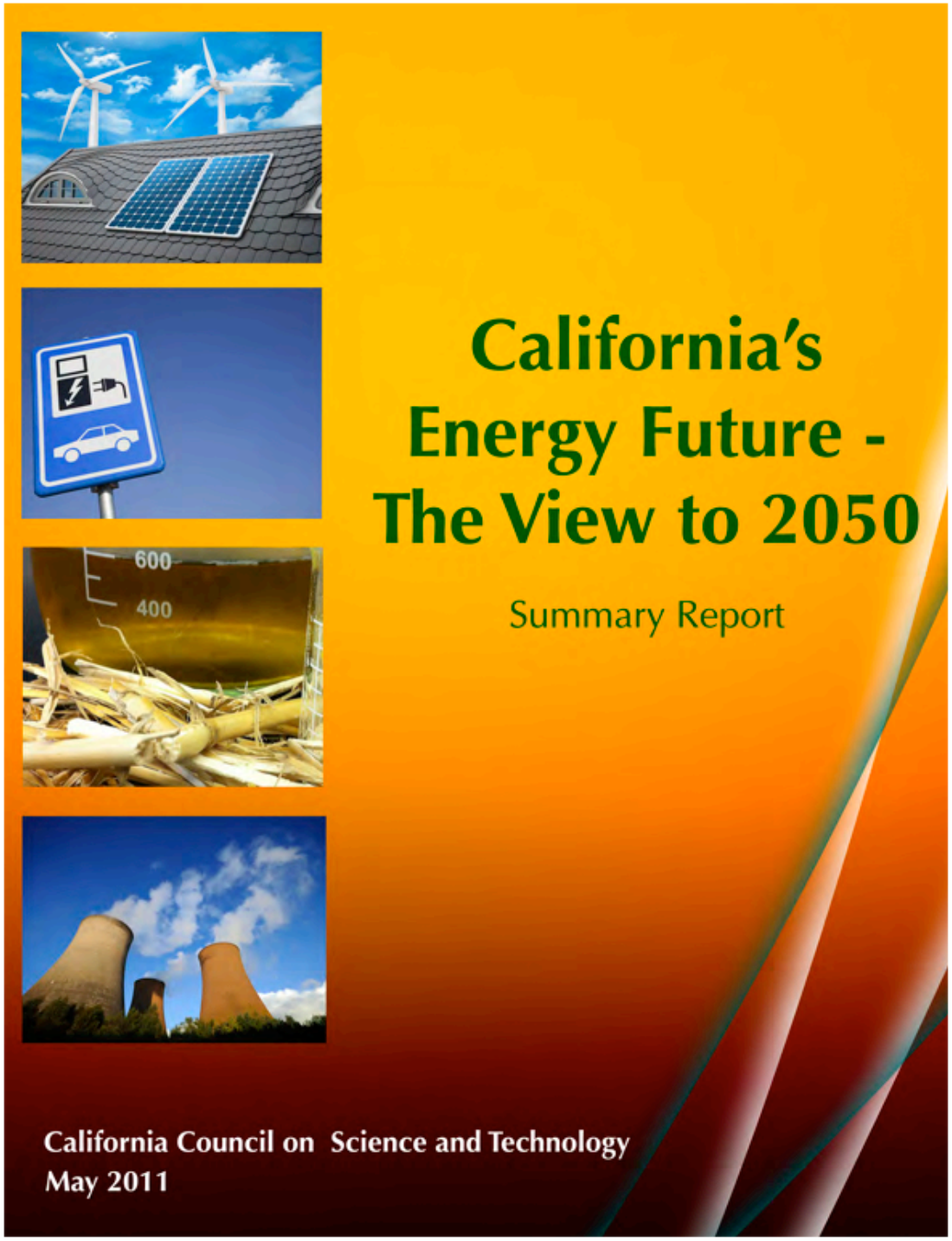


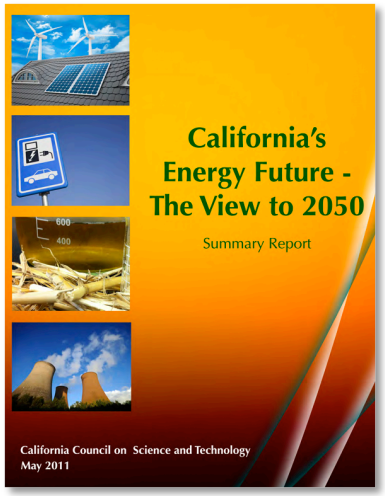
California's Energy Future 2050 study: Insights for 2030

