

# COUNTRY EXPOSURE MODEL

Review main statistic of a exposure model and create summaries for a given Country.

/home/risk/venvs/py38w/lib/python3.8/site-packages/geopandas/compat.py:111: UserWarning: The Shapely GEOS version (3.9.1-CAPI-1.14.2) is incompatible with the GEOS version PyGEOS was compiled with (3.10.0-CAPI-1.16.0). Conversions between both will be slow.  
warnings.warn(

```
# Parameters
country = "United_States_of_America"
```

Exposure files:  
Exposure\_Com\_United\_States\_of\_America.csv  
Exposure\_Ind\_United\_States\_of\_America.csv  
Exposure\_Res\_United\_States\_of\_America.csv

## Sanity checks and formats

**United States of America**  
../Exposure/North\_America/Exposure\_Com\_United\_States\_of\_America.csv  
../Exposure/North\_America/Exposure\_Ind\_United\_States\_of\_America.csv  
../Exposure/North\_America/Exposure\_Res\_United\_States\_of\_America.csv  
Not possible to check if No\_dwellings >= No\_buildings.  
Missing column 'DWEELLINGS' in DataFrame  
Occupants / Buildings = 2.8  
Reference avg household size (2019) = 2.54  
Population (exposure / UN\_2021) = 0.85  
**Exposure models OK**

## Exposure at National level

### Summary by occupancy type

	OCCUPANTS	BUILDINGS	COST_USD	BUILDINGS_%	COST_USD_%
<b>OCCUPANCY</b>					
Res	284.0M	102,498.2K	\$56,565.6B	93.86%	76.64%
Ind	0.0M	1,295.7K	\$4,037.3B	1.19%	5.47%
Com	0.0M	5,413.7K	\$13,207.1B	4.96%	17.89%

### Other metrics to consider

	AREA_SQM	COST_BUILDING_USD	COST_PER_CAPITA	AVG_BUILDING_AREA_SQM	AVG_COST_PER_BUILDING
<b>OCCUPANCY</b>					
Total	21,459.1M	\$45,780.0B	\$259.9K	196	
Res	17,437.4M	\$37,707.5B	\$199.2K	170	
Ind	958.3M	\$1,679.7B	\$14.2K	740	
Com	3,063.4M	\$6,392.9B	\$46.5K	566	

