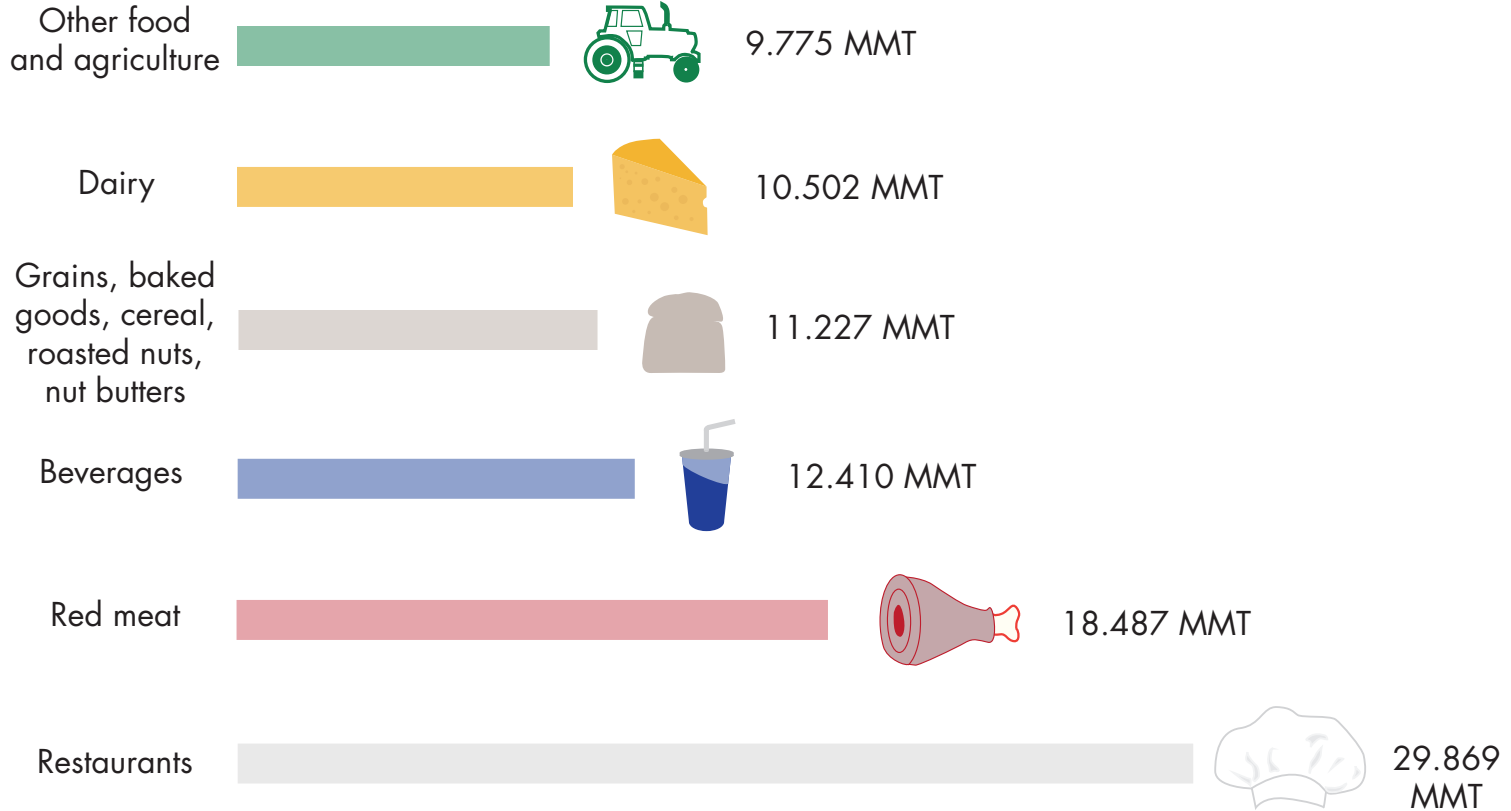
FOOD

What follows is a condensed summary of the California CBEI study that was commissioned by the City and County of San Francisco for Green Cities California. For the purposes of this discussion, and in light of interest expressed by GCC members, we have chosen to highlight the carbon intensity of food consumed in the Golden State.

