BCG ENERGY

WSPA
Western States Petroleum Association

Comments on Low Carbon Fuel Standard Re-Adoption

Compliance Curve and Cost Containment Workshop

November 2014

THE BOSTON CONSULTING GROUP

Executive summary

On October 27, 2014, CARB held a workshop to discuss potential compliance schedules for the California Low Carbon Fuel Standard (LCFS) for the years 2016-2020.

CARB presented three potential compliance schedules and illustrative volumes of low-carbon intensity (low-CI) biofuels for each year that would allow regulated parties to comply through 2020.

- BCG believes that these schedules are overly optimistic and do not reflect a true "P50" scenario
- As a result, shortfalls in any of the fuel pathways would lead to inadequate supplies of low-CI fuels

In addition, the proposed schedules remains unsustainable as deficits continue to grow toward the end of the existing schedule, putting regulated parties at risk in the later years of the schedule.

At the previous workshop on low-CI fuel availability in September, CARB published its estimates of low-CI fuel availability to the United States.

- Detail regarding changes made to those projections based on public comments and how those projections were translated into volumes available to California were not transparent.
- Therefore, a number of questions remain regarding how the volumes presented as part of the compliance scenario were calculated/estimated

Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

Agenda

Near-term growth of banked credits

Fuel availability through 2020

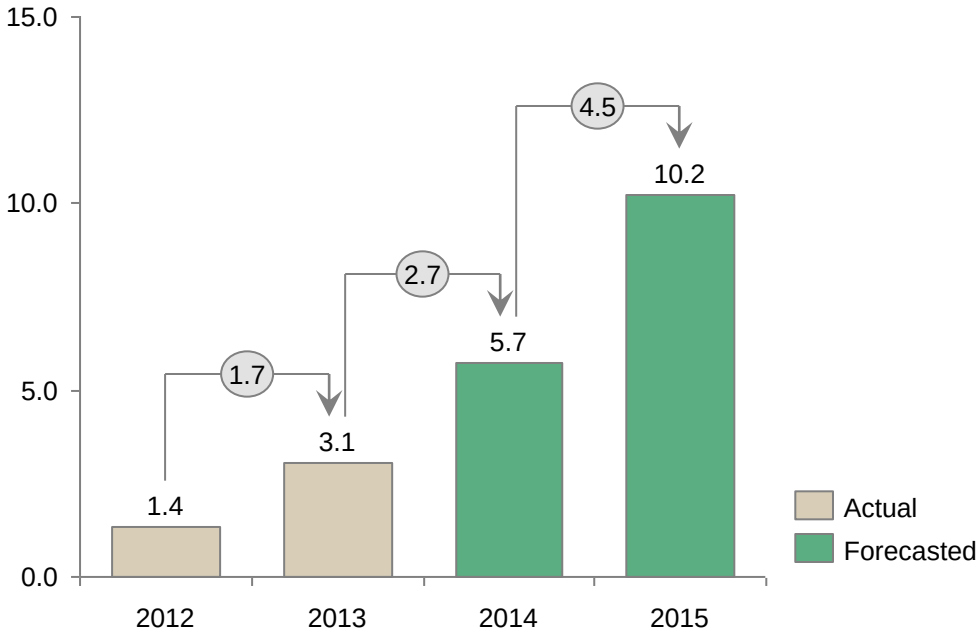
Sustainability

Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

CARB assumes continued strong surpluses in the near-term

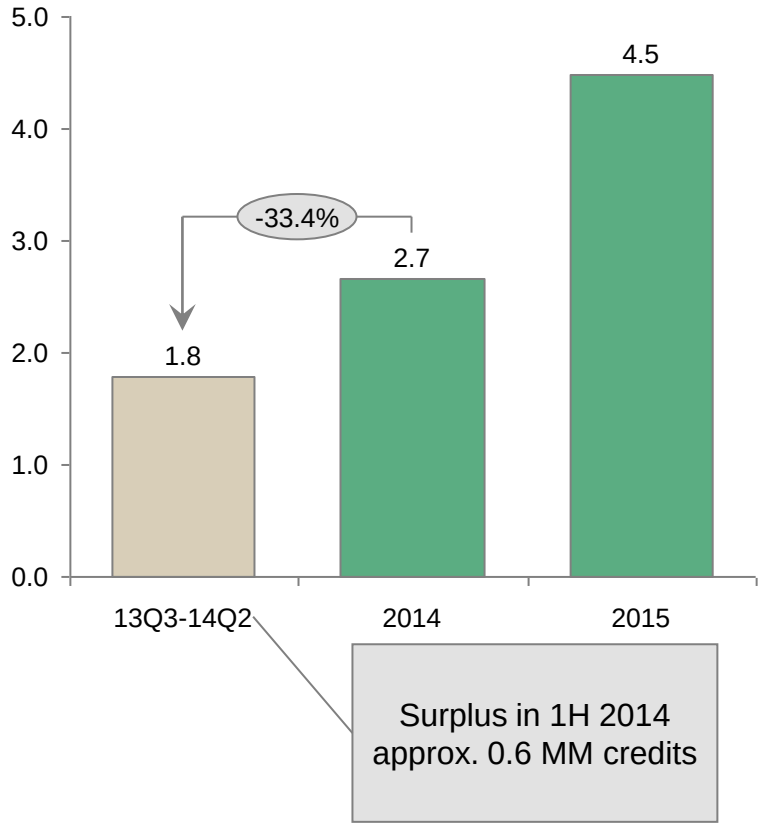
CARB assumes surplus will triple during 2014-15, even with flat CI target

