2014 LCFS Advisory Panel

California Air Resources Board

California Environmental Protection Agency

Coastal Hearing Room

Monday, October 6, 2014

2014 LCFS Advisory Panel

Welcome and Introductions

Today's Schedule

- ✓ **Welcome**
  - **Introductions**
  - **Purpose of Advisory Panel**
- ❑ **Review of Today's Schedule**
- ❑ **Bagley-Keene Overview**
- ❑ **Review of Panel Charter**
- ❑ **Summary of May 19, 2014, Meeting**
- ❑ **Program Status, Progress Toward Targets**

Today's Schedule (cont.)

- Advances in Lifecycle Analysis
- Fuel Availability, Compliance Schedule, Cost Containment, and Harmonization
- Economic Analysis
- Environmental Analysis
- Discussion of other LCFS Issues (if needed)
- Public Comments
- Closing Remarks

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Bagley-Keene Public Meetings

- **The work of the Advisory Panel must be conducted in public**
- **Your work is to discuss, deliberate, and recommend regarding 13 topics**
- **Do that work in public if a quorum involved**

Email Distribution

- **If email likely to reach a quorum, avoid working on the 13 topics**
- **To distribute something that is likely to reach a quorum, ask ARB to distribute and post**

Your Emails May be Public Records

- **Correspondence between Panel members about Panel business**
- **Correspondence from others commenting on the work of the Panel**

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Review of Panel Charter

- **Advisory Panel is a regulatory requirement**
- **Executive Officer to conduct two reviews**
- **Required to convene an Advisory Panel**
- **Reviews will address a broad range of topics**
- **May include recommended amendments**
- **Reviews to the Board by January 1, 2012, and January 1, 2015**

Review of Panel Charter
Scope of Review

- **Generally higher level**
- **Not duplicate effort of workgroups**
- **Between scheduled meetings, work performed by less than 20 Panel members may be submitted for posting**

Review of Panel Charter
Panel Composition

- **Government Agencies**
- **Fuels Industry**
- **Academia**
- **Environmental Groups**
- **Others**

Review of Panel Charter
Role of Chair and Co-Chair

- **Ensure discussion remains focused**
- **Clarify points of discussion as needed**
- **Disseminate meeting summaries**
- **Provide Panel report to the Board**

Review of Panel Charter
Role of Panel Members

- **Attend each meeting and prepare in advance**
- **Stay focused on the specific review areas**
- **Comment constructively, specifically, and in good faith**
- **Provide ARB staff with research and documentation as needed**
- **Conduct activities in compliance with the requirements of Bagley-Keene**

Review of Panel Charter Code of Conduct

- **Place name card on end to be recognized to make a comment**
- **No substitutes for Panel members' absence from a scheduled meeting**
- **Treat Panel members and discussions with professional courtesy and disclosure etiquette**

Public Comments

- **Identification cards are available**
- **Form queue next to podium**

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Summary of May 19, 2014, Meeting

- **Discussed methodology to analyze fuel availability to meet LCFS requirements**
- **Examined expected growth potential of biodiesel, renewable diesel, CNG/LNG, ethanol, electricity, hydrogen, and renewable gasoline**
- **Discussed how proposed post-2015 compliance curves will be based on the availability of low CI fuels plus a degree of market push, otherwise known as "giddy-up"**

Summary of May 19, 2014, Meeting

- **Considered advantages of updating the current CA-GREET model to a CA modified version of Argonne GREET 2013**
- **Discussed methods used to prepare the economic analysis of the LCFS re-adoption**
  - **Evaluate transportation energy demand, estimate supply of lower CI fuels, and estimate the cost of fuel production**
  - **Employ REMI model to project economic impacts on the CA economy**

Summary of May 19, 2014, Meeting

- **Discussed the role of price caps and price floors in incentivizing investment**
- **Outlined results of the 2009 LCFS environmental analysis and plans to conduct CEQA review for LCFS re-adoption**
- **Discussed Pacific Coast Collaborative as an example of recent progress towards harmonization of California's LCFS**

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2014 LCFS Proposed Amendments

Had planned to propose amendments to Board in October 2013 and again in 2014

- **Per Board's direction on many amendments**
- **For clarity and enhancement of the regulation**
- **To be responsive to stakeholder feedback**

Lawsuits – Federal Court Cases

- **9th Circuit Court of Appeals ruled LCFS' ethanol provisions were not facially discriminatory, 2011 crude oil provisions were not discriminatory, and LCFS was not an impermissible extraterritorial regulation**
- **Other constitutional issues were remanded to the district court in Fresno for further proceedings**
- **U.S. Supreme Court declined to review the 9th Circuit's decision**

Lawsuits – State Litigation

- **5th District Court of Appeal found procedural errors in the 2009 LCFS adoption that ARB must address by re-adopting the LCFS**
- **Appeals court left LCFS in place, but froze LCFS implementation at 2013 levels**
- **ARB will consider adoption of an alternative diesel fuel regulation and re-adoption of the LCFS in early 2015**

2014 LCFS Proposed Amendments

Staff sees this as an opportunity to strengthen LCFS, given four years of implementation

- Revised indirect land use (iLUC) values
- Electricity credits for mass transit and electric forklifts
- Low-complexity/low-energy-use refineries provision
- Credits for innovative crude oil production
- Cost containment mechanism
- GHG emissions reductions at refineries as additional compliance pathway
- Bifurcated fuel pathway application process (Tier 1/Tier 2)
- Miscellaneous revisions for clarity and enhancement

2014 LCFS Re-Adoption Activities

- **<u>March</u>** **Initial public workshop to discuss LCFS framework for 2014 and Indirect Land Use Analysis**

- **<u>April</u>** **Workshop - Fuel Pathways, Producer Facility Registration, and Cost Containment**

  Workshop - Refinery and Crude Oil Provisions and Reporting and Enforcement Provisions

- **<u>May</u>** **Workshop – Update on Proposed Revisions to the LCFS Regulation**

- **<u>July</u>** **Workshop – Draft Regulation Language for Refineries and Crude Oil Provisions, and for Regulated Party Provisions**