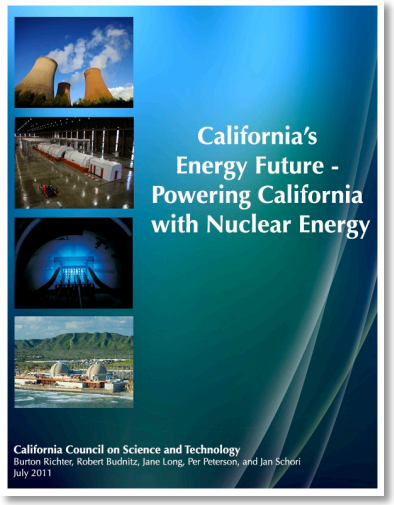
Jeffery Greenblatt
Staff Scientist, Lawrence Berkeley National Laboratory
Senior Fellow, California Council on Science and Technology

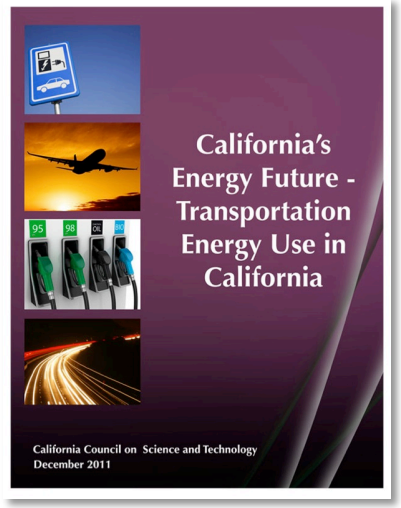
Workshop on Evaluation of Electricity System Needs in 2030

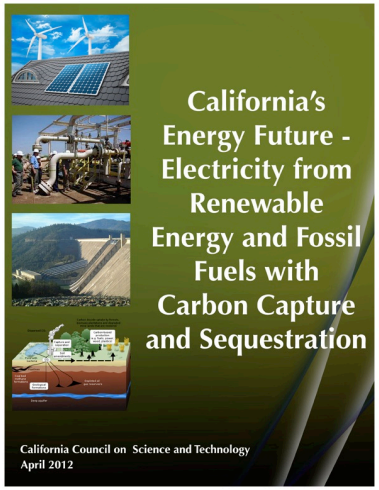
August 19, 2013
California Energy Commission