MMT cumulative surplus (banked credits)[1]



2014 annual surplus lagging behind forecast

MMT surplus[1]

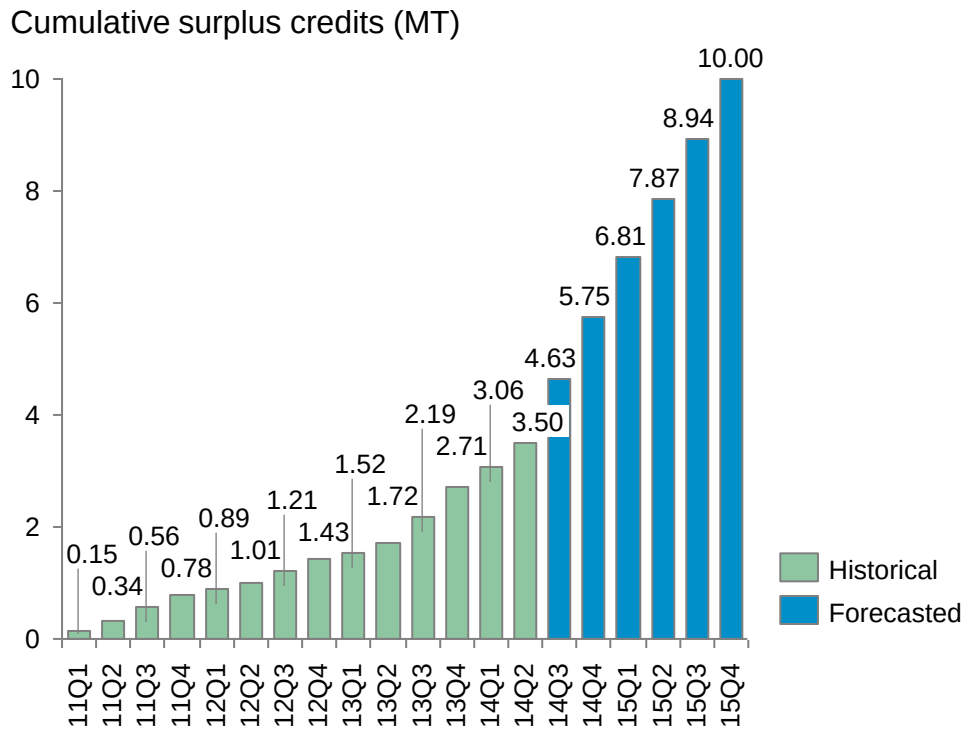


1. Credits less deficits
Source: CARB, BCG analysis

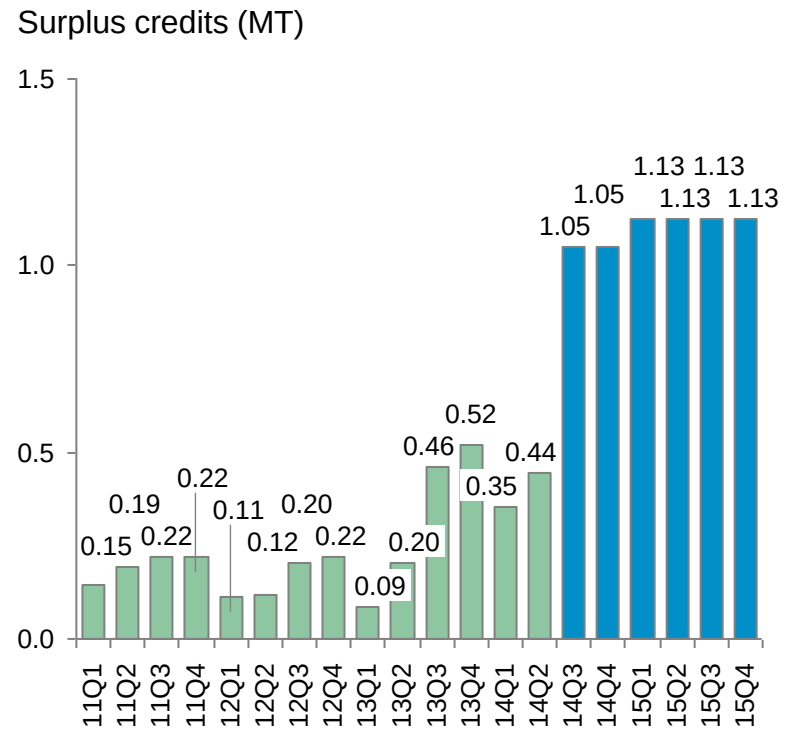
Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