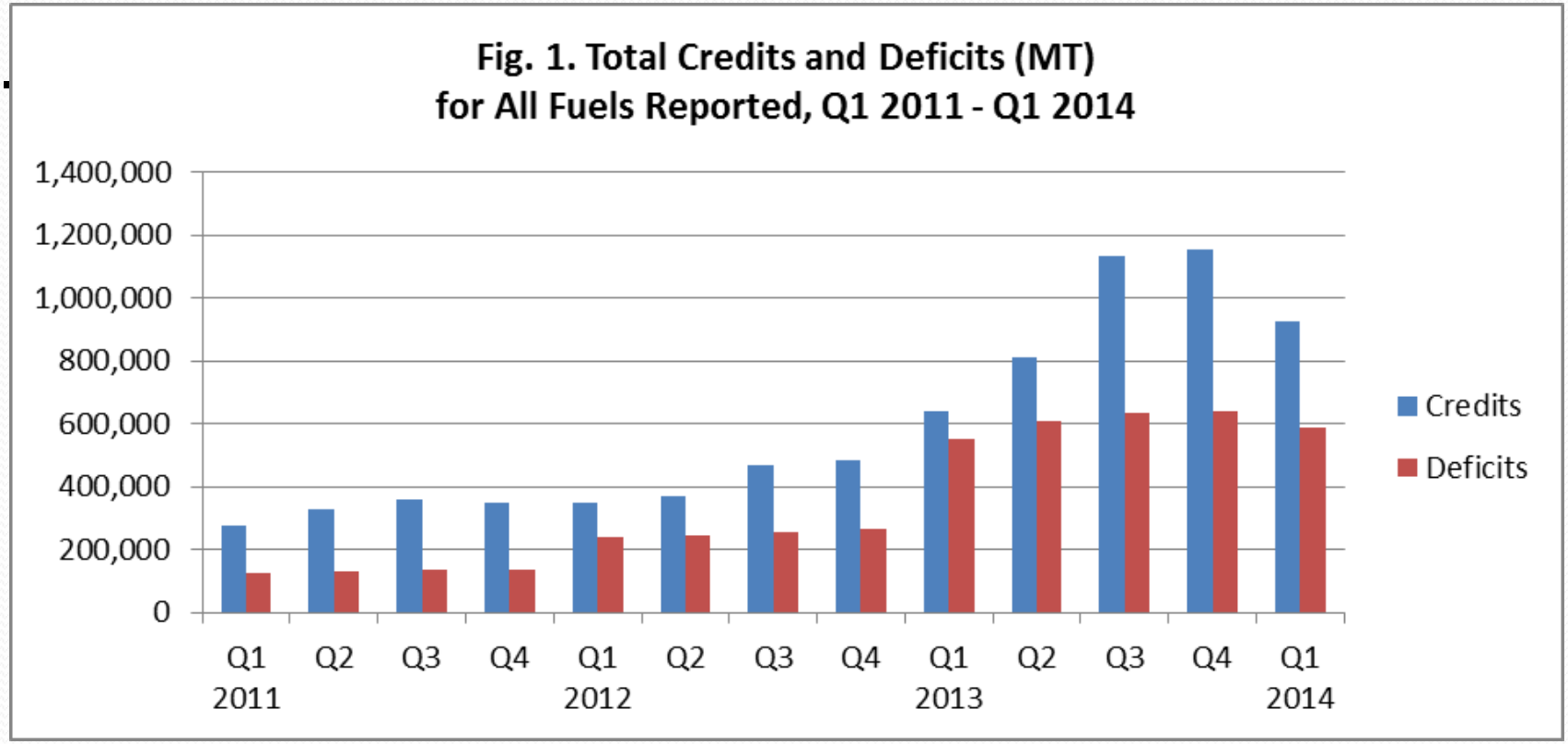
  Update to the Board on the Proposed Re-Adoption of the LCFS

2014 LCFS Timeline (cont.)

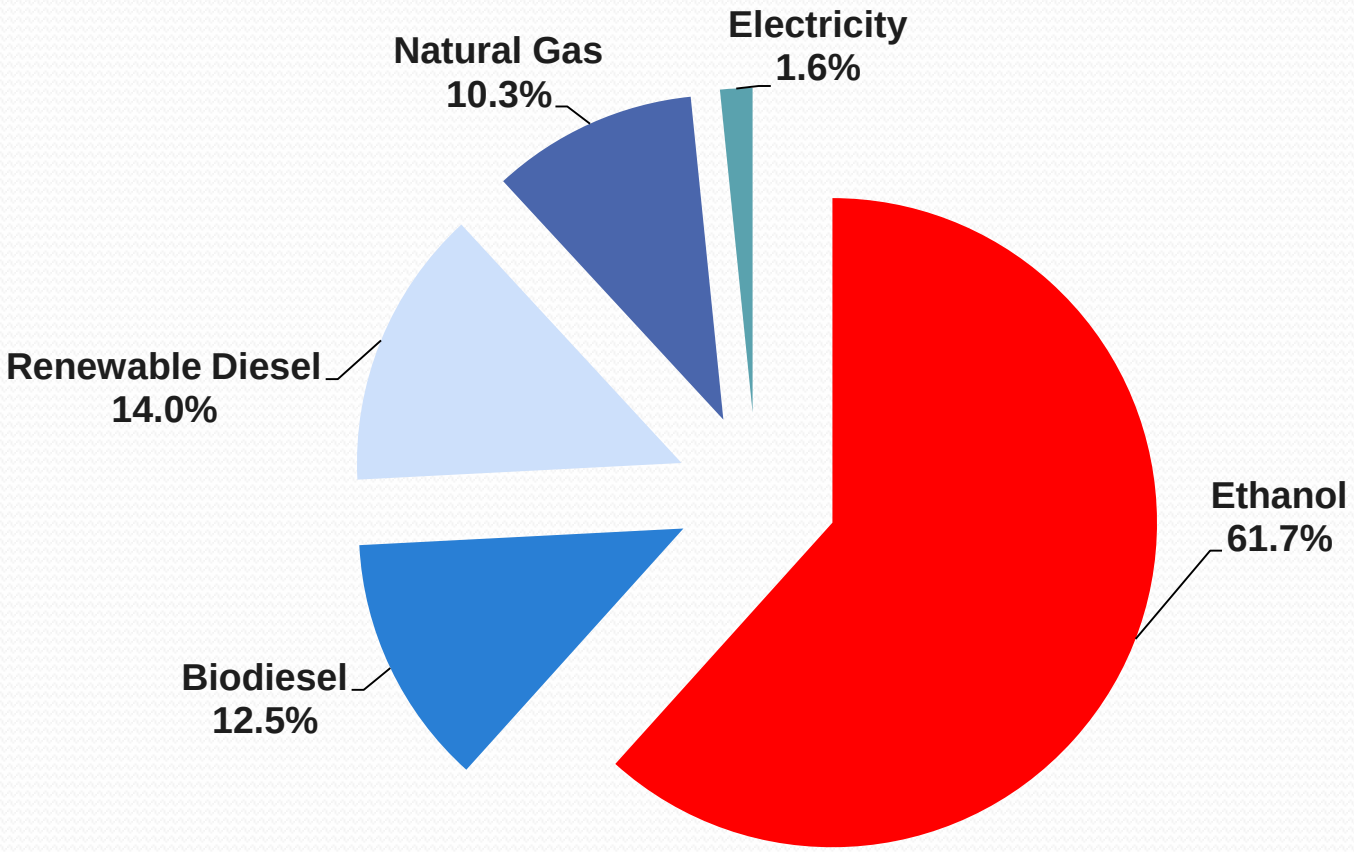
- **<u>August</u>** **Workshop - CA GREET 2.0 for Fuel Pathways Lifecycle Evaluation**
- **<u>September</u>** **Workshop – Low-Carbon-Intensity Fuel Availability**