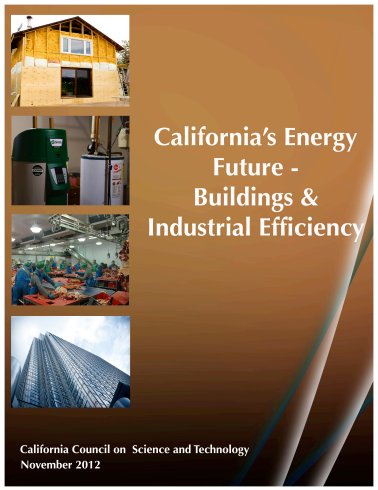
California's Energy Future reports

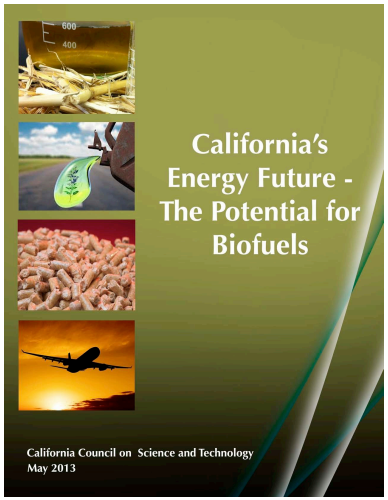