10 MT surplus by end of 2015 would require unrealistic growth and credit generation starting immediately

Surplus of 10 MT by end of 2015 requires rapid growth...



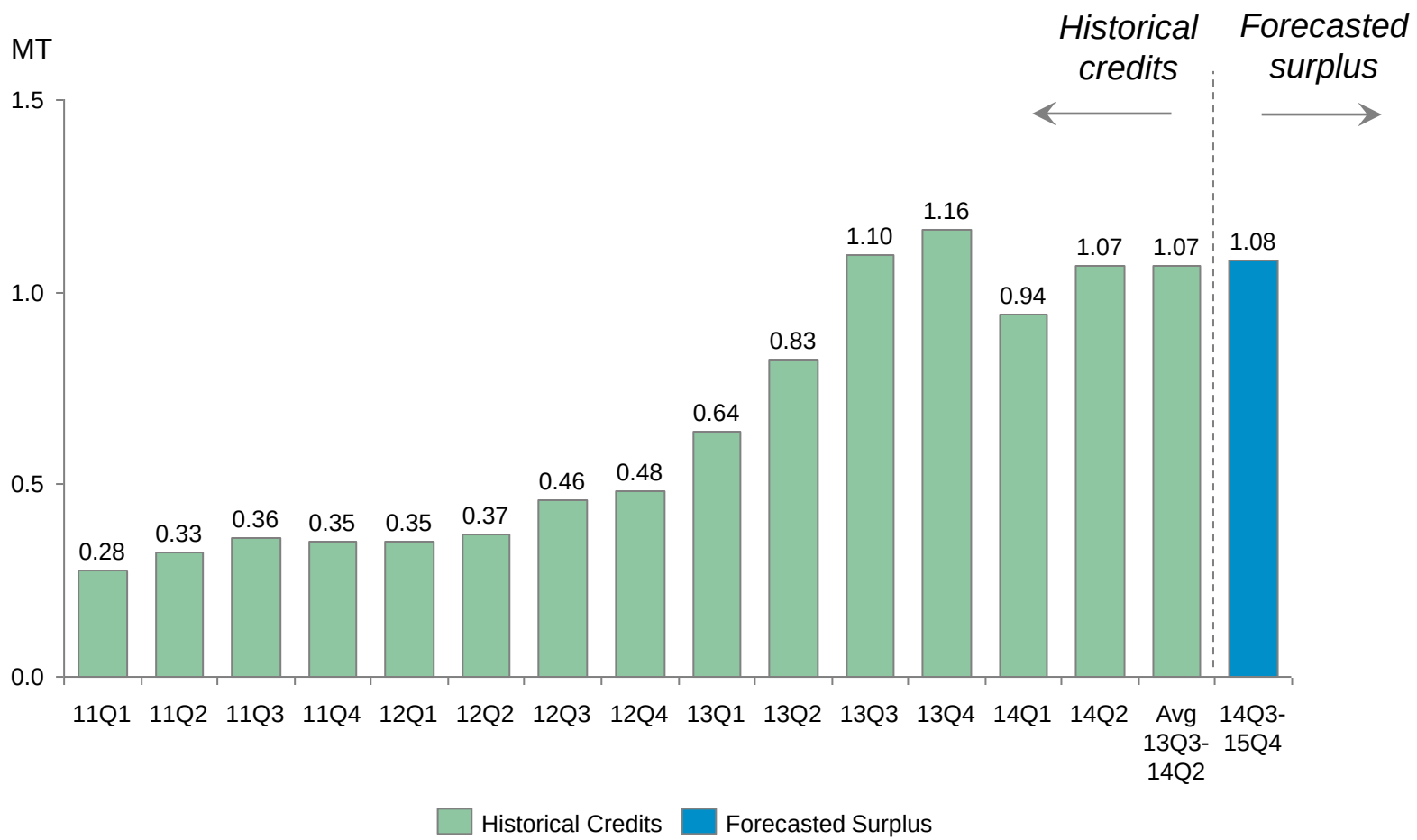
...including surplus 2x times previous quarters



