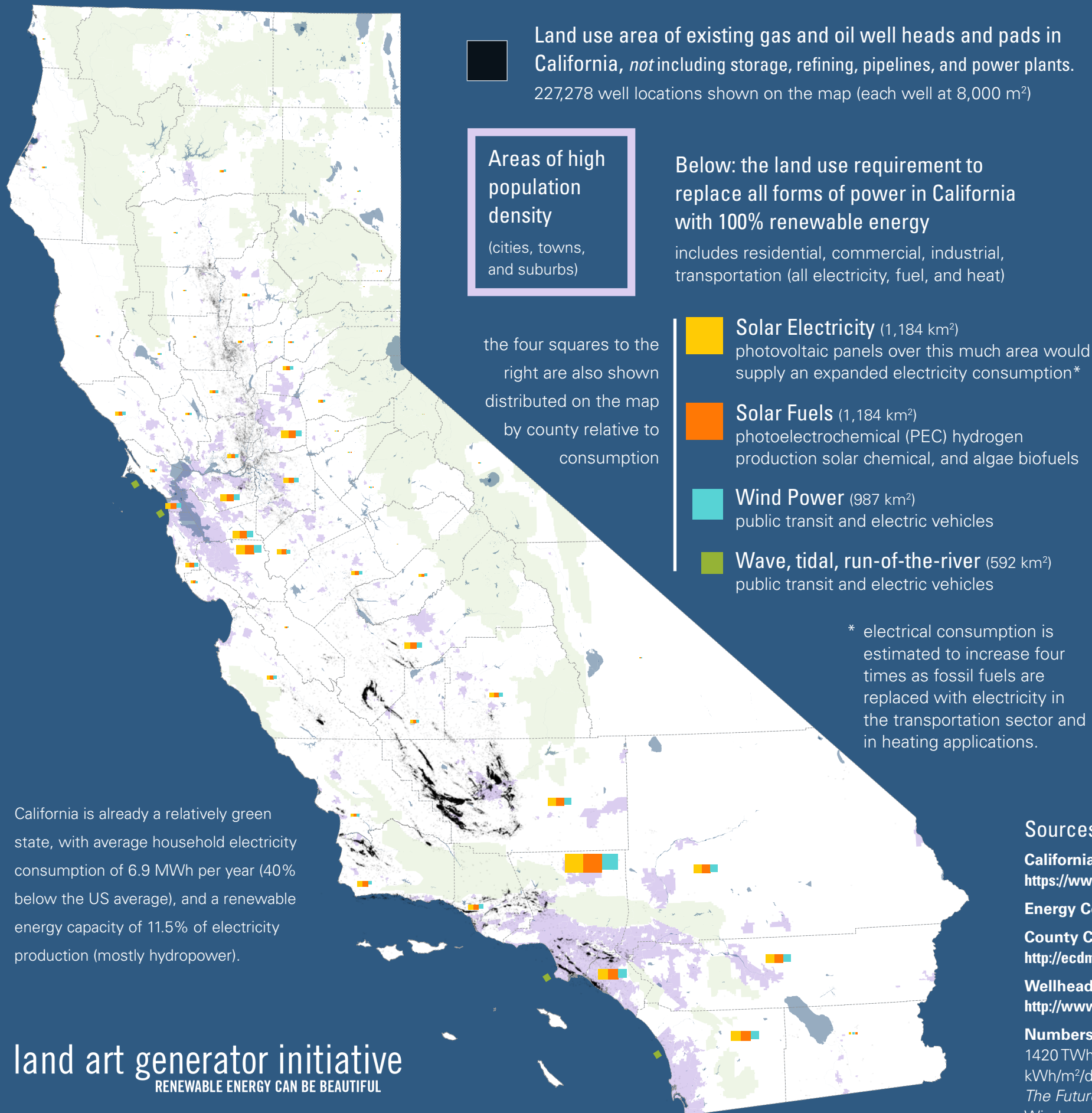


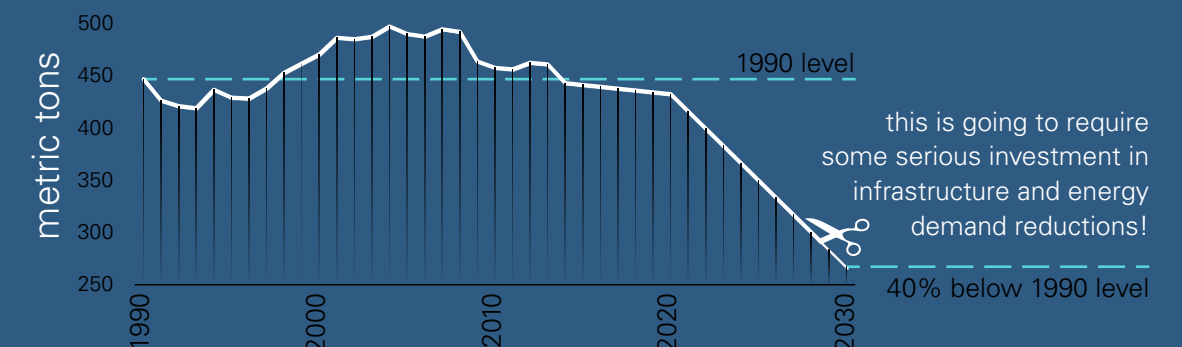
SURFACE AREA REQUIRED TO POWER CALIFORNIA with zero carbon emissions and 100% renewable energy



California is already a relatively green state, with average household electricity consumption of 6.9 MWh per year (40% below the US average), and a renewable energy capacity of 11.5% of electricity production (mostly hydropower).

California has enacted an ambitious carbon reduction policy to bring emissions down to 40% below 1990 levels by the year 2030. We decided to take a look at what the land use impact of energy has been on California in the past, and what a real shift to a 100% renewable energy infrastructure might look like.

State of California Total CO₂ Emissions by Year



The surface area of solar panels required to match all of California's Btu and kWh consumption will be large, but it is certainly possible. Much of the infrastructure can be located within our cities—the **lavender areas on the map**—on rooftops and through **creative and community-owned applications in public spaces**. The rest could easily be located in the places that have already been disturbed by oil and gas extraction—the dark dots on the map.

Sources and Figures

California Emissions: California Environmental Protection Agency Air Resources Board: <https://www.arb.ca.gov/cc/inventory/data/data.htm>

Energy Consumption and Production: U.S. Energy Information Administration (EIA): <http://www.eia.gov/>

County Consumption Data: California Energy Consumption Data Management System: <http://ecdms.energy.ca.gov/elecbycounty.aspx>

Wellhead Data: California Department of Conservation: <http://www.conservation.ca.gov/dog/maps/Pages/GISMapping2.aspx>

Numbers: total consumption in 2014 = 2231 TWh (7620 trillion Btu); total consumption post decarbonization = 1420 TWh (4850 trillion Btu); solar production estimated at 360 kWh/m²/year based on surface insolation of 5.5 kWh/m²/day and PV conversion efficiency of 18%. This is aligned with the conclusions of the 2015 MIT study, *The Future of Solar Energy*: <http://energy.mit.edu/wp-content/uploads/2015/05/MITEL-The-Future-of-Solar-Energy.pdf>. Wind production can be more easily shared with agricultural land uses, but is also estimated at the same 360 kWh/m²/year density. Data used can be found at <http://landartgenerator.org/californiainfographicdata.xlsx>.

land art generator initiative
RENEWABLE ENERGY CAN BE BEAUTIFUL

<http://landartgenerator.org>