McKinsey's report.

Embarcadero's report.

McKinsey Global Institute on October 24, 2016: California needs 3,500,000 new homes by 2025 (let us assume January 1, 2025 for clarity).

On Exhibit 3, page 2 they show that in 2014 California had 0.358 housing units per person (358 units per 1000 people) and Texas had 0.387 housing units per person. From the US Census Bureau using the 2014 American Community Survey (ACS) 1-Year Estimate we find that California had a population of 38,802,500 and 13,901,594 housing units. Texas had a population of 27,862,596 and 10,754,268 housing units.

```
# California housing per capita, 2014
13901594 / 38802500
```

```
## [1] 0.3582654
```

```
# Texas housing per capita, 2014
tx_hpc_2014 <- 10426760 / 26956958
tx_hpc_2014
```

```
## [1] 0.3867929
```

McKinsey's housing per capita figures work out.

In the first paragraph of page 4 they say '[California's] population is expected to increase by 3.6 million people' by 2025. I have not determined the source of this projection. From the Census Bureaus ACS 1-Year Estimate for 2016'(the year the report was published), California's population was 39,250,017 and it had 14,061,375 housing units.

```
# California's population in 2025
ca_pop_2025 <- 39250017 + 3600000
ca_pop_2025
```

```
## [1] 42850017
```

```
# number of homes California needs in 2025 with Texas' housing per capita
ca_pop_2025 * tx_hpc_2014
```

```
## [1] 16574082
```

```
# number of homes to be built between 2016 and 2025
(ca_pop_2025 * tx_hpc_2014) - 14061375
```

```
## [1] 2512707
```

```
# number of homes California should have had in 2016 with Texas' 2014 housing per capita
# they mention this number in footnote 2, page 2 ('it would have 15.1 million homes')
39250017 * tx_hpc_2014
```

```
## [1] 15181628
```

This is a more conservative estimate since McKinsey recommended California have the same housing per capita by 2025 as New York (0.415) or New Jersey (0.402) did in 2014. These per capita numbers are from Exhibit 3, page 3; I have not verified them.

```
# number of homes California needs in 2025 with New York's 2014 housing per capita
ca_pop_2025 * 0.415
```

```
## [1] 17782757
```

```
# number of homes to be built between 2016 and 2025
(ca_pop_2025 * 0.415) - 14061375
```

```
## [1] 3721382
```

McKinsey's number of 3,500,000 homes that need to be built by 2025 seems to roughly match up with these calculations. The number to focus on should be 2,512,707, the number of homes California should build to have Texas' housing per capita by 2025. This is the quantity that the Embarcadero Institute focuses on, and gives a different estimate for.

The Embarcadero Institute (cited by Livable California), on June 24, 2019: California needs 1,500,000 new homes by 2025.

On page 5, they say California's projected population in 2025 is 42,000,000. They cite the California Department of Finance Population Forecasts. From table P1-A under P-1: State Population Projections (2010-2060), the Department's population estimate for California in 2025 is 40,808,001. This figure is significantly off from both Embarcadero's projection and McKinsey's 42,850,017 projection. I have not determined the true source of Embarcadero's 42,000,000 projection.

On page 5, they show that in 2017 Texas's housing per capita is 0.37 and California's housing per capita is 0.35. They cite the US Census Bureau's 2017 ACS 5-Year Estimate. California's population is 38,982,847 and its housing is 13,996,299. Texas' population is 27,419,612 and its housing is 10,611,386.

```
# California housing per capita, 2017
13996299 / 38982847
```

```
## [1] 0.3590374
```

```
# Texas housing per capita, 2017
tx_hpc_2017 <- 10611386 / 27419612
tx_hpc_2017
```

```
## [1] 0.3869999
```

Embarcadero's housing per capita figures do not work out. Keep in mind that the ACS 5-Year Estimates do differ from the ACS 1-Year Estimates, the latter of which McKinsey cites and uses. In calculating housing per capita rates for a given year however, I believe any difference is negligible.

I cannot determine how exactly Embarcadero obtained their housing per capita numbers. I take the ACS 5-Year Estimate for California and Texas housing units and divide those by their population figures for California and Texas on page 4, 39,400,000 and 28,300,000 respectively. From what I can tell, these population figures do not come directly from the Census Bureau, either the 5-Year Estimate (38,982,847 and 27,419,612 respectively) or 1-Year Estimate (39,536,653 and 28,304,596 respectively), but rather directly from Google (which cites the Census Bureau as one of its included sources; I do not know how Google calculates their numbers) by searching 'California population 2017' or 'Texas population 2017'.

```
# attempt to recreate California housing per capita, 2017
13996299 / 39400000
```

```
## [1] 0.355236
```

```
# attempt to recreate Texas housing per capita, 2017
10611386 / 28300000
```

```
## [1] 0.3749606
```

These numbers more closely align with Embarcadero's numbers, but are not exactly what they show. Whatever their methodology is, I cannot determine it.

On page 5 they multiply their projection for California's population in 2025, 42,000,000, by their Texas housing per capita in 2017, 0.37. Remember that I could not find or recreate either of these numbers. Also on page 5 they say California's 'current housing' is 14,000,000. I do not know which year they refer to, 2017 or the year of publication, 2019, but 14,000,000 is roughly accurate.

```r
# number of homes California needs in 2025 with Texas' housing per capita
42000000 * 0.37
```

```
## [1] 15540000
```

```r
# number of homes to be built between 'now' and 2025
(42000000 * 0.37) - 14000000
```

```
## [1] 1540000
```

This appears to be how they obtain their number of only 1.5 million homes that need to be built by 2025. McKinsey's estimate, using the same methodology (California's projected population in 2025 times Texas' housing per capita in 2014) is 2,512,707 as calculated above. The discrepancy between McKinsey and Embarcadero appears to be a result of different projections used for California's 2025 population, and different numbers for Texas' housing per capita (though McKinsey calculates from 2014 and Embarcadero cites from 2017, the housing per capita figure seems to remain fairly stable over this time period).