Note: For 2014 subtracted 1H 2014 and divded remaining surplus needed to meet scenarios by 2. For 2015 assumed four equal quarters of surplus to meet compliance scenario
Source: CARB, BCG analysis

Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

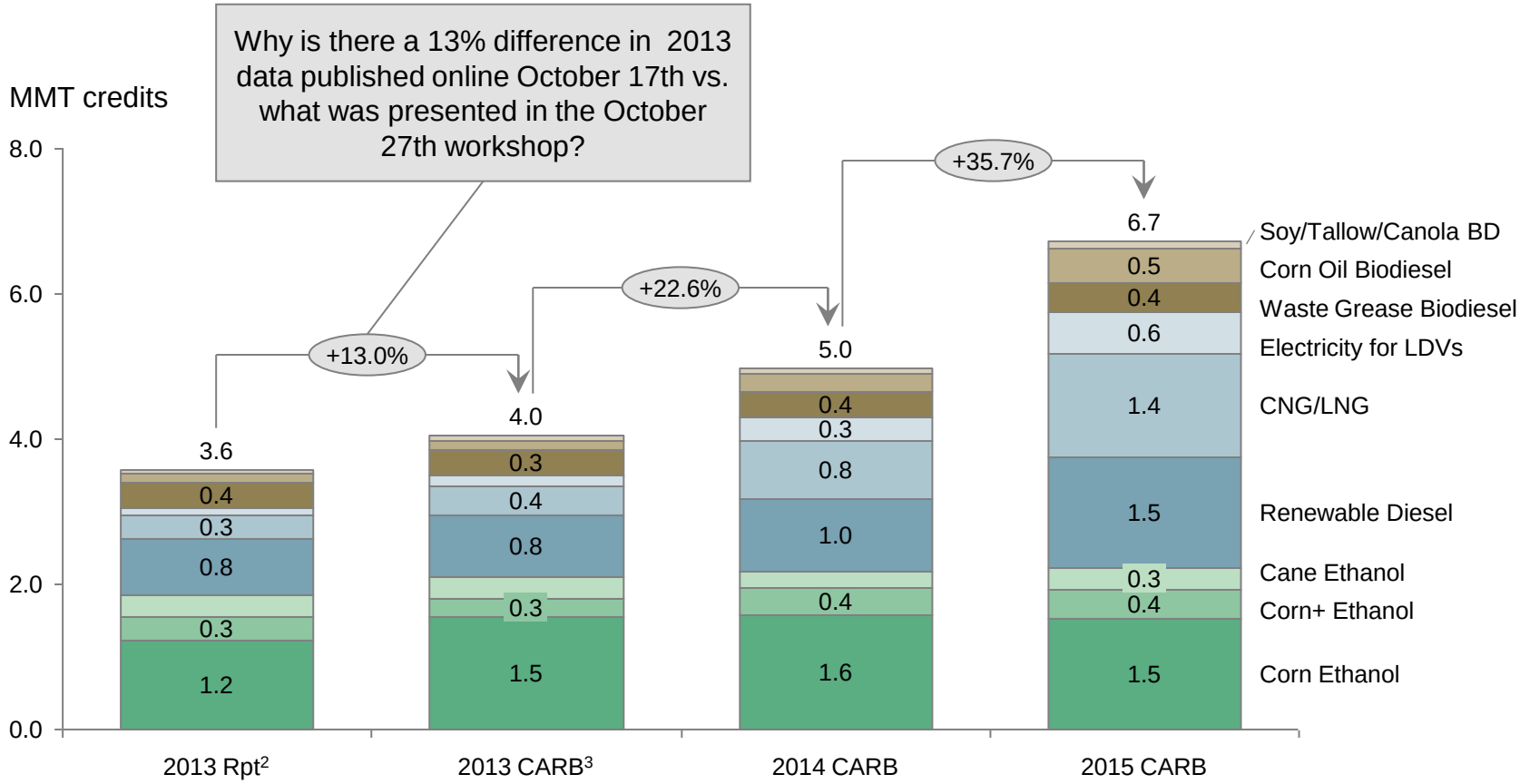
Forecasted surplus higher than average number of credits generated in last four quarters