  Workshop – Refinery Investment Provision and Indirect Land Use Values
- **<u>October</u>** **27th Workshop – Compliance Scenarios and Cost Containment Provisions**
- **<u>November</u>** **18th (Tentative) Workshop – LCFS Re-Adoption Proposal**
- **<u>February</u>** **19th and 20th, 2015: Board Hearing**

Progress Toward Targets



Fuels Generating LCFS Credits



Sources of credits through Q1 2014

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Advances in Lifecycle Analysis

- CA-GREET 2.0
- GTAP
- OPGEE

Advances in Lifecycle Analysis

CA-GREET 2.0

GREET Update Approach

The LCFS reconsideration includes a proposed CA-GREET version update

- Direct GHG emissions have always been estimated using a model based on Argonne's GREET
- GREET is still preferred:
  - Considered to be authoritative for U.S. fuel pathways
  - Freely available to the public
  - Very flexible; readily modified (spreadsheet format)
- CA-GREET 2.0 will therefore be based on Argonne's GREET1 2013

CA-GREET 1.8b & 2.0 Compared

- CA-GREET 2.0 is based on Argonne's GREET 1 2013 (not CA-GREET 1.8b)
- CA-GREET 1.8b was based on Argonne's GREET 1.8b
- Updates from both ARB staff and Argonne are reflected in CA-GREET 2.0
- More pathways and feedstocks are built-in:
  - Biomethane
  - Used cooking oil to bio- and renewable diesel
  - Corn oil biodiesel—wet DGS-associated

CA-GREET 1.8b & 2.0 Compared (Cont.)

- More pathways and feedstocks are built-in (Cont.)
  - Animal waste biomethane pathway with methane-emissions-avoided credit
  - Liquefied-compressed natural gas (L-CNG)
- Extensive life cycle inventory data updates
  - Fertilizer production
  - Farming and fuel production energy
- Emission factors are updated
  - Updated California on-road mobile-source emission factors from ARB's EMFAC 2011 inventory
  - Updated CNG/LNG tailpipe emissions data

CA-GREET 1.8b & 2.0 Compared (Cont.)

- Emission factors are updated (Cont.)
  - Updated natural gas leakage rates
  - Crude production emissions data from ARB's OPGEE model
  - Soil N_2O emissions
- Process efficiency factors are updated
- Electrical energy generation mixes are all based on latest USEPA eGRID database
- Tier 1 pathway calculator for expedited estimation of first-generation pathway CIs
- Some changes move CIs up; some move them down

Next Steps

A preliminary version of CA-GREET 2.0 will be posted for feedback by October 10th

- The feedback received and ongoing staff development will go into shaping the final version
- The final version will be posted at the beginning of the 45-day comment period

Selected CA-GREET 2.0 CI Values (as of 10/6/14 and Subject to Change)

	Fuels	CA-GREET1.8b	CA-GREET2.0
		Direct	Direct
1	CARBOB	98.38	99.41
2	ULSD	98.01	102.82
3	CaRFG	98.95	99.24
4	North American NG - CNG	68.01	77.27
5	North American NG - LNG	83.13	96.762
6	North American NG - L-CNG	N/A	99.50
7	Landfill Gas - CNG	11.44	29.88
8	Landfill Gas - LNG (80% liquefaction eff.)	26.33	51.79
9	Landfill Gas - LNG (90% liquefaction eff.)	15.58	41.15
10	Soybean Biodiesel	21.25	20.41
11	Corn Ethanol (Midwest Corn and EtOH, 100% NG)	68.32	59.59
12	Corn Ethanol (Midwest Corn and California EtOH)	58.88	55.34

Advances in Life Cycle Analysis

GTAP

GTAP: Updates since 2009

- Updated oilseeds sector to account for vegetable oils and co-products
- Updated GTAP database from v.6 (2001) to v.7 (2004)
- Introduced cropland pasture into the model
- Re-estimated energy sector demand and supply elasticities
- Updated co-product treatment
- Modified livestock sector
- TEM model to update yields of new cropland
- Adoption of a consistent model version and set of model inputs for all biofuel pathways

GTAP: Updates (cont.)

- Incorporation of an endogenous yield adjustment for cropland pasture
- Disaggregated coarse grains to add sorghum
- Disaggregated other oilseeds to add canola
- Developed regionalized ETL1 and ETL2 values
- Incorporated irrigated/rain-fed cropland category within the GTAP model
- Used water scarcity information from World Resources Institute (WRI) for use with GTAP regions/AEZs
- Included option of updated land transformation structure
- Included a disaggregated Yield Price Elasticity (YPE) option based on crop and region

iLUC: Preliminary Results

Biofuel	2009 (g/MJ)	March 2014 Ave. (g/MJ)	Range of Values Appr. A (g/MJ)	Ave. of Appr. A (g/MJ)	Range of Values Appr. B (g/MJ)	Ave. of Appr. B (g/MJ
Corn Ethanol	30.0	23.2	13.6 – 42.0	**25.0**	11.5 – 37.0	**21.6**
Sugarcane Ethanol	46.0	26.5	16.2 – 44.1	**27.9**	10.7 – 36.3	**21.3**
Soy Biodiesel	62.0	30.2	16.6 – 51.4	**30.6**	14.2 – 45.6	**26.6**
Canola Biodiesel (US+EU)	n/a	41.6	21.2 – 68.9	**40.3**	18.2 – 61.1	**35.2**
Canola Biodiesel (US only)	n/a	n/a	6.1 – 21.0	**12.2**	5.0 – 18.5	**10.4**
Sorghum Ethanol	n/a	n/a	9.2 – 22.6	**14.6**	8.3 – 20.3	**13.0**

Advances in Life Cycle Analysis

OPGEE

Refinery-specific Incremental Deficit Option

- Resolution 11-39
- Low complexity – low energy use (LC-LE) refineries can be affected by a California Average incremental deficit but cannot affect the Annual Crude Average CI
- Proposing to offer the option for refinery-specific incremental deficit accounting to LC-LE refiners
  - Incorporate option into LC-LE refinery provision
  - Large, complex refineries will continue to follow the California Average approach

Basic Provisions for Participating Refineries

- One-time option for interested refineries
- Incremental deficit assessed if refinery Annual Average CI exceeds the LC-LE refinery 2010 Baseline Average CI
- Applicable to the volume fraction of finished fuel derived from crude oil supplied to the LC-LE refinery
- Finished fuels derived from intermediate feedstocks, blendstocks, etc. will be subject to the provisions of the California Average approach (i.e., incremental deficits apply, if warranted)

Innovative Crude Provision

Proposing to

- Allow the crude producer to receive credit instead of the purchasing refinery
- Simplify the application process for some methods
- Reduce the emissions reduction threshold
- Expand allowable methods to include:
  - Solar, wind, and biomass-based power
  - Biomass-based steam and heat
  - Solar heat