## Exposure summary at Admin level 1

	COST_USD	BUILDINGS	OCCUPANTS	COST_USD_%	BUILDINGS_%	OCCUPANTS_%
<b>NAME_1</b>						
California	\$8,049.1B	10,609.3K	34,151.9K	10.91%	9.71%	12.02%
Texas	\$5,466.4B	8,390.8K	23,513.9K	7.41%	7.68%	8.28%
New York	\$4,892.3B	5,105.2K	17,226.0K	6.63%	4.67%	6.07%
Florida	\$4,674.5B	7,109.4K	17,427.6K	6.33%	6.51%	6.14%
Illinois	\$3,437.4B	4,162.6K	11,893.6K	4.66%	3.81%	4.19%
Pennsylvania	\$3,100.1B	4,979.6K	11,793.4K	4.20%	4.56%	4.15%
Ohio	\$3,059.7B	4,495.3K	10,791.0K	4.15%	4.12%	3.80%
Michigan	\$2,653.5B	4,122.3K	9,251.7K	3.60%	3.77%	3.26%
New Jersey	\$2,424.3B	2,771.9K	8,096.0K	3.28%	2.54%	2.85%
Georgia	\$2,266.7B	3,607.0K	9,090.0K	3.07%	3.30%	3.20%
North Carolina	\$2,218.7B	3,958.6K	8,974.1K	3.01%	3.62%	3.16%
Virginia	\$2,110.4B	2,893.4K	7,443.8K	2.86%	2.65%	2.62%
Massachusetts	\$1,889.3B	2,090.2K	5,992.9K	2.56%	1.91%	2.11%
Maryland	\$1,646.8B	1,969.2K	5,370.7K	2.23%	1.80%	1.89%
Indiana	\$1,616.1B	2,538.6K	6,093.1K	2.19%	2.32%	2.15%
Washington	\$1,549.7B	2,381.8K	6,237.4K	2.10%	2.18%	2.20%
Minnesota	\$1,494.9B	2,047.0K	4,930.6K	2.03%	1.87%	1.74%
Missouri	\$1,490.1B	2,429.8K	5,621.1K	2.02%	2.22%	1.98%
Tennessee	\$1,447.4B	2,559.3K	5,963.4K	1.96%	2.34%	2.10%
Arizona	\$1,316.0B	2,411.4K	5,909.3K	1.78%	2.21%	2.08%
Colorado	\$1,209.6B	1,834.1K	4,671.0K	1.64%	1.68%	1.64%
Alabama	\$1,049.2B	2,010.3K	4,488.4K	1.42%	1.84%	1.58%
Connecticut	\$1,039.4B	1,190.3K	3,289.4K	1.41%	1.09%	1.16%
South Carolina	\$1,025.1B	1,936.1K	4,330.3K	1.33%	1.77%	1.52%
Kentucky	\$982.3B	1,762.9K	4,083.1K	1.39%	1.61%	1.44%
Louisiana	\$957.0B	1,783.7K	4,247.6K	1.30%	1.63%	1.50%
Wisconsin	\$896.3B	1,247.0K	2,962.8K	1.21%	1.14%	1.04%
Oregon	\$857.3B	1,443.2K	3,541.2K	1.16%	1.32%	1.25%
Oklahoma	\$838.7B	1,534.0K	3,527.6K	1.14%	1.40%	1.24%
Iowa	\$798.3B	1,232.3K	2,861.5K	1.08%	1.13%	1.01%
Kansas	\$699.3B	1,131.3K	2,681.7K	0.95%	1.04%	0.94%
Arkansas	\$610.5B	1,222.3K	2,746.6K	0.83%	1.12%	0.97%
Nevada	\$601.6B	905.1K	2,502.6K	0.82%	0.83%	0.88%
Mississippi	\$585.0B	1,213.0K	2,793.0K	0.79%	1.11%	0.98%
Utah	\$528.1B	866.6K	2,580.3K	0.72%	0.79%	0.91%
Nebraska	\$445.5B	716.8K	1,707.5K	0.60%	0.66%	0.60%
West Virginia	\$404.4B	835.6K	1,737.9K	0.55%	0.77%	0.61%
New Mexico	\$379.4B	826.7K	1,921.3K	0.51%	0.76%	0.68%
New Hampshire	\$357.6B	532.6K	1,232.1K	0.48%	0.49%	0.43%
Maine	\$340.0B	655.3K	1,242.2K	0.46%	0.60%	0.44%
Hawaii	\$313.9B	359.9K	1,231.5K	0.43%	0.33%	0.43%
Idaho	\$311.5B	629.4K	1,461.6K	0.42%	0.58%	0.51%
Rhode Island	\$284.4B	353.0K	964.3K	0.39%	0.32%	0.34%
Delaware	\$256.3B	365.0K	842.9K	0.35%	0.33%	0.30%
Montana	\$221.2B	453.3K	924.0K	0.30%	0.42%	0.33%
District of Columbia	\$187.5B	143.6K	522.8K	0.25%	0.13%	0.18%
Alaska	\$186.5B	261.5K	651.1K	0.25%	0.24%	0.23%
South Dakota	\$183.1B	326.1K	751.0K	0.25%	0.30%	0.26%
Vermont	\$169.6B	288.5K	584.3K	0.23%	0.26%	0.21%
North Dakota	\$161.5B	268.8K	632.1K	0.22%	0.25%	0.22%
Wyoming	\$126.5B	246.7K	527.2K	0.17%	0.23%	0.19%

## Exposure by simplified taxonomy

Adding `MACRO\_TAXO` column

	COST_USD	BUILDINGS	OCCUPANTS	COST_USD_%	BUILDINGS_%	OCCUPANTS_%
<b>MACRO_TAXO</b>						
OT	\$73,809.9B	109.2M	284.0M	100.00%	100.00%	100.00%