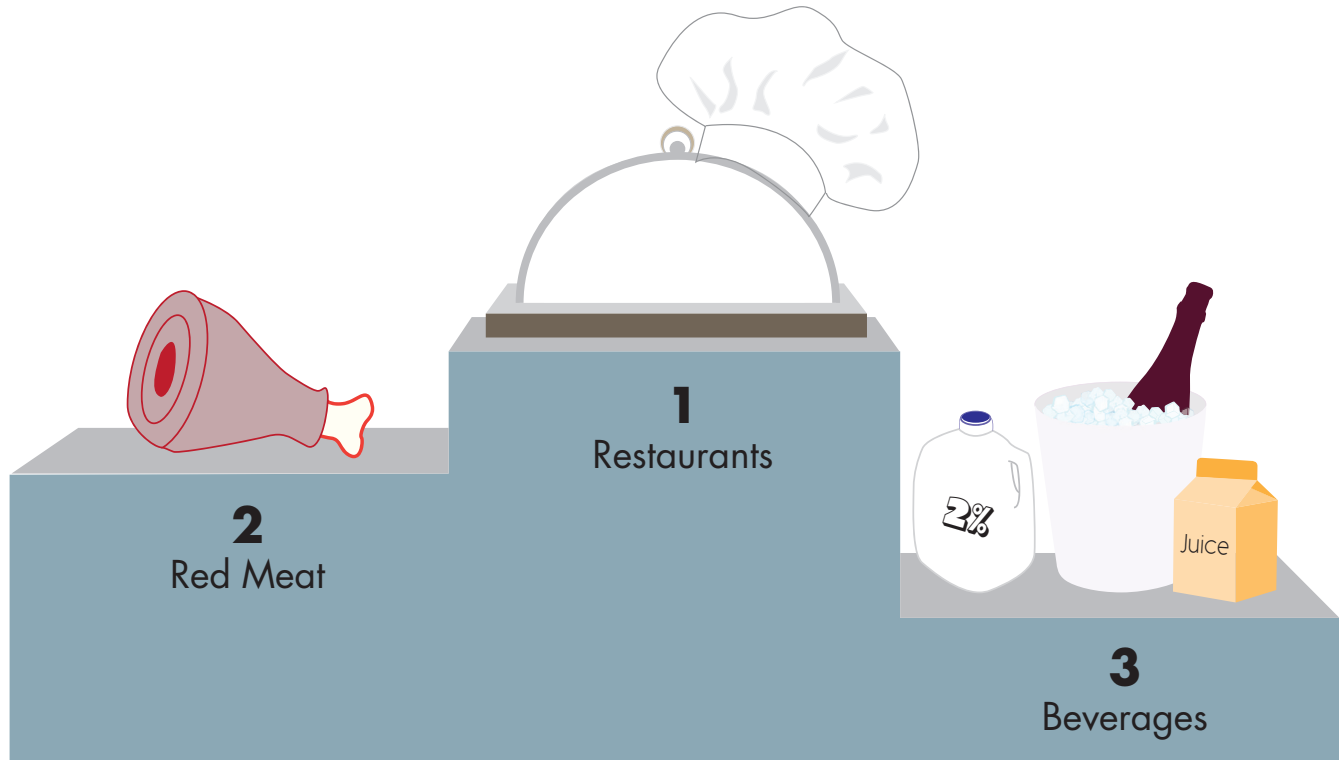
The Race to Your Dining Table

*all units are expressed in million mT CO₂ -e

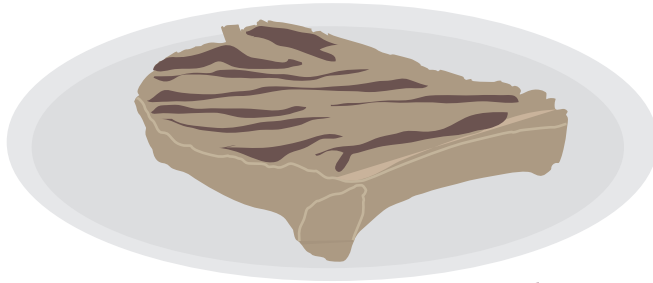




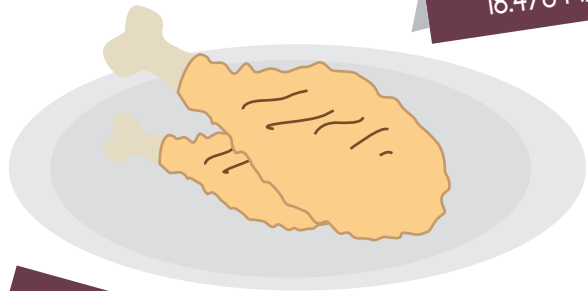
Top Three Offenders



We make choices every day. What will you choose?



18.478 MMT



6.205 MMT



4.046 MMT



Terms

Websters Dictionary: Con`sump`tion

n. 1. The act or process of consuming by use, waste, etc.; decay; destruction.

“Every new advance of the price to the consumer is a new incentive to him to retrench the quality of his consumption.”

- Burke.

Wikipedia: Consumption

Economics

- Use of final goods by a consumer until disposal.

Material Management Approaches for State and Local Climate Protection: Consumption
Final demand; the purchases of goods and services (including energy) by households and governments. Includes business purchases that are classified as investment or capital – typically, goods that are kept in inventory for more than one year, and not quickly passed on to another business. Other business-to-business expenditures are not part of “consumption”, in order to avoid double-counting.

Marx, Capital on "Commodity"

A commodity is an object outside of us, a thing that by its properties satisfies human wants of some sort or another. The nature of such wants, whether, for instance, if they spring from the stomach or from fancy, makes no difference.

Neither are we concerned to know how the object satisfies these wants, whether directly as means of subsistence, or indirectly as means of production.

Marx, Capital on "Consumers"

The conception of "consumer" is an illusion possible only once production and consumption have been alienated as apparently separate and independent processes... Every act of consumption is equally an act of production, so the alienation of one from the other is a social construction. Since wage-workers produce only to earn a living, and are alienated from their own labour, the illusion is created that their only real life is as a consumer. But nothing could be more powerless than a consumer.

Inspired Economist on "Consumer Power"

Every dollar you spend is a vote for how you want the world to be and who you want to control it.

This California CBEI Study was conducted by the Stockholm Environment Institute, U.S. Center. <http://sei-us.org/ClimateEconomics>. Its year of assessment was 2008. For further details please see the SF-CBEI -TechnicalReport-Part3 SEI. For more information on Consumption based accounting please visit <http://captopoolkit.wikispaces.com>. This report was produced for the Fall 2011 Green Cities California retreat by the SF Department of Environment Climate Team's Climate Action Coordinator Calla Rose Ostrander, Information Management Associate Marcus Keller and graphics by Paula Chiu.



Green Cities CALIFORNIA
Accelerating the adoption of sustainability policies and practices



SF Environment

Our home. Our city. Our planet.

A Department of the City and County of San Francisco