Crude Lookup Table CI Values

Proposing to

- Adopt OPGEEv1.1 from Stanford University
- Update the crude CI values using OPGEEv1.1 and 2012 oil field production data
- Expand the lookup table to include over 300 domestic and international crude CI values
- Adopt a three-year cycle for future OPGEE and lookup table revisions

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Fuel Availability

- Held public workshop on September 25th
- Discussed U.S. availability of fuels
  - Growth potential/opportunities
  - Hurdles/barriers
- Asserted that higher LCFS credit prices will attract significant volumes of available fuels

Fuel Availability - Methodology

Investigated:

- Statewide, national, and global capacity of fuel
- Past and current production of fuel by feedstock
- Growth patterns for each feedstock and fuel
  - Nascent fuels
  - Current fuels with limited growth potential

Ethanol Methodology

- Brazilian sugarcane production projections: Food and Agricultural Policy Research Institute (FAPRI) World Agricultural Outlook
- Corn and Sorghum ethanol fuels: EIA data and LCFS reporting tool data
- U.S. Cellulosic ethanol production projections: EIA's 2014 Energy Outlook
- Brazilian cellulosic ethanol projections: Publically available announcements from suppliers and discussions with Brazilian cellulosic producers

U.S. Ethanol Fuel Availability

- Estimated U.S. ethanol availability in 2020 (MGY)
  - Corn and Sorghum: ~14,800
  - Sugarcane: 850 - 1,750
  - Molasses: 150 - 500
  - U.S. cellulosic: 100 - 250
  - Brazilian cellulosic: 150 - 300
- LCFS expected to attract significant portion of the lowest-CI ethanol fuels to CA

Renewable Gasoline

Renewable Gasoline Projection Assumptions

- Cool Planet facility (10 MGY) to be operational by 2016
- Sundrop facility (60 MGY) to be operational by 2017
- Growth estimates
  - Low case: Growth of 30 million gallons from 2018-2020
  - Mid case: Growth of 60 million gallons from 2018-2020
  - High case: Growth of 90 million gallons from 2018-2020

Low-, Mid-, and High-Volume Projections

2020 Projected U.S. Renewable Gasoline Supply

(MGPY)	Announced Facilities online by 2016	Announced Facilities online by 2017	Projected U.S. Facilities 2018-2020	Total
Low	10	60	30	**100**
Mid	10	60	60	**130**
High	10	60	90	**160**

U.S. Availability of Renewable Diesel

Factors in analysis

- U.S. Feedstock capacity
- Current RD facilities (U.S. or international)
- Announced RD facilities (focus on U.S.)
- Projected RD capacity increase (focus on U.S.)
- Low-, mid-, and high-volume projections

Current RD Facilities

Diamond Green – 137 MGPY
2013

Neste Porvoo – 158 MGPY
2006, 2009

Neste Singapore – 240 MGPY
2010

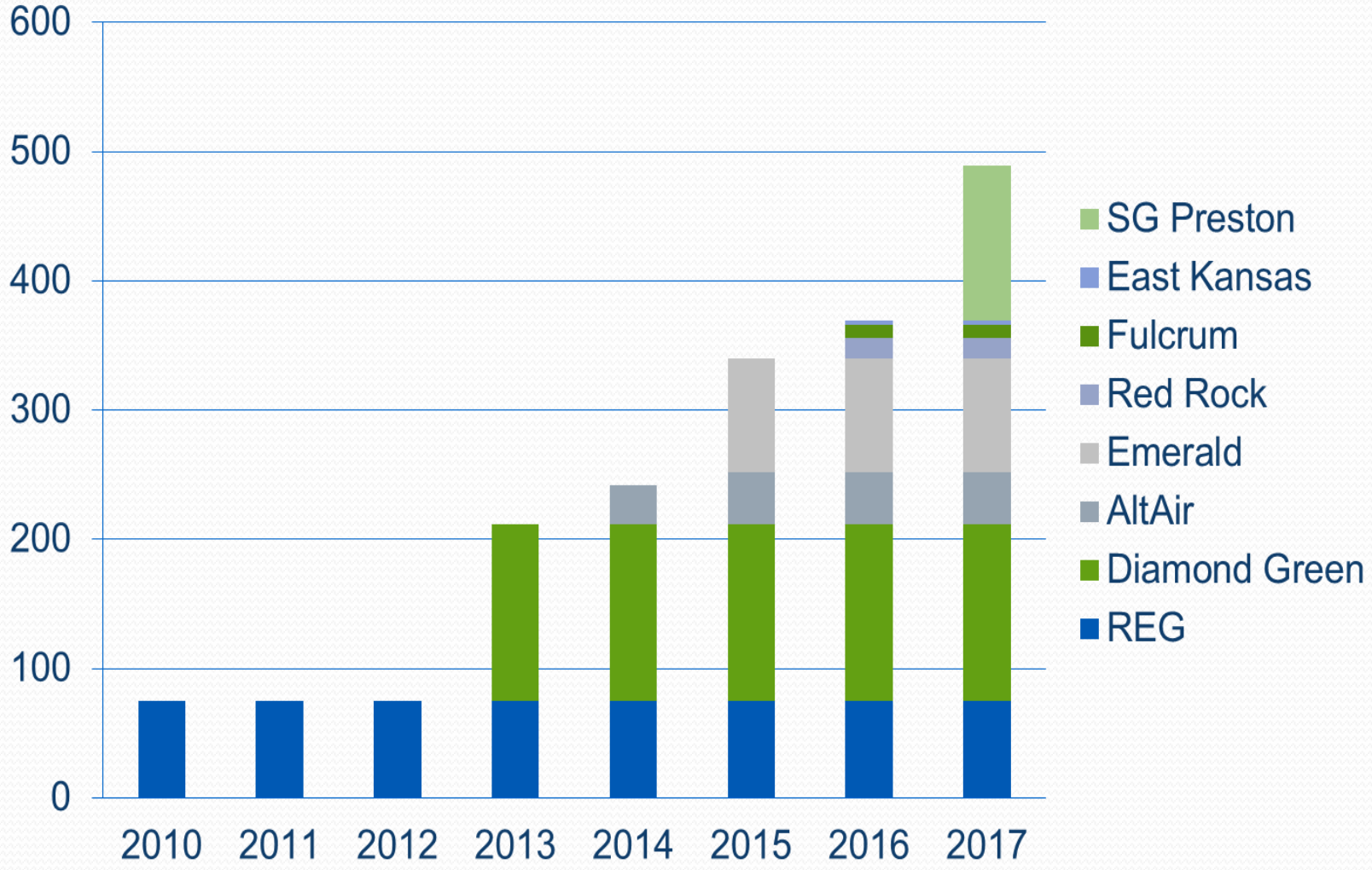
Neste Rotterdam – 240 MGPY
2011

REG Synthetic Fuels – 75 MGPY
2010

Announced RD Facilities

- United States
  - AltAir (CA): 40 MGPY
  - Red Rock Biofuels (OR): 16 MGPY
  - Fulcrum Bioenergy (NV): 10 MGPY
  - Emerald Biofuels (LA): 88 MGPY
  - East Kansas Agri-Energy (KS): 3 MGPY (expandable to 6 MGPY)
  - SG Preston (OH): 120 MGPY
- International
  - Petrixo Oil and Gas (U.A.E): 150 MGPY (plus another 150 MGPY of jet)

