2020 Solar Valley Consortium Webinar

August 6, 2020
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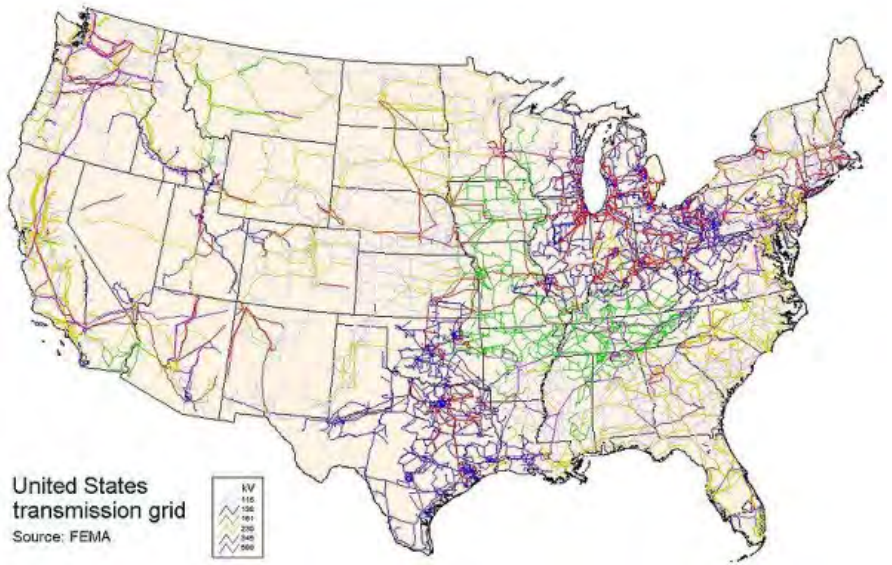
VOTE SOLAR

Solar Energy is Rapidly Advancing in the West

- SB 100 became law in September, 2018 setting the goal for a carbon-free grid in California by 2045
- Since then, utilities in AZ, CO, NV, NM, OR and UT have announced plans to close fossil fuel power plants and build renewables.
  - Public Service of Colorado – 80% carbon free by 2030
  - Arizona Public Service – 100% carbon free by 2050
  - NVEnergy – 100% carbon free by 2050
  - New Mexico Public Service to immediately replace 100% of San Juan coal power plant with solar and battery storage
  - Pacific Corp. to build 1.8 GW of solar with 600 MW of battery storage by 2023
- LADWP is reassessing plans to repower its natural gas generating units in the LA Basin
- The Sacramento Municipal Utility District to achieve carbon neutrality by 2030

90% Grid Decarbonization in the U.S. by 2035 is Feasible and Lowers Electricity Costs

- The UC Berkeley Goldman School of Public Policy using the latest renewable energy and battery cost data demonstrate the technical and economic feasibility of achieving 90% carbon-free electricity across the United States by 2035.
- Wholesale electricity costs, which include the cost of new generation plus incremental transmission investments, are about 10% lower in 2035 under the low carbon scenario than they are today.