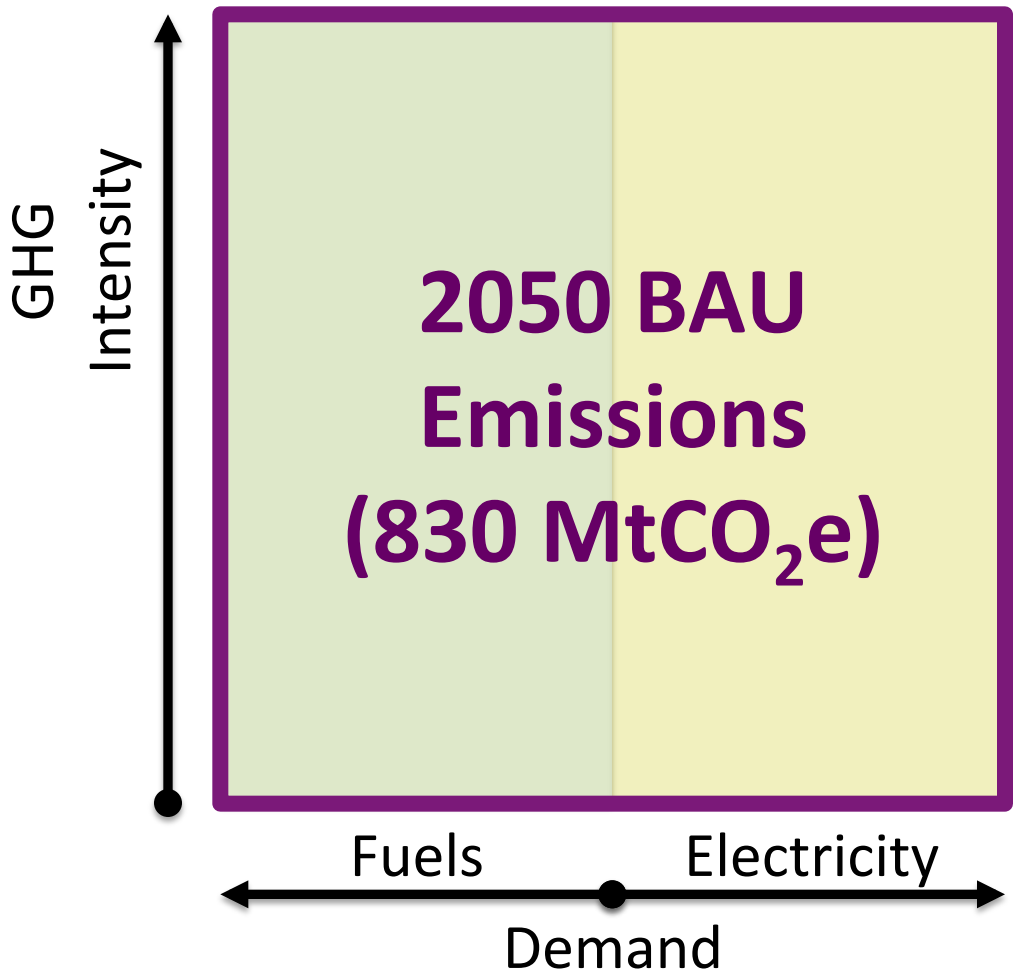




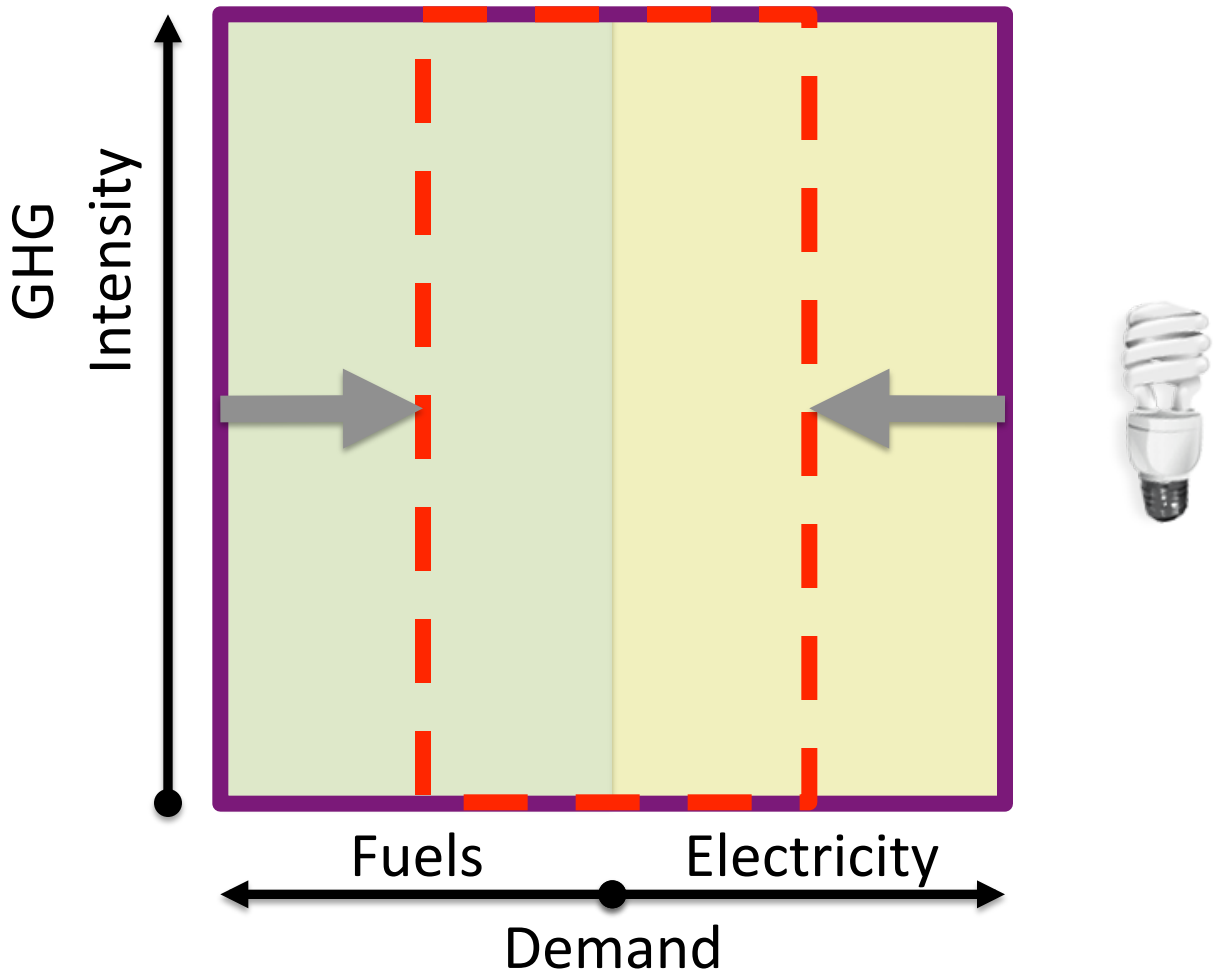
http://ccst.us/publications/2011/CEF%20index.php