U.S. RD Capacity Growth



Projected RD Capacity Increase

- Expect growth beyond what has been announced
- Projected capacity additions based on previous growth rates and announced facility growth rates
- Growth from 2017 - 2020 (4 years):
  - Low: 200 million gallons, current facility growth rate
  - Mid: 400 million gallons, projected facility growth rate
  - High: 800 million gallons, double mid-growth rate

Low-, Mid-, and High-Volume Projections

2020 Projected U.S. Renewable Diesel Supply

(MGPY)	Current U.S. Facilities	Announced U.S. Facilities	International Facilities	Projected U.S. Facilities	Total
Low	212	277	240	200	**~900**
Mid	212	277	240	400	**~1,100**
High	212	277	240	800	**~1,500**

Current U.S. Biodiesel Fuel Volumes

Fuel Type (millions of gallons)	2013
Canola Biodiesel	87
Soy Biodiesel	744
Waste Grease/UCO Biodiesel	157
Corn Oil Biodiesel	136
Tallow Biodiesel	147
Palm Oil Biodiesel	85
Total Biodiesel	**1,356***

*Calculated using biodiesel feedstock inputs from EIA. EIA total biodiesel production number is 1,339 million gallons

Biodiesel Availability

- 2013 U.S. biodiesel production is at about 1.3 billion gallons
- Current U.S. biodiesel capacity is 2.2 billion gallons
- By 2020, staff projects that U.S. biodiesel production to be about 2 billion gallons
- Staff expects an ample supply of biodiesel to fulfill California market demands through 2020 and beyond
- The LCFS will attract the lowest-CI biodiesel fuels to CA

Natural Gas

- As transportation fuel:
  - Compressed natural gas (CNG)
  - Liquefied natural gas (LNG)
- Renewable natural gas (RNG), or biomethane, is natural gas produced from various biomass resources:
  - Landfills
  - Wastewater treatment facilities
  - Food and green waste
  - Dairies

Natural Gas Methodology

- Reviewed various sources that contain natural gas transportation projections for 2020:

  CEC IEPR 2013, Cal ETC, Boston Consulting Group, Bloomberg New Energy Finance, Ca Natural Gas Vehicle Coalition, and Historic EIA data trend

- Surveyed medium duty and heavy duty fleets about adoption rates of NG vehicles
- Low-demand case for RNG based on survey of RNG providers, citing contracts in place
- High-demand case for RNG based on what RNG providers thought was likely to come to CA

2013 California Transportation Natural Gas Consumption

Fuel Type (million DGE)	2013
Fossil LNG	28
Fossil CNG	61
Renewable LNG	5
Renewable CNG	6
Total Natural Gas	**100**

California Natural Gas Availability

- Total transportation natural gas consumption in 2020 expected to be 600-1,200 million DGE
- Of that, renewable natural gas consumption expected to be 250-500 million DGE
- Majority of the supply of RNG is expected to come from out of state
- CPUC working on a pipeline injection standard for RNG in CA

Electricity

- Several studies show that existing grid capacity can fuel a significant number of EVs in California
- Many power plants are underutilized during off-peak hours and could be used to recharge a majority of vehicles
- Effective grid management is important as increasing numbers of EVs are introduced

Hydrogen

- By the end of 2015, 51 stations are expected to be operational statewide, providing up to 9,400 kg/day
- This capacity will be nearly sufficient through 2017 to support the FCEV fleet within that timeframe
- Up to 49 additional stations are projected to be needed to meet 2020 demand
- Current operational and funded hydrogen stations in California are well within compliance with the SB 1505 (33.3% renewable resources) standard

Other Potential Low Carbon Fuels

- Algal diesel
  - Solazyme, Amyris
  - Potential additional feedstock for RD
- Gas-To-Liquid diesel
  - Sasol
  - Potentially biogas or flare gas derived
- Biomass to Liquid diesel
  - Sierra energy
  - Potential MSW feedstocks
- Dimethyl Ether
  - Oberon
  - Potential biogas feedstock
- Biobutanol
  - Cobalt, Gevo, Butamax
  - Can be added in higher volumes than ethanol

Attracting Low-CI Fuels to CA

- Ethanol CI values continue to decrease
- Renewable diesel production is increasing
- Renewable natural gas production is increasing and moving toward transportation use

These fuels can come to California.

Will these fuels come to California?

Potential Value Added for Low-CI Fuels (2020) (For Illustrative Purposes Only)

Potential Revenues per Gallon of Low-CI Fuel					
Fuel Type	Example CI (g/MJ)	Example Credit Price			
		$50	$100	$150	$200
Corn Ethanol	70	$0.08 / gal	$0.16 / gal	$0.24 / gal	$0.31 / gal
Cellulosic Ethanol	20	$0.28 / gal	$0.56 / gal	$0.84 / gal	$1.12 / gal
Soy Renewable Diesel	50	$0.29 / gal	$0.58 / gal	$0.86 / gal	$1.15 / gal
Waste Grease Biodiesel	15	$0.55 / gal	$1.09 / gal	$1.64 / gal	$2.19 / gal
Renewable CNG	30	$0.42 / DGE	$0.84 / DGE	$1.27 / DGE	$1.69 / DGE

LCFS Will Attract Low-CI Fuels

- LCFS provides real value for low-CI fuels
- Higher credit value will encourage needed infrastructure to get low-CI fuels to CA
- LCFS will encourage production of low-CI fuels
- LCFS programs along Pacific Coast will encourage additional production of low-CI fuels

Pacific Coast Collaborative (PCC)

Signed by California, Oregon, Washington, and British Columbia

- Oregon and Washington will consider adopting low-carbon fuels standards
- California and British Columbia will consider maintaining their existing standards
- Over time, these programs may lead to an integrated West Coast market for low-carbon fuels

PCC Activities

- Shared LCFS Reporting Tool with British Columbia, Washington, and Oregon
- Conduct routine conference calls with Washington staff
- Conduct periodic conference calls with all PCC members
- Have met several times to discuss LCFS programs
  - Overall design of programs
  - Cost containment

Cost Containment

- Two approaches have been considered:
  - Credit window
  - Credit clearance
- Discussions with PCC colleagues have moved in the direction of the credit clearance approach
- ARB staff will propose the credit clearance approach
  - Eliminates challenges associated with receiving funds from regulated parties
  - Incents longer-term contracts with low-CI fuel producers

Credit Clearance

- The credit clearance process would only be activated if there are insufficient credits available for compliance
- Regulated parties could carry remaining deficits after purchasing their *pro rata* share of credits
- Clearance credits would be offered at or below a pre-determined price

Year-end Clearance Process

Year A

Year B

- RPs report to ARB year-end credit positions.
- ARB determines if a shortage exists & issues a call for excess credits.
- RPs with excess credits report to ARB the number of credits (if any) they intend to pledge into credit pool.
- ARB calculates and reports to RPs with outstanding deficits their *pro-rata* share of credits.
- Private negotiations take place between RPs seeking to sell and acquire clearance credits.
- RPs with outstanding deficits submit final compliance report to ARB, after purchasing their *pro-rata* share of clearance credits.
- ARB assigns any carry-over deficits to RPs' cumulative compliance accounts, and considers those RPs in compliance for Year A.

