LCFS goal: Reduce transport fuel carbon intensity (CI) by 10%, 2010-2020 (part of suite of California climate policies)

Compliance Schedule

- Focus on CI, not volume or specific fuel type
- Technology-forcing
- Backloaded
- On ‘hold’ at 1% CI reduction due to court case

• Lifecycle CI ratings generate credits/deficits (performance based), each represents 1 MT CO$_2$e
• Each g CO$_2$e/MJ CI point has value (market mechanism)
• Flexibility (fuel, CI mix for compliance; opt in fuels; new pathways; banking/trading credits)
Program metrics: compliance exceeded thru 2013

Available Credit “Bank” Up

Rated CI of California Fuels Down

End of 2013. 2.62 million MT CO2e ‘excess’ credits systemwide
2013 deficits: 2.45 million

Less CI reduction for higher volume fuels
gasoline substitutes: -6%
diesel substitutes: -26%

Source: California Air Resources Board (CARB)
Compliance via shifting portfolio of alternative fuels, then higher volumes in 2013

**VOLUMES**
- Of alternative fuels, eth 85%, CNG/LNG 9%, BD/RD 6%, elect <1%
- Alt fuel share 2013: 7.3% of total LCFS transport energy (avg 18.0 bgge/yr 2011-3)

**CREDITS**
- Ethanol ~ 64% of credits; lower CI profile in 2013
- Renewable diesel & biodiesel <10% of credits 2011-2012; 35% of credits in 2013

Source: CARB
Calculated CI for alternative fuels: two groups, different trends

- Small CI declines for higher CI-rated fuels
- Volatility, CI increase for lower CI-rated fuels

Source: CARB data
LCFS biofuels & feedstocks – credits double in 2013 on 10% volume growth outside corn ethanol

- Corn & grain mix: 67% of biofuel credits. Corn-based fuel credits up 76%, volumes drop 5%
- Sugar-based fuel: 11% of biofuel credits. Volumes up 3.4 times, steadier contribution
- Tallow, waste/UCO fuels: 27% of biofuel credits, 4% of biofuel volume (due to relatively low CI)
- Soy contribution <0.5% of biofuel volume and credits (>50% US biodiesel)

Source: CARB 2011-2013
New pathways – key to lowering CI ratings

Source: CARB
LCFS draws lower CI-rated fuels into CA

California transport energy: roughly 10% US

**Sugarcane.** CA sugar-based fuels as % of US sugarcane imports:
- 2011: 33%
- 2012: 23%
- 2013: 69%

**Renewable Diesel.** CA renewable diesel as % of US production+imports:
- 2011: 3%
- 2012: 7%
- 2013: 21%

(No cellulosics yet, little soy)

Source: CARB
LCFS credit prices up then down

- NOT like Cap&Trade allowance price (price on emissions relative to standard)
- Volume & # of transfers increase with price
- 1.4 million credits traded

Source: CARB

- 2013-14 price range ~$80/t (Nov.), ~$20/t (Mar.)
- Effect of court case, frozen standard?

Sources: Oil Price Information Service and Progressive Fuels Limited
LCFS, US Renewable Fuel Standard: Shifting incentives for fuel pathways

- RFS RIN credit & LCFS credit value additive for CA use

- For CA, non-soy biodiesels attractive in 2013

- Policy uncertainty a factor in credit price volatility, uncertainty
  - RFS annual mandate adjustments
  - LCFS court cases, pending amendments
LCFS – Looking Ahead

• Re-adoption (due to court ruling on environmental procedures) can alter incentives...
  • cost containment (potential price collar)
  • land use change review
  • streamlined pathways (‘CI binning’)
  • innovative oil credits
• ...Standard on ‘hold’ at 1% ‘til re-adoption
  • LCFS credit prices, excess credit ‘bank’
    • reflects policy uncertainty... (price not zero)
• Policy interaction
  • fossil fuel transport in Cap-and-Trade from 2015
  • LCFS expansion issues? (Pacific Coast Collaborative)
    • fuel availability, shuffling, harmonization?
Concluding thoughts

- Importance of flexibility
  - Various ‘margins’ contribute to compliance (new fuels + incremental CI reduction in high volume fuels)
  - Trading across fuel pools (reliance on diesel pool)

- Smaller jurisdiction
  - Draw existing fuels in → compliance at lower cost (shuffling)
  - Learn from larger programs (cost mechanism for hi/lo prices prior to crisis?)

- Program Issues
  - CI ratings v. GHG realities, now & if scaled up ("waste" alternative uses, market effects from land use & beyond, e.g. fuel displacement)
  - Administrative capacity to rate & monitor CI
  - Technology neutral? (different treatment for reference fuels)
  - Technology forcing? (trade-off between low-cost GHG reductions today & deeper change) Is there an innovation CI threshold?
Questions?

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Funding from
California Air Resources Board, California Energy Commission