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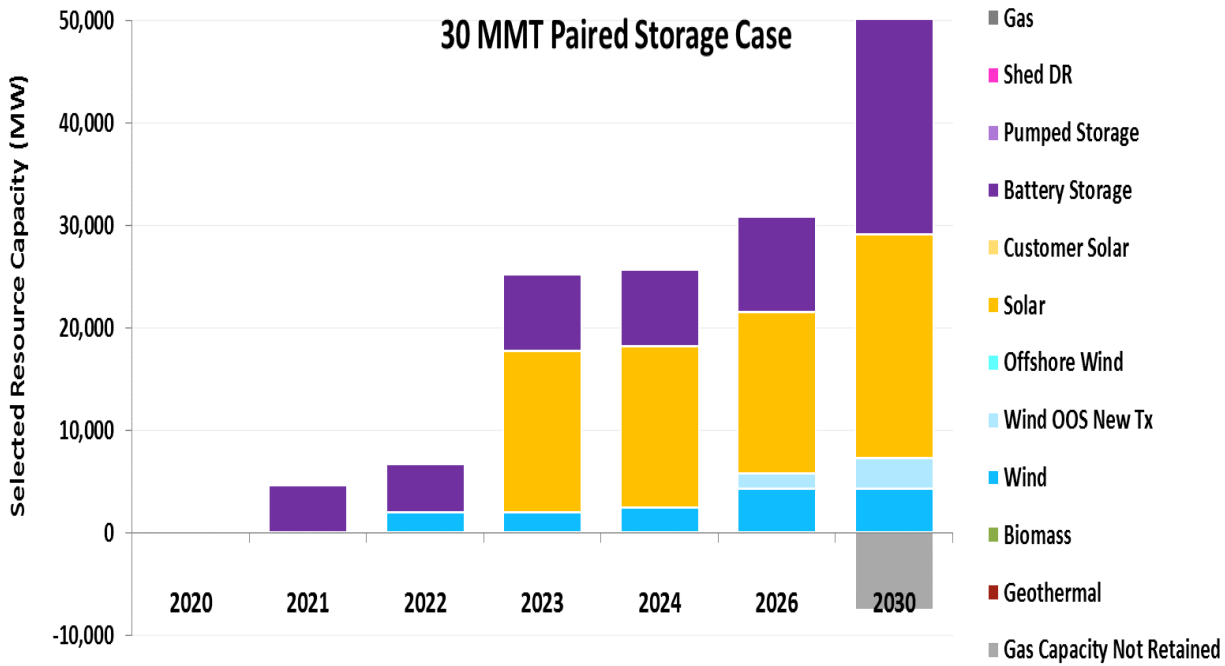
Over 20 GW of New Solar and 20 GW of Battery Storage Needed for a Clean Grid

Table 1: Vote Solar - LSA - SEIA 30 MT Alternate Scenario					
	Staff 30 MT paired storage		VS - LSA - SEIA 30 MT Alternate		
			Battery		
Year	Battery	Solar	Standalone	Paired	Solar
2021	4,608	0	500	1,300	2,000
2022	4,801	0	1,000	3,900	6,000
2023	7,528	15,724	1,500	7,150	11,000
2024	7,528	15,724	2,000	8,174	12,575
2026	9,290	15,724	3,000	10,221	15,724
2030	21,251	21,804	7,079	14,172	21,804



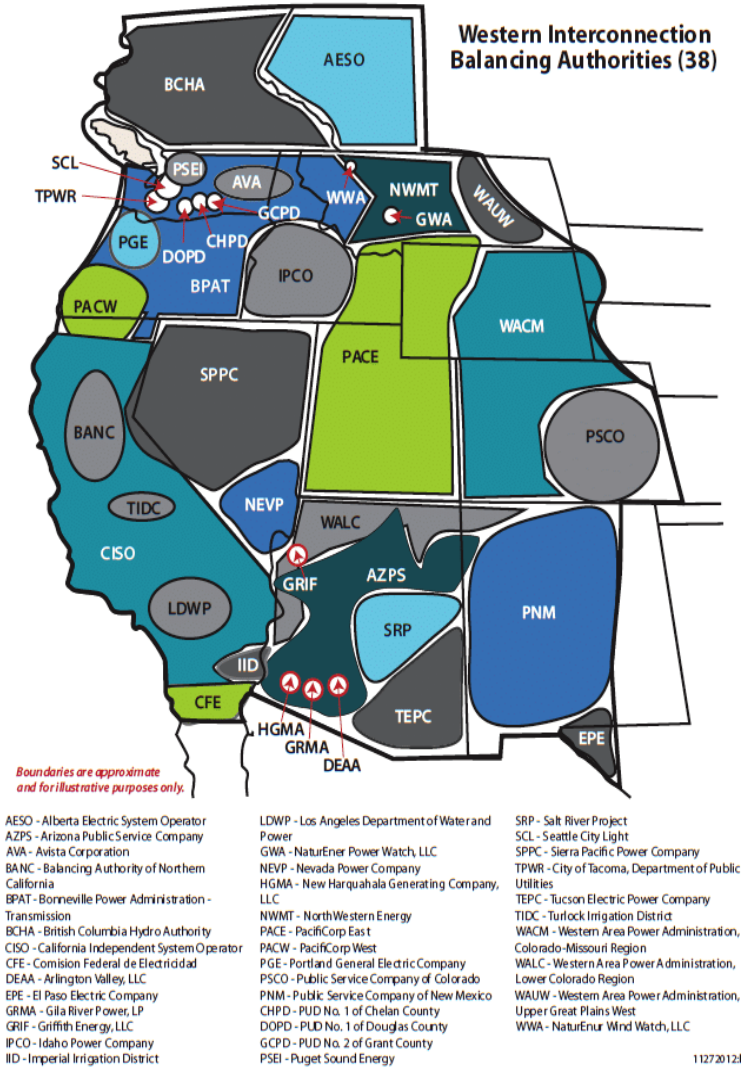
Pricing for Renewable Energy and Hybrid Renewable Energy Plus Storage Projects