## Exposure by taxonomy

Showing only taxonomies that represent 90% of the total `COST\_USD`

	COM1-W2-PC	\$204.0B	130,370	0.43%	0.13%
	COM1-URML-PC	\$274.6B	150,096	0.41%	0.14%
	RES1-RM1L-LC	\$272.2B	565,209	0.41%	0.53%
	COM4-URML-LC	\$261.4B	92,894	0.39%	0.09%
	COM3-URML-PC	\$240.3B	191,013	0.36%	0.18%
	COM2-URML-PC	\$232.4B	105,098	0.35%	0.10%
	COM8-W2-PC	\$231.3B	113,686	0.35%	0.11%
	RES5-URML-PC	\$229.7B	32,931	0.35%	0.03%
	COM7-W2-PC	\$222.0B	73,240	0.33%	0.07%
	COM8-URML-PC	\$219.1B	107,809	0.33%	0.10%
	COM3-W2-PC	\$218.3B	174,198	0.33%	0.16%
	RES3F-URML-PC	\$211.8B	8,247	0.32%	0.01%
	RES4-W1-LC	\$205.0B	48,550	0.31%	0.05%
	RES3C-URML-PC	\$200.3B	91,558	0.30%	0.09%
	RES3C-W1-MC	\$195.8B	86,230	0.29%	0.08%
	COM4-S5L-PC	\$190.4B	64,362	0.29%	0.06%
	COM4-S1L-PC	\$187.9B	59,046	0.28%	0.06%
	RES3F-W1-MC	\$185.6B	7,774	0.28%	0.01%
	RES3D-URML-PC	\$177.6B	43,204	0.27%	0.04%
	COM4-S3-PC	\$174.5B	63,558	0.26%	0.06%
	COM7-URML-PC	\$172.6B	56,519	0.26%	0.05%
	RES3A-URML-PC	\$171.9B	297,054	0.26%	0.28%
	RES3D-W1-MC	\$165.7B	39,076	0.25%	0.04%
	COM4-S2L-PC	\$163.0B	52,843	0.25%	0.05%
	RES5-W1-LC	\$162.2B	24,151	0.24%	0.02%
	RES3E-W1-MC	\$158.3B	13,936	0.24%	0.01%
	IND1-S3-PC	\$155.6B	26,216	0.23%	0.02%
	RES3E-URML-PC	\$153.9B	13,085	0.23%	0.01%
	IND1-S5L-PC	\$152.4B	27,108	0.23%	0.03%
	RES3B-URML-PC	\$148.8B	153,264	0.22%	0.14%
	COM1-S1L-PC	\$148.6B	75,019	0.22%	0.07%
	RES3C-URML-LC	\$135.7B	63,116	0.20%	0.06%
	COM1-S5L-PC	\$135.7B	70,422	0.20%	0.07%
	RES1-C2L-PC	\$132.4B	252,664	0.20%	0.24%
	IND2-URML-PC	\$127.7B	38,962	0.19%	0.04%
	IND1-S2L-PC	\$127.1B	23,467	0.19%	0.02%
	COM8-S1L-PC	\$124.6B	59,250	0.19%	0.06%
	RES3F-URML-LC	\$123.9B	5,214	0.19%	0.00%
	COM1-W2-LC	\$120.5B	64,960	0.18%	0.06%
	RES3D-URML-LC	\$120.3B	29,847	0.18%	0.03%
	RES1-RM1L-MC	\$120.2B	233,191	0.18%	0.22%
	COM4-RM1L-PC	\$120.2B	41,560	0.18%	0.04%
	COM6-PC1-PC	\$117.7B	3,283	0.18%	0.00%
	COM4-PC1-PC	\$116.4B	39,968	0.18%	0.04%
	COM4-C2L-PC	\$116.3B	41,349	0.18%	0.04%