Four Actions to Reduce Emissions

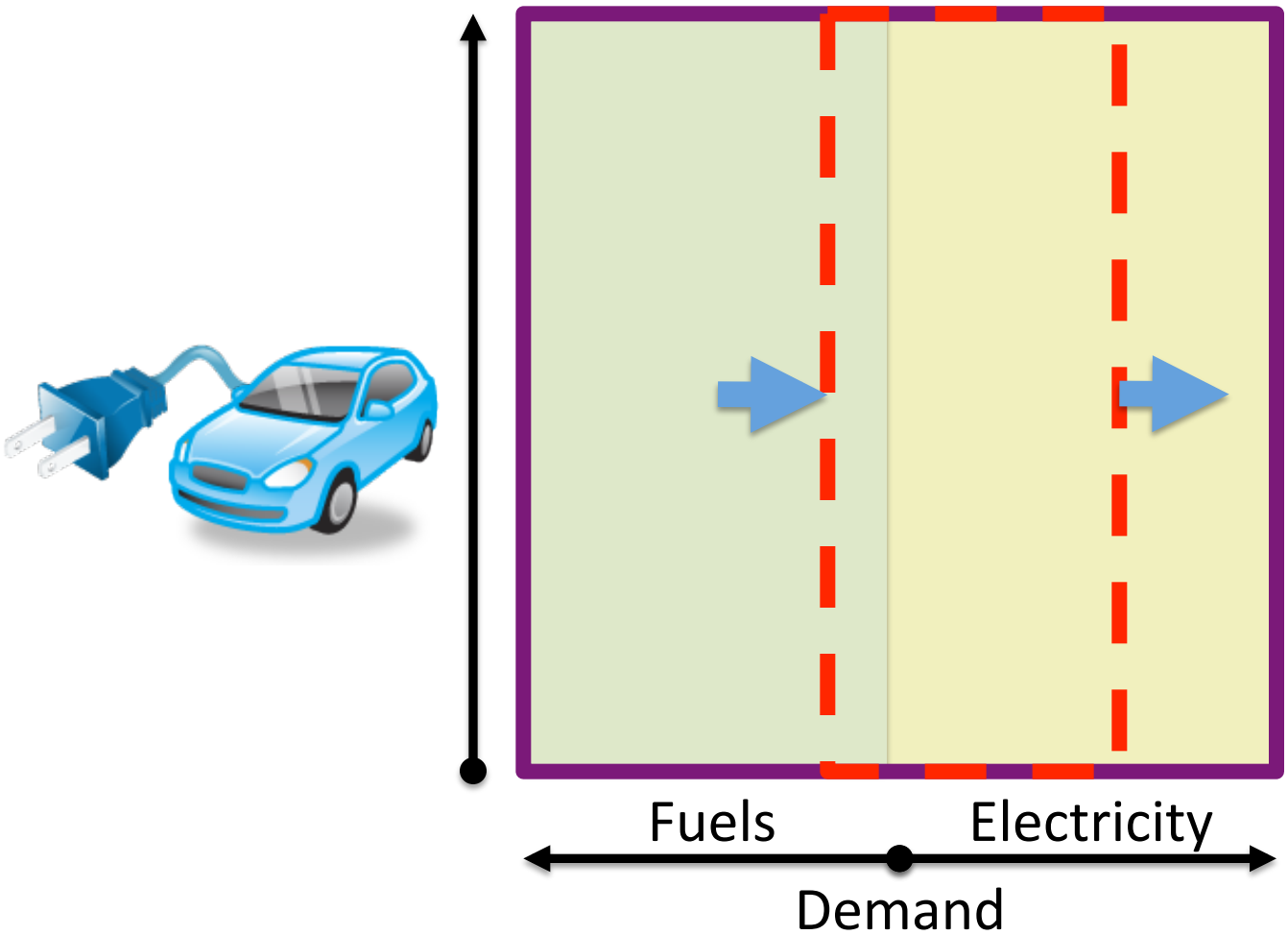
GHG Intensity-Demand Diagram



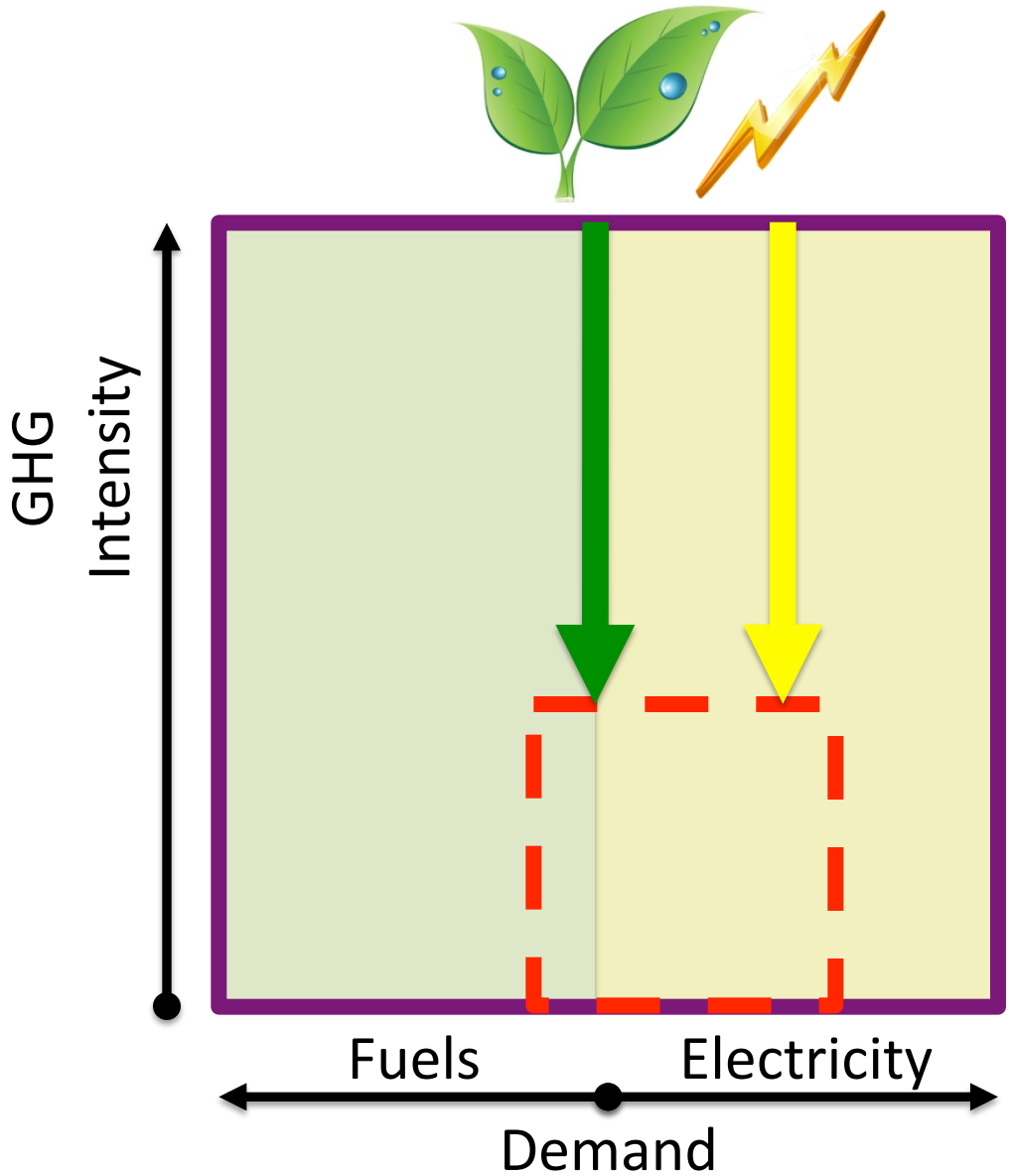
1. Efficiency



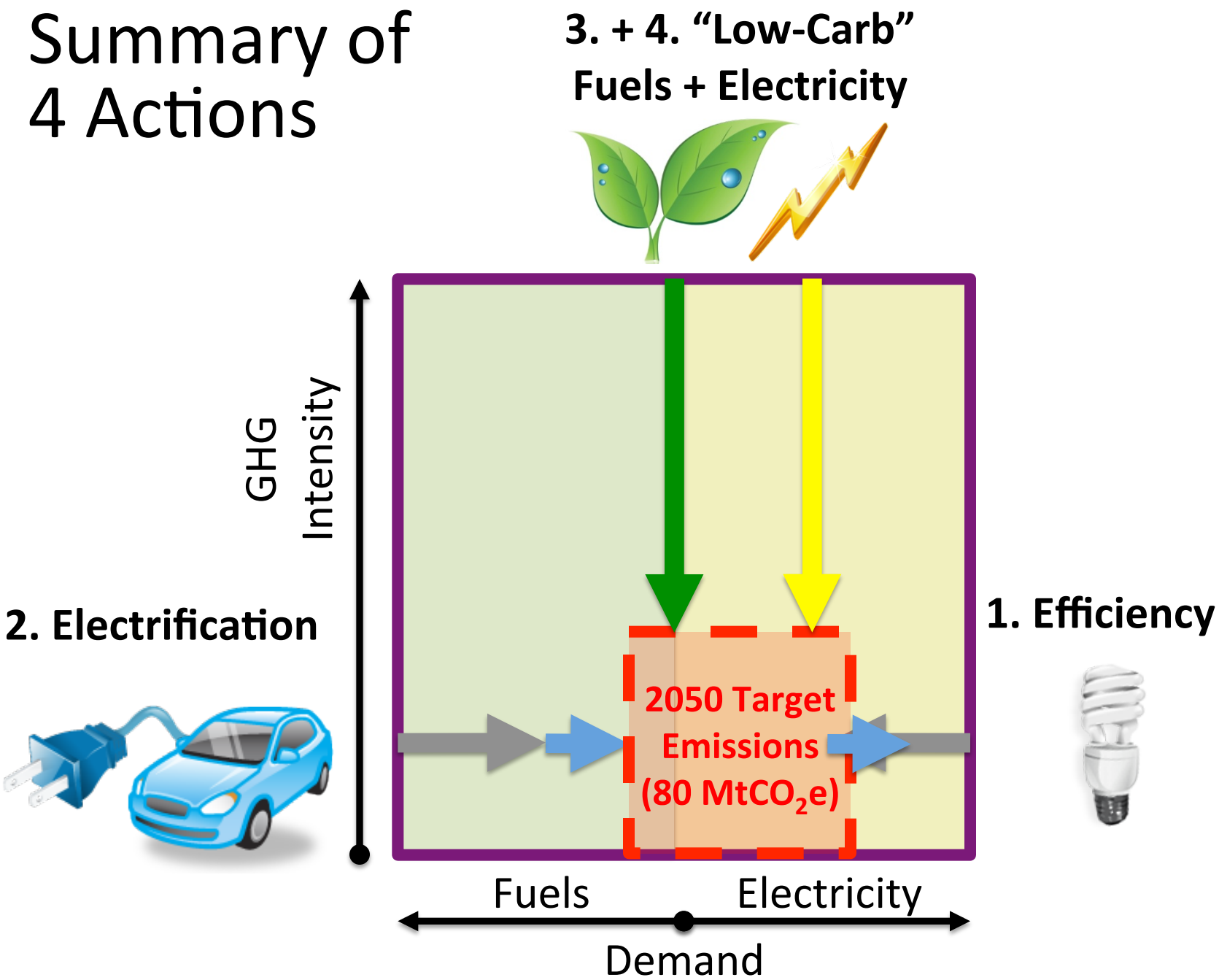
2. Electrification



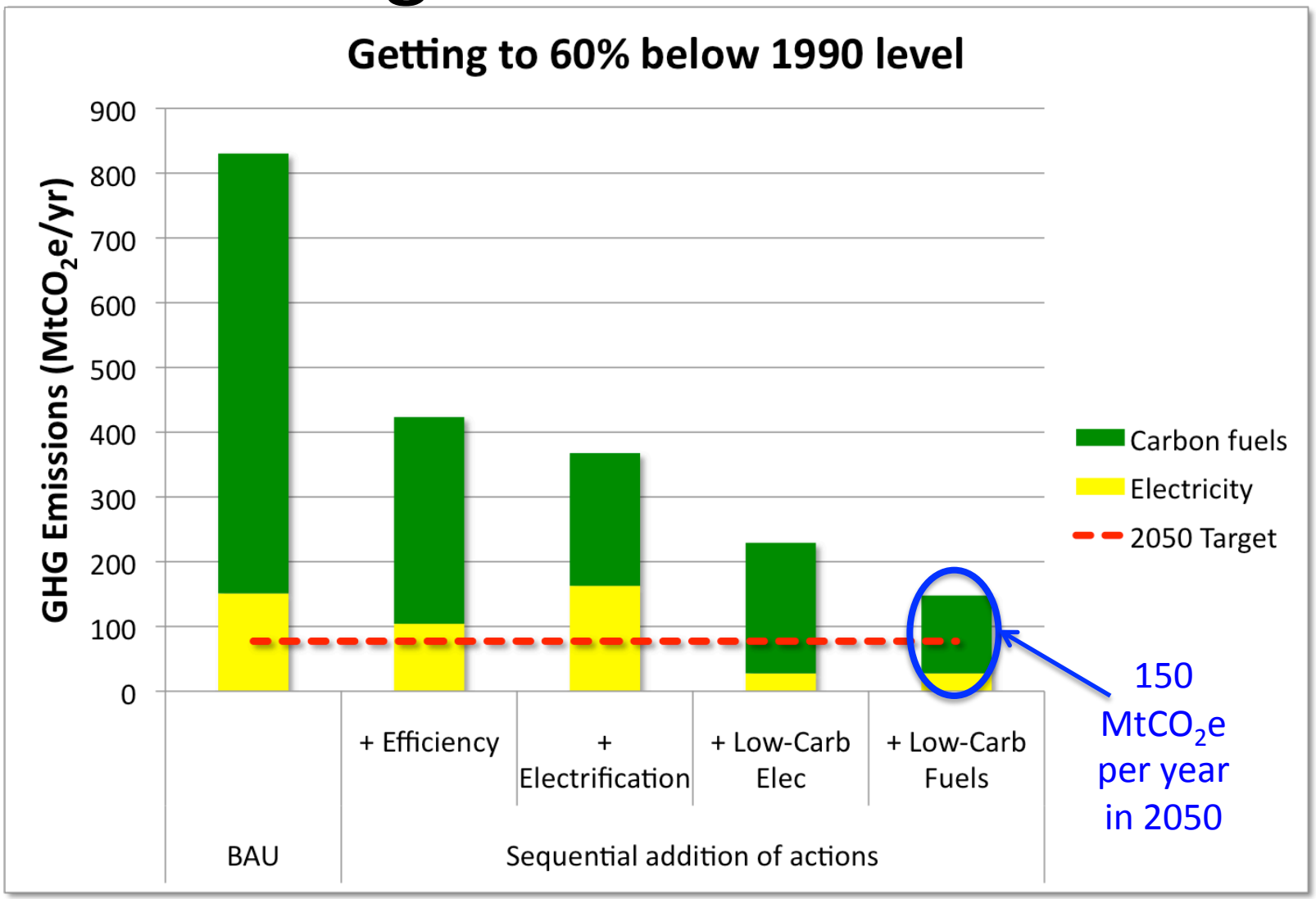
3 + 4. “Low-Carb” Fuels + Electricity



Summary of 4 Actions



Getting to 60%: All 4 Actions



Lessons for 2050

- Even if we assume:
  - Efficiency improvements in all sectors
  - Electric vehicles *and* building heat to reduce fuel use
  - Very decarbonized electricity system
  - Massive amounts of low-carbon biofuels
- We can reduce emissions 60% but not 80% unless some of the below occur:
  - Zero-carbon load balancing (storage, demand response)
  - Increased supplies of low-carbon fuels (like biofuels)
  - Robust hydrogen economy (not assumed in base case)
  - Net negative emissions (biofuels with carbon sequestration?)
  - Less demand growth (efficiency? conservation? fewer people?)
  - Other technology developments
- Don't forget non-energy sector emissions

Insights for 2030

- RPS mechanism working, but CCS might be important too
- Natural gas is a bridge fuel, not an endpoint
  - Need to invest in flexible generation alternatives (storage, demand response, CCS) to avoid carbon liabilities post-2030
- Electric vehicle goals should be more ambitious by 2030
- No state policy on building electrification; we need to start
- Can we reach ambitious efficiency targets in CPUC strategic plan (and CEF study)? If we can't, what do we do instead?
- Is LCFS the right mechanism to push biofuels into California? We need significant levels of demand by 2030
- Pay attention to changes in transportation sector; there may be game-changers lurking there