Technology	Number of Projects	Total Megawatts	Median Price (MWH)
Solar	75	13,436	$29.50
Solar with Storage	39	10,813	$36.00
Wind	42	17,380	$18.10
Wind with Storage	8	5,097	$21.00

Source: Public Service of Colorado, December 2017 – Results from competitive solicitation for renewable energy and battery energy storage

The Western Grid is Interconnected

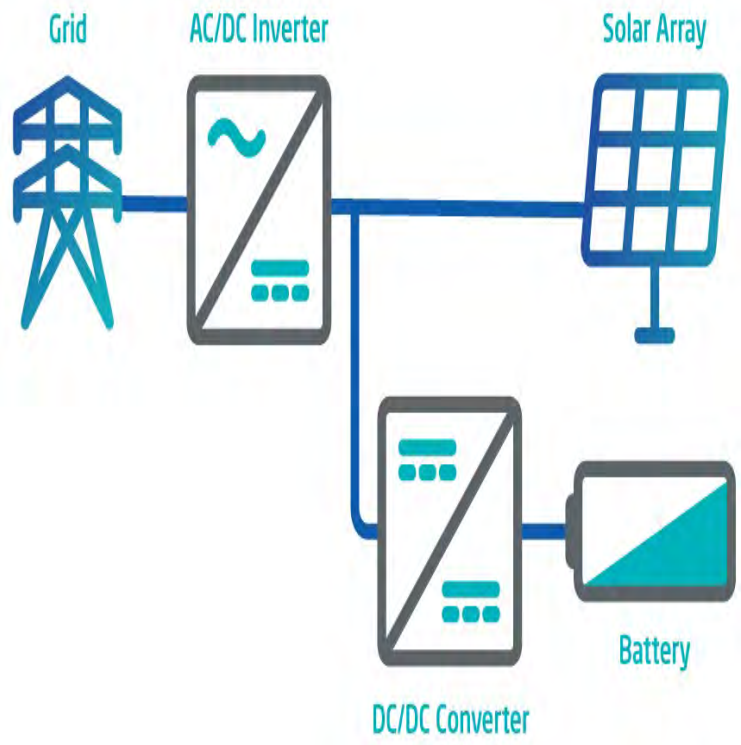
- The Western Interconnect covers 14 states, two Canadian province and parts of Baja
- There are 38 Balancing Authorities in the Western Interconnect responsible for operating the Grid
- The CAISO is the largest Balancing Authority and the only one to use markets to dispatch power
- The Western Energy Imbalance Market includes 11 participants and will add another 9 members by 2022
- Plans are underway to expand the EIM from the real-time market to the day-ahead market.
- Clean energy resources developed in the Solar Valley can reach all of these markets throughout the West