	RES6-W1-LC	\$115.7B	24,354	0.17%	0.02%
	COM4-W2-MC	\$115.2B	35,668	0.17%	0.03%
	COM1-S2L-PC	\$115.0B	58,346	0.17%	0.05%
	IND1-S1L-PC	\$114.8B	22,342	0.17%	0.02%
	COM1-URML-LC	\$113.7B	61,269	0.17%	0.06%
	COM2-S1L-PC	\$113.3B	48,637	0.17%	0.05%
	COM2-S5L-PC	\$112.7B	49,157	0.17%	0.05%
	RES3B-W1-MC	\$111.7B	134,742	0.17%	0.13%
	COM2-PC1-PC	\$111.4B	53,510	0.17%	0.05%
	RES5-PC1-PC	\$110.3B	15,501	0.17%	0.01%
	COM8-S5L-PC	\$103.5B	49,408	0.16%	0.05%
	COM2-W2-PC	\$100.6B	43,859	0.15%	0.04%
	RES3A-URML-LC	\$99.8B	180,970	0.15%	0.17%
	COM6-URML-PC	\$98.7B	2,650	0.15%	0.00%
	RES1-W1-LS	\$97.5B	231,474	0.15%	0.22%
	RES3E-URML-LC	\$97.3B	8,834	0.15%	0.01%
OT	COM3-URML-LC	\$96.6B	77,037	0.15%	0.07%
	COM2-URML-LC	\$96.0B	41,998	0.14%	0.04%
	COM2-S2L-PC	\$94.1B	40,112	0.14%	0.04%
	IND6-W2-PC	\$92.9B	111,262	0.14%	0.10%
	COM3-W2-LC	\$92.3B	74,074	0.14%	0.07%
	COM4-S5L-LC	\$92.2B	30,367	0.14%	0.03%
	RES3B-URML-LC	\$90.4B	98,088	0.14%	0.09%
	RES5-URML-LC	\$89.8B	12,589	0.14%	0.01%
	COM7-S3-PC	\$89.7B	28,039	0.14%	0.03%
	IND6-URML-PC	\$88.8B	105,358	0.13%	0.10%
	COM2-S3-PC	\$87.9B	38,152	0.13%	0.04%
	IND1-PC1-PC	\$87.8B	14,713	0.13%	0.01%
	COM8-W2-LC	\$87.5B	42,796	0.13%	0.04%
	COM1-S3-PC	\$86.6B	46,831	0.13%	0.04%
	COM7-W2-LC	\$85.7B	26,756	0.13%	0.03%
	COM3-S3-PC	\$85.2B	66,865	0.13%	0.06%
	RES5-C1L-PC	\$85.1B	11,171	0.13%	0.01%
	IND3-URML-PC	\$84.4B	7,806	0.13%	0.01%
	COM8-S2L-PC	\$82.9B	39,226	0.12%	0.04%
	COM6-C2L-PC	\$81.9B	2,142	0.12%	0.00%
	RES5-C2L-PC	\$81.1B	11,844	0.12%	0.01%
	COM8-URML-LC	\$79.8B	38,841	0.12%	0.04%
	IND1-S4L-PC	\$77.8B	12,504	0.12%	0.01%
	COM4-RM1L-LC	\$76.8B	23,137	0.12%	0.02%
	RES4-URML-PC	\$75.4B	17,693	0.11%	0.02%
	RES1-C2L-LC	\$75.4B	146,455	0.11%	0.14%
	COM8-S3-PC	\$74.1B	35,850	0.11%	0.03%
	COM6-S1L-PC	\$74.1B	1,963	0.11%	0.00%
	RES3C-W1-HC	\$71.8B	31,135	0.11%	0.03%
	RES3F-W1-HC	\$71.3B	2,983	0.11%	0.00%
	COM2-C2L-PC	\$69.9B	30,255	0.11%	0.03%
	IND2-S3-PC	\$69.8B	19,720	0.11%	0.02%
	IND1-S5L-LC	\$69.2B	11,375	0.10%	0.01%
