California ZEV Policy
Lessons Learned for EU

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Overall Observation

• Vehicle electrification is inevitable and desirable (for light duty vehicles).
  - Question #1: How fast should/could transition occur?
  - Question #2: What should EU do? Member states? Others?
My Key Points

• California ZEV mandate was key to launching EVs (globally)
  ▪ Requires each automaker to produce a minimum number of “zero emission vehicles”

• Strong mandate important for 2 reasons:
  ▪ Sends strong signal to automakers and provides them with regulatory certainty
  ▪ Strong signal to “ecosystem” of EVs (local governments, electric utilities, consumers, media, politicians….)

Incorrect to characterize challenge as “chicken and egg”. Government must lead with strong targets/requirements
  Others follow
The Theory

- ZEV mandate is a temporary policy to accelerate early EV investments and commercialization—to overcome initial barriers
  - #1 goal: facilitate a smooth transition to EVs and FCVs, allowing a continuing reduction in GHGs and air pollution
  - #2 goal: inspire an EV ecosystem of supportive practices, policies, and automotive supply chains
    - Mandate needs to be complemented by incentives; electricity charging (and H2 supply) infrastructure; and miscellaneous other actions such as reformed permitting practices for chargers, subsidies for charging/fueling infrastructure, utility pricing of electricity, etc
ZEV Mandate Target for 2025

Possible mix of vehicle types to meet 80% reduction goal

ZEV Sales

- FCV
- BEV
- PHEV

ZEV - 15% in 2025
Credit Per Vehicle Based on Electric Range
BEVs/FCVs Get More Credit Than PHEVs (2018-25)

Source: ARB ZEV Tutorial Webcast (https://www.arb.ca.gov/msprog/zevprog/zevtutorial/zev_tutorial_webcast.pdf)
Key Elements of California ZEV Policy Design

• Longer range = more credits (for PHEVs, BEVs, and FCVs)
  ▪ This encourages automakers to favor electrification of small EVs (because cost is less)

• Majority of credit compliance must be with BEVs/FCVs (not PHEVs)
  ▪ Are PHEVs transitional? (not necessarily!)
  ▪ Even so, more than half of complying vehicles likely to be PHEVs in California

• Automaker compliance is same across all ZEV states
  ▪ ... even though some states invest much less in ZEVs (via incentives, charger/H2 infrastructure, etc)

• Smaller automakers (<$40B global sales) given more flexibility
California’s ZEV Action Plan
Complementary to ZEV Mandate

- Financial incentives for:
  - ZEV purchase
  - Electric buses and trucks (including H2)
  - Hydrogen stations
  - Charging infrastructure (by State and electric utilities)
- Non-monetary incentives (e.g., access to carpool lanes)
- Assistance to local governments for charger permitting, etc
- Financial credits from “low carbon fuel standard”
- Government fleet purchase mandates
Creating a Charging Infrastructure

- Home
- Workplace
- Public
Complementary

**Streamlining permits for EV charging installation**

**Non-monetary incentives for Evs/FCVs**
Complementary
Collaborate with Local Electric Utilities

• Reduce electricity costs by charging at low-cost times
  ▪ Electricity prices and tariff structures vary across utilities
• Access to public fast chargers (often operated by utilities)
• Adjust rules on energy efficiency, local pollution and other local issues to support ZEVs
Something Else to Think About ...
Added credit for ZEVs in automated, ridesharing, fleet vehicles??
Job Impacts

• Many job gains and losses from electrification but overall impact hard to estimate

• Much greater job impacts from “mobility as a service” and vehicle automation (probably more jobs)

• Much greater impacts from reduced competitiveness of EU automotive industry
Alternative Policy Designs (for EU to consider)

1. **Use e-kilometers** as regulatory metric (instead of range)
   - Good way to handle PHEV vs BEV issue
   - Simple metric that overcomes shortcoming of simple “range” metric

2. **Link automaker requirements to local member state efforts** on incentives, charging infrastructure, etc
   - More fair to automakers and can serve as motivation to nations and cities…. but more complex

3. **Give more credit for larger batteries** (to encourage use of batteries/FCs in larger cars and SUVs)
   - Could combine kwh/vehicle + electric range to create new regulatory metric, such as kwh/km (adds complexity but more robust)

➢ But remember key principles:
   ➢ Regulatory certainty, ease of enforcement and administration (simplicity!), minimize economic cost, broadly equitable
Conclusions and Lessons

• Government needs to send strong signal to automakers and others that vehicle electrification is important and urgent.
  - Provides regulatory certainty
  - Strong 2030 target/requirement is important
  - Flexibility for automakers is important
    • Regulators are not omniscient
    • Huge uncertainty in costs, market response, complementary responses

• EU needs to send strong signal to “ecosystem” of EVs (local governments, electric utilities, consumers, media, politicians….)
Think global and act local

Thank You