https://www.westerneim.com/Pages/About/default.aspx

Hybrid Solar Paired with Battery Storage Unleashes New Opportunities

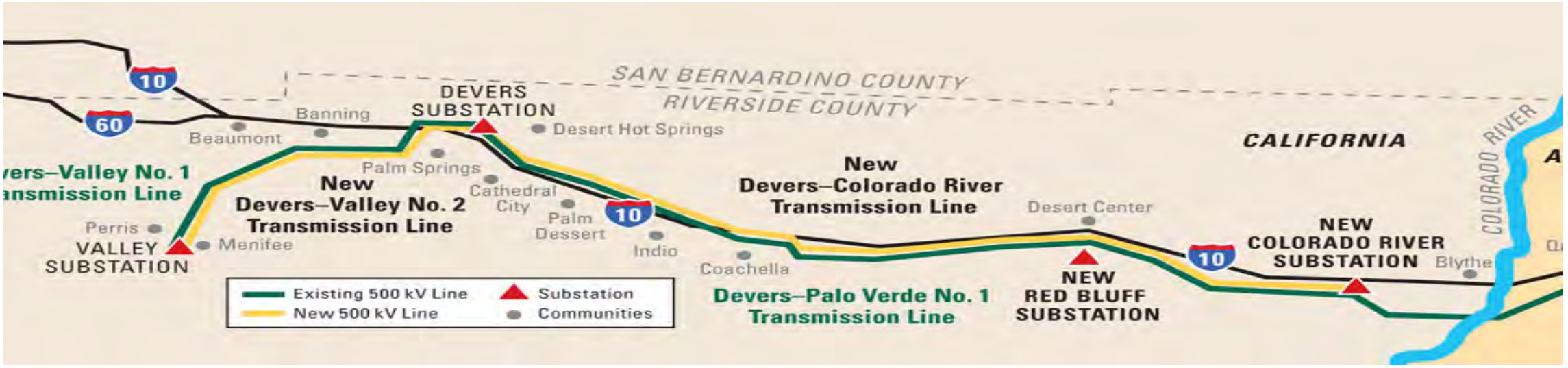
- Hybrid power plants can offer energy and grid services but with more flexibility through the coordinated use of energy, storage, power electronics and software.
- A hybrid power plant can operate like a gas plant except that it can start instantly, quickly ramp down to zero and requires no advance commitment.
- Hybrid plants simplify operation of the grid by placing responsibility for managing the battery state-of-charge with the hybrid operator.
- The battery storage can be charged from the renewable generator or from the grid based on an economic choice.
- Hybrids can help the grid operator better manage the “duck curve” and lower grid operating costs.