	IND1-URML-PC	\$69.2B	12,117	0.10%	0.01%
	COM4-S3-LC	\$67.9B	23,298	0.10%	0.02%
	COM6-S5L-PC	\$66.9B	1,691	0.10%	0.00%
	COM4-RM1L-MC	\$66.5B	19,841	0.10%	0.02%
	RES3A-W1-MC	\$65.1B	138,191	0.10%	0.13%
	COM4-S1L-LC	\$64.7B	20,679	0.10%	0.02%
	COM4-C1L-PC	\$63.6B	19,373	0.10%	0.02%
	COM4-S4L-PC	\$63.3B	24,678	0.10%	0.02%
	IND1-S1L-LC	\$62.7B	11,187	0.09%	0.01%
	COM2-PC1-MC	\$61.8B	25,188	0.09%	0.02%
	RES3E-W1-HC	\$61.1B	5,306	0.09%	0.00%
	RES3D-W1-HC	\$59.6B	13,732	0.09%	0.01%
	IND1-S3-LC	\$59.3B	9,230	0.09%	0.01%
	COM4-W2-HC	\$58.8B	15,831	0.09%	0.01%
	IND1-S2L-LC	\$58.6B	10,078	0.09%	0.01%
	COM7-URML-LC	\$58.5B	18,276	0.09%	0.02%
	COM4-RM2L-PC	\$58.1B	17,020	0.09%	0.02%
	COM1-S1L-LC	\$57.6B	29,972	0.09%	0.03%
	COM6-S2L-PC	\$57.3B	1,399	0.09%	0.00%
	IND3-S1L-PC	\$57.2B	5,362	0.09%	0.01%
	COM1-S5L-LC	\$56.7B	29,089	0.09%	0.03%
	IND2-PC1-PC	\$56.4B	18,362	0.08%	0.02%
	IND1-C2L-PC	\$56.3B	8,869	0.08%	0.01%
	COM1-PC1-PC	\$53.9B	28,329	0.08%	0.03%
	COM1-RM1L-PC	\$52.5B	26,797	0.08%	0.03%
	COM4-C2L-MC	\$52.0B	15,607	0.08%	0.01%
	RES1-W1-MS	\$51.7B	122,823	0.08%	0.12%
	IND3-S5L-PC	\$51.7B	4,426	0.08%	0.00%
	COM7-S1L-PC	\$51.2B	15,394	0.08%	0.01%
	COM2-S1L-LC	\$50.4B	22,162	0.08%	0.02%
	COM4-C2L-LC	\$50.4B	17,334	0.08%	0.02%
	IND2-URML-LC	\$50.2B	13,207	0.08%	0.01%
	IND2-S1L-PC	\$50.1B	14,533	0.08%	0.01%
	IND2-W2-PC	\$49.9B	12,960	0.08%	0.01%
	RES1-W1-PC	\$49.7B	118,098	0.07%	0.11%
	IND6-S1L-PC	\$49.3B	54,510	0.07%	0.05%
	COM8-S1L-LC	\$48.9B	23,541	0.07%	0.02%
	COM6-PC1-LC	\$48.9B	1,305	0.07%	0.00%
	COM1-C2L-PC	\$48.8B	24,959	0.07%	0.02%
	COM6-C1L-PC	\$48.7B	1,172	0.07%	0.00%
	RES2-MH-MC	\$48.6B	457,699	0.07%	0.43%
	IND6-S5L-PC	\$48.3B	54,553	0.07%	0.05%
	COM7-W2-MC	\$48.1B	14,601	0.07%	0.01%
	COM4-S2L-LC	\$47.9B	14,276	0.07%	0.01%
	RES5-W1-PC	\$47.9B	7,495	0.07%	0.01%
	COM2-PC1-LC	\$47.8B	20,695	0.07%	0.02%
	COM2-S5L-LC	\$47.2B	19,831	0.07%	0.02%
	COM7-S5L-PC	\$46.4B	13,904	0.07%	0.01%
	COM8-RM1L-PC	\$46.4B	22,122	0.07%	0.02%