Source: CARB, BCG analysis

Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

Optimistic short-term credit generation largely driven by high projections for RD and RNG over the next six quarters



RD and natural gas pathways account for nearly 2/3 of the increase from 2014 to 2015

1. Credits less deficits 2. As reported in the LCFS Quarterly Data from the LCFS Standard Reporting Tool (last released 17 October 2014) 3. From CARB forecast spreadsheet released after 27 October 2014 compliance curve workshop
Source: CARB, BCG analysis

Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

Agenda

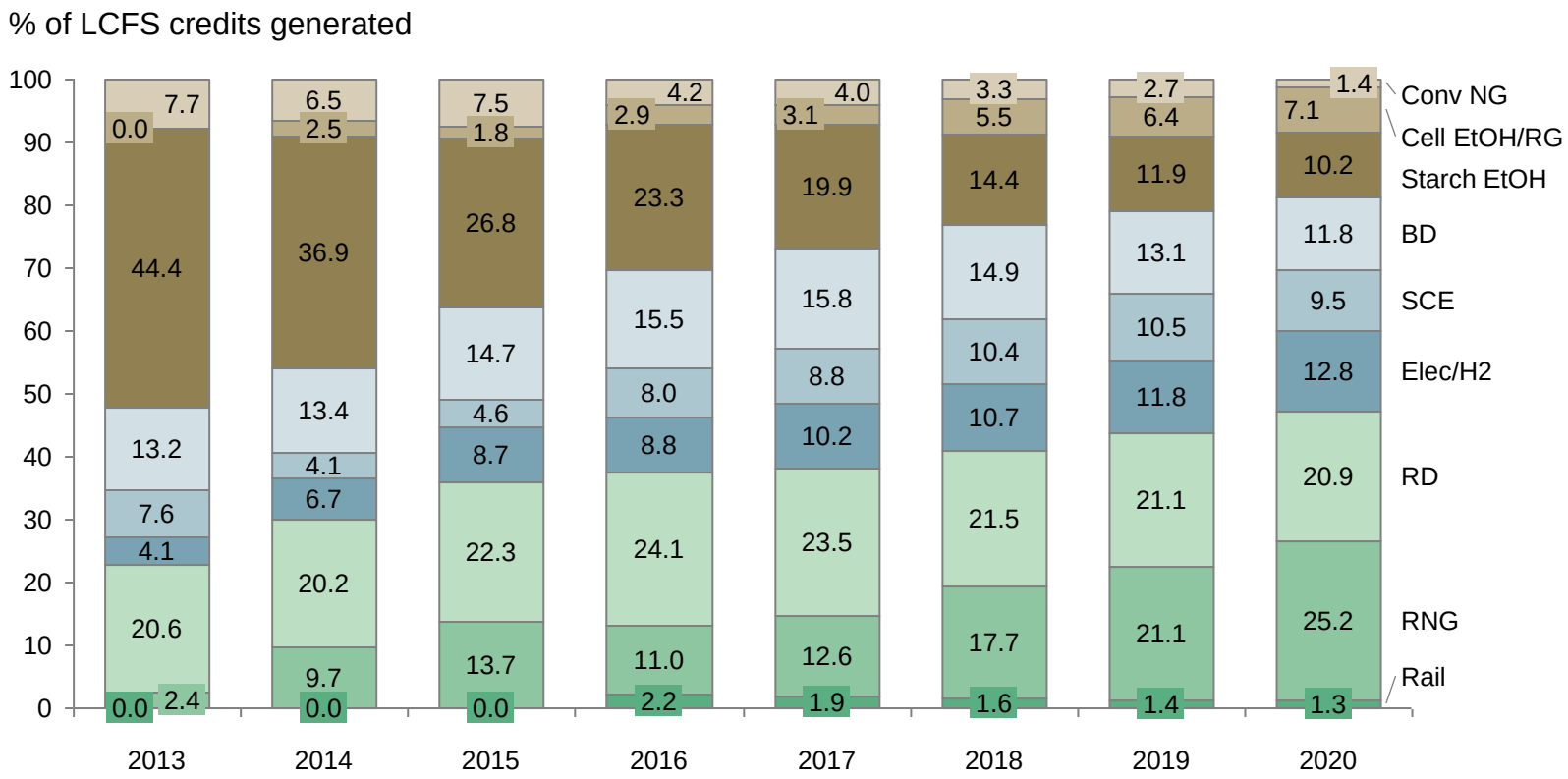
Near-term growth of banked credits

Fuel availability through 2020

Sustainability

Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

Renewable diesel (RD) and renewable natural gas (RNG) account for more than 45% of credits by 2020