Source: Mark Ahlstrom, VP of Renewable Energy Policy, NextEra Energy Resources

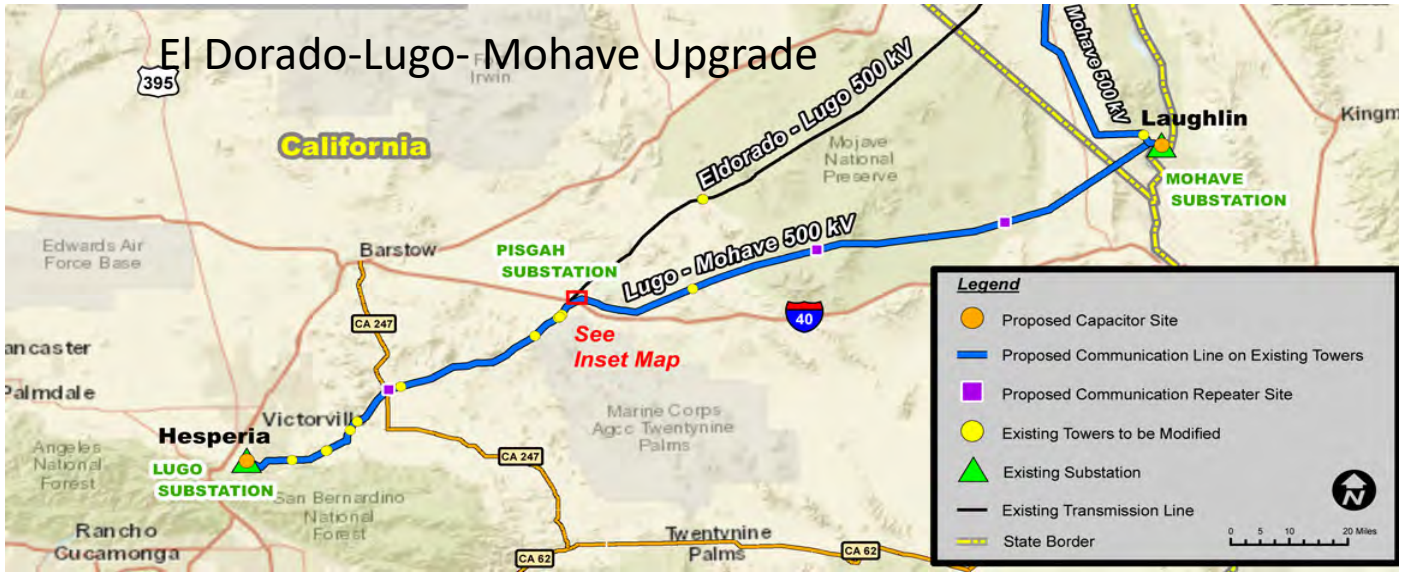
Developing Projects in the Solar Valley

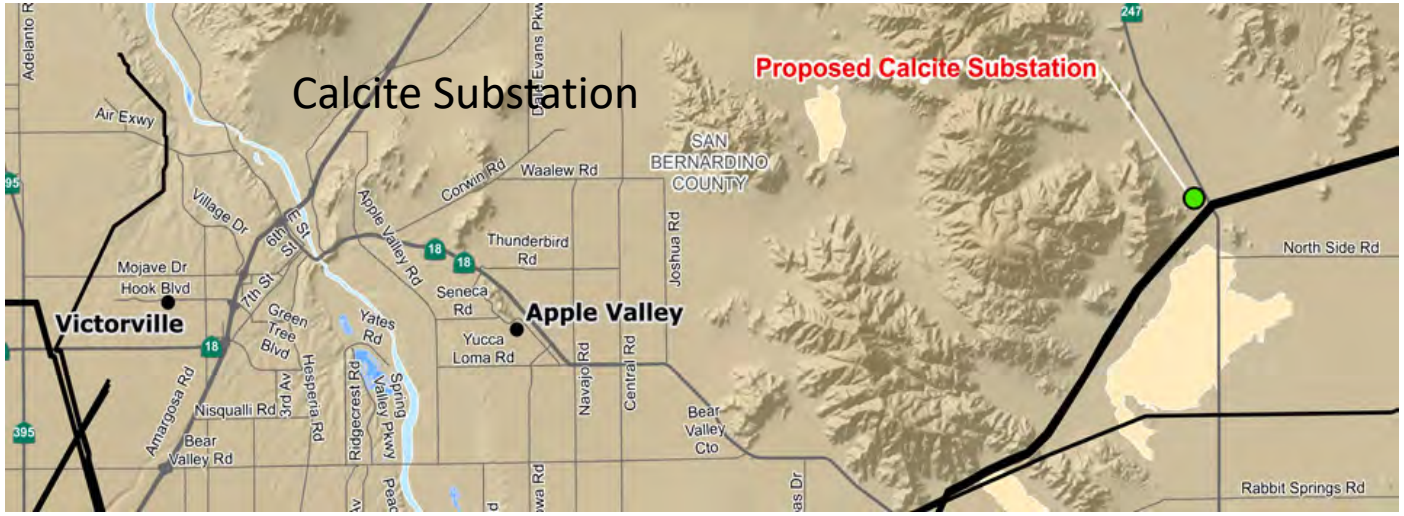
- 31 CAISO Interconnection Applications are Active in the Solar Valley totaling 8,202 megawatts
  - 6,266 MW in Riverside County
  - 1,936 MW in San Bernardino County
- 23 projects are hybrid solar plus storage, 5 projects are standalone storage and 3 projects are solar without storage.
- Project Locations – Colorado River Substation (7 – 2,169 MW), Red Bluff Substation – (7 – 2,412 MW), Kramer Substation (4 – 832 MW), Calcite Substation (4 -560 MW), Valley Substation (2 batteries – 1,205 MW), Devers Substation (2 – 400 MW battery, 79 MW solar), Roadway Substation (2 – 200 MW)