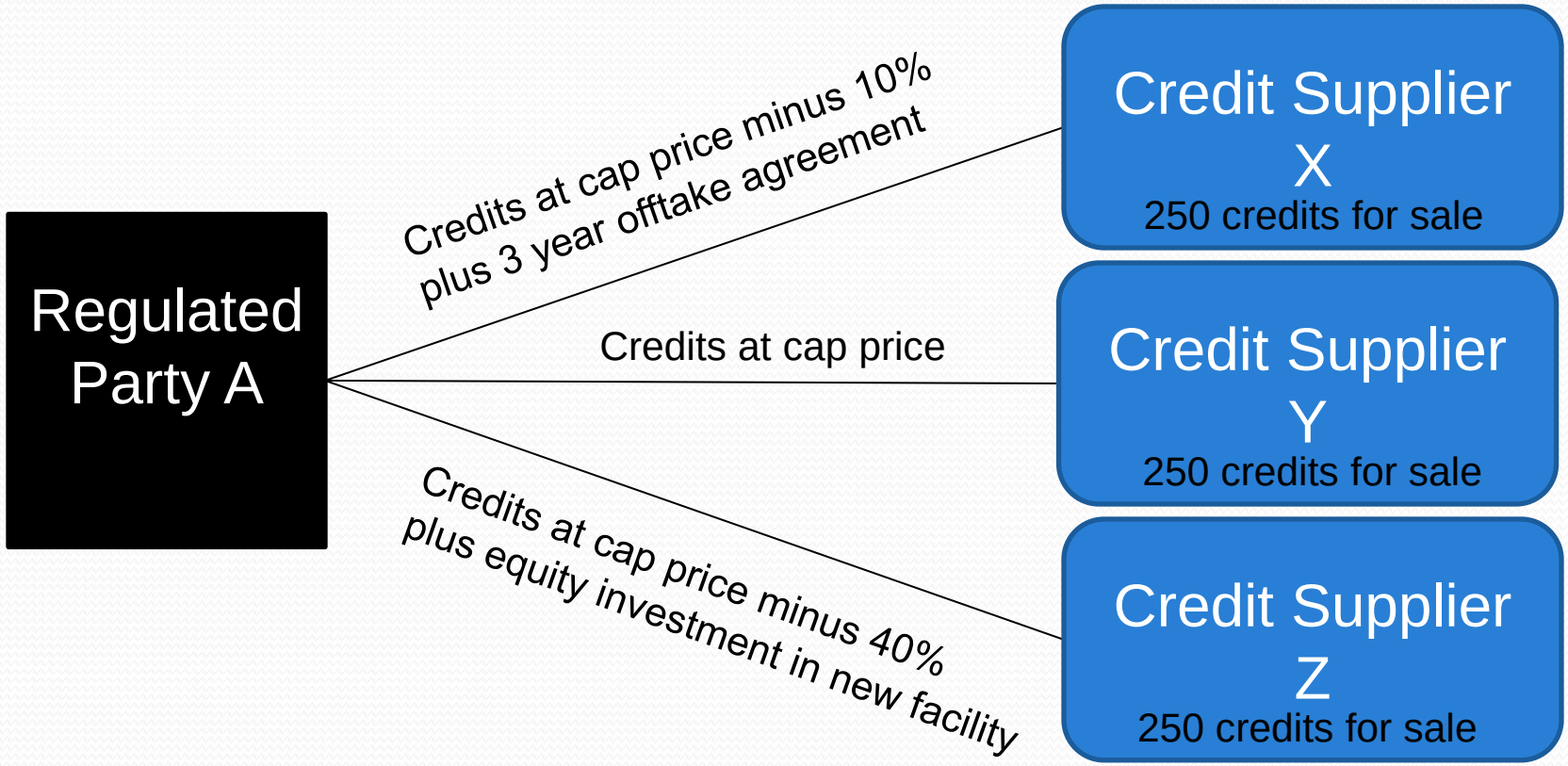
Calculation of Pro-rata Credit Obligation

Example:

- RPs need 1,000 more credits
- Three credit suppliers offer 250 credits each to be sold in the credit clearance market (750 total credits available)

Regulated Party	Additional Credits Required	Pro-rata Share of Compliance Shortfall	Credits Purchased via Clearance Process	Debt Carryover
Regulated Party A	700	70%	525 (= 750 * 70%)	175
Regulated Party B	0	0%	0	0
Regulated Party C	300	30%	225 (= 750 * 30%)	75
TOTAL	*1,000*	--	*750*	*250*

Credit Clearance Transactions



After purchasing its share of clearance market credits, Regulated Party A will have fully complied for the year.

Benefits to Regulated Parties

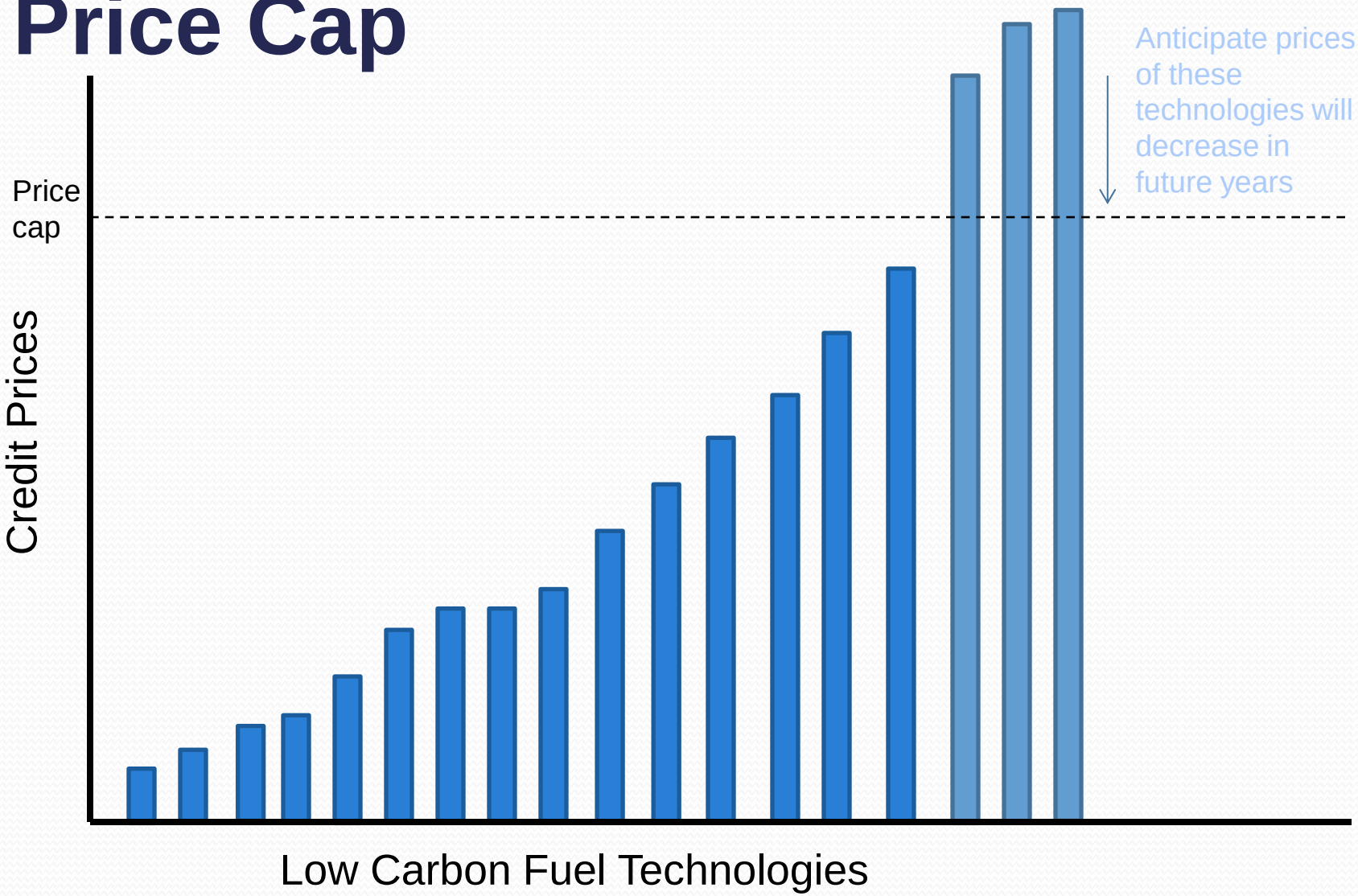
Conventional Fuel Suppliers

- Prevents destabilizing increases in credit prices.
- Increases certainty regarding the maximum cost of compliance.
- Enables compliance without having to pay for credits or fuels the market has failed to produce.

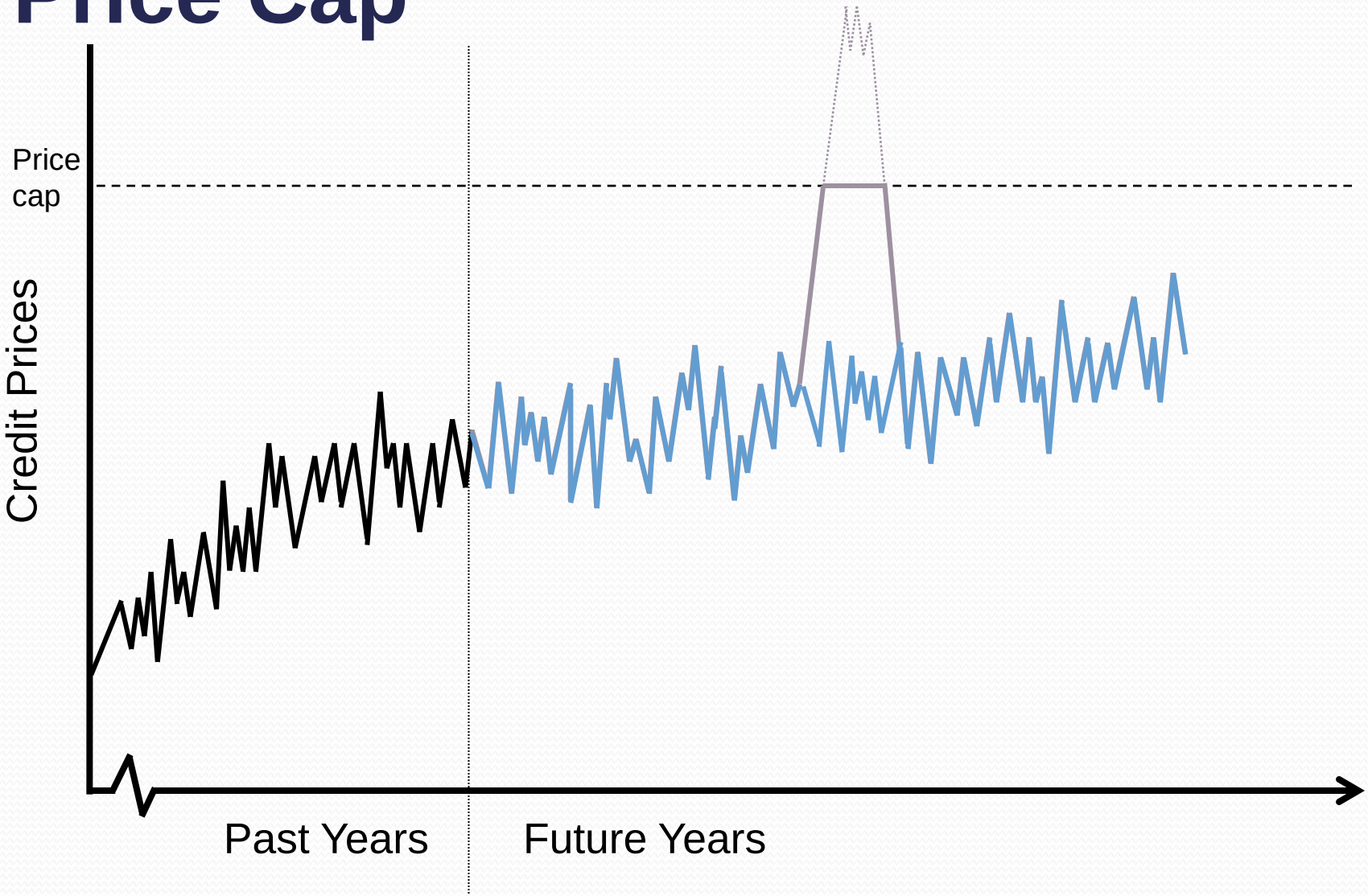
Low-Carbon Fuel Suppliers

- Prevents destabilizing increases in credit prices.
- Improves market durability, increasing investor confidence and increasing supplies of low-CI fuels.
- Ensures that producers and investors can more confidently assess the market value for low-CI fuels and credits, stimulating investments.