Expanding the Grid for Renewables in the Solar Valley

- Grid Infrastructure Projects in San Bernardino County
  - Calcite Substation
  - El Dorado-Lugo-Mohave Upgrade
  - Falcon Ridge Substation
  - Ivanpah Control Project
  - Techachapi Renewable Transmission Project
- Grid Infrastructure Projects in Riverside County
  - Alberhill System
  - Ivyglen Project
  - West of Devers Upgrade
  - Valley South Sub-transmission Project

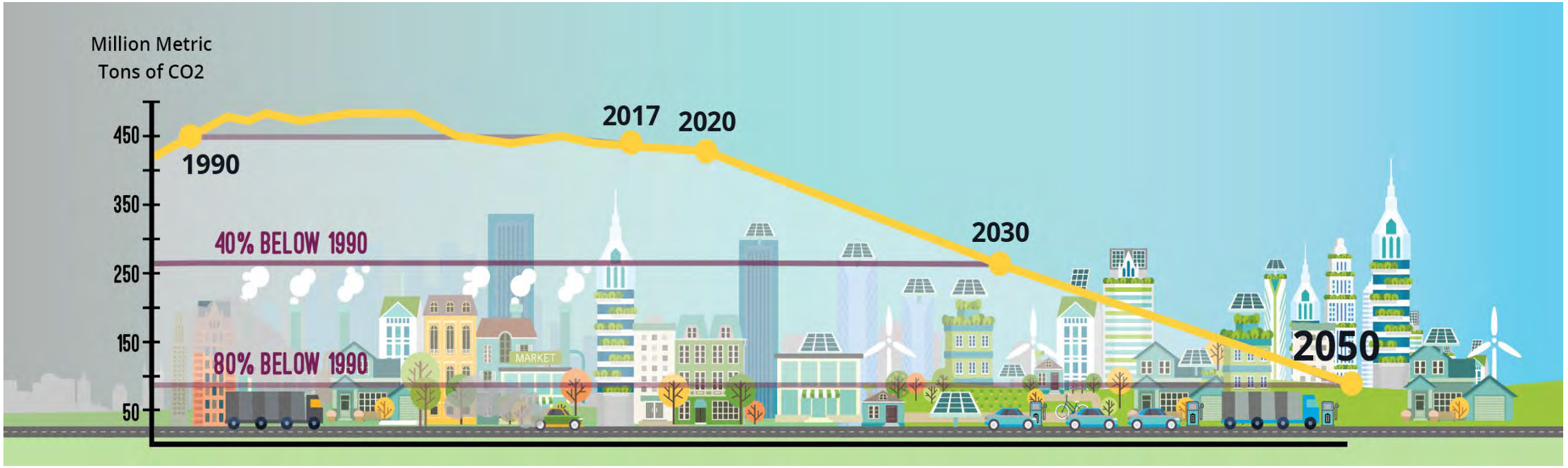




https://www.sce.com/about-us/reliability/upgrading-transmission

Decarbonizing the California Economy

- **SCE's Clean Power and Electrification Pathway calls for:**
  - **80%** carbon-free electricity
  - **24%** of light-duty vehicles are EVs (7MM)
  - **15%** of medium-duty and **6%** of heavy-duty vehicles are electrified
  - **30%** efficient electrification of commercial and residential space and water heating



https://www.sce.com/sites/default/files/inline-files/SCE_CleanPowerandElectrificationPathway_WHITEPAPER.pdf