Price Cap


Anticipate prices of these technologies will decrease in future years
Price cap
Credit Prices
Low Carbon Fuel Technologies

Price Cap



Price Floor

Benefits

- Stimulate investments in low-CI fuels
- Provide a clear market signal regarding the minimum credit price
- Lenders have more confidence in the value of LCFS credits
- Facilitate long-term business planning for low-CI fuel producers

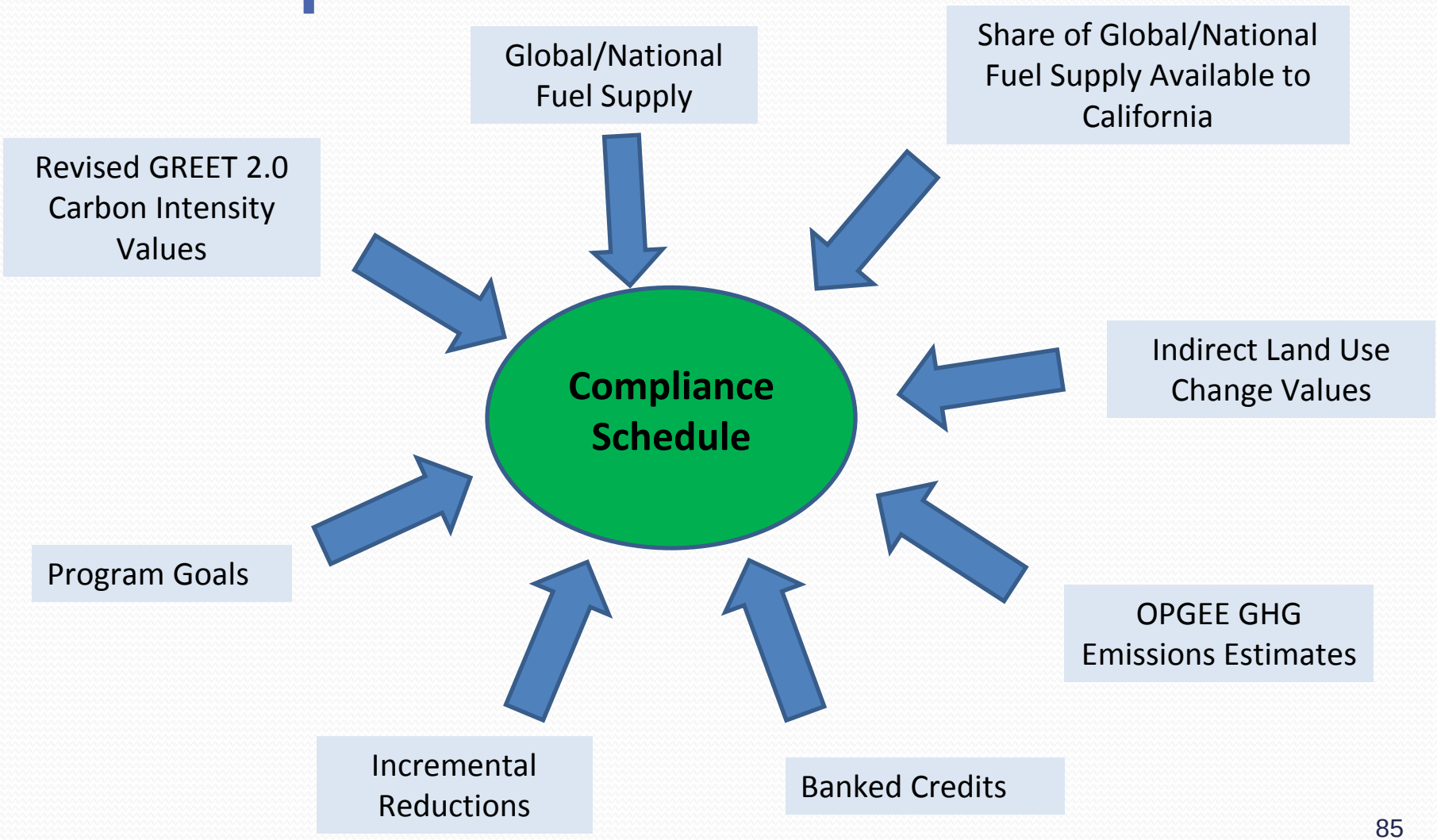
Potential Drawbacks

- Risk of setting floor at incorrect level:
  - Too high: lost gains from trade
  - Too low: may not deliver intended benefits
- May artificially inflate cost of compliance
- May not deliver additional environmental benefits

Compliance Schedule

- LCFS CI reduction standards frozen at 1.0% for 2014 and 2015
- Opportunity to deposit additional credits in the “bank”
- Post-2015 compliance curves based on fuel availability and banked credits
- Compliance curves will include some market push

Methodology to Determine Compliance Schedule



Today's Schedule (cont.)

- ✓ Advances in Lifecycle Analysis
- ✓ Fuel Availability, Compliance Schedule, Cost Containment, and Harmonization
- ❑ Economic Analysis
- ❑ Environmental Analysis
- ❑ Discussion of other LCFS Issues (if needed)
- ❑ Public Comments
- ❑ Closing Remarks

LCFS Economic Analysis

Standardized Regulatory Impact Assessment (SRIA)

- Required by SB 617 (Calderon, 2011)
- SRIA due to Department of Finance (DoF) 60 days prior to OAL date for submission of Initial Statement of Reasons ("Staff Report")
- DoF requires macroeconomic modeling with REMI model

Macroeconomic Model

- REMI is a Computable General Equilibrium (CGE) model of the California economy
- LCFS is modeled as a disruption to various market equilibria in place throughout the economy
- REMI provides estimates of how economy will react to the LCFS and models any resultant changes (e.g., gross state product and employment impacts)

Preliminary REMI Runs

- Transportation fuels are highly aggregated in REMI
  - For example, conventional transportation fuels and liquid biofuels are aggregated into one industry
- Staff taking conservative approach
  - Costs passed on to consumers
  - Credit generators receive the proceeds from selling credits
- Preliminary runs indicate that LCFS and ADF economic impacts are "in the noise" of California's $2 trillion economy

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Purpose of the Environmental Analysis

- **Comply with the California Environmental Quality Act (CEQA) and ARB's certified regulatory program under CEQA**
- **Evaluate the potentially significant environmental effects of reasonably foreseeable compliance responses**
- **Inform the public and decision makers of the environmental effects associated with implementation of the LCFS and ADF regulations**

Compliance Responses

- **Reasonably foreseeable actions that could result in physical changes to the existing environment**
- **The types of compliance responses may include:**
  - **Change in the transportation fuel mix in California**
  - **Land use changes**
  - **Changes to fuel-associated transport or shipment patterns**
  - **Infrastructure needs**
  - **New construction of facilities**
  - **Modifications to existing facilities**

Scope of the Environmental Analysis

- Project Purpose, Objectives, and Need
- Project Description
- Environmental Setting
- Regulatory Setting
- Impact Analysis (Program-Level)
- Cumulative Impacts
- Growth-Inducing Impacts
- Alternatives

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http://www.arb.ca.gov/fuels/lcfs/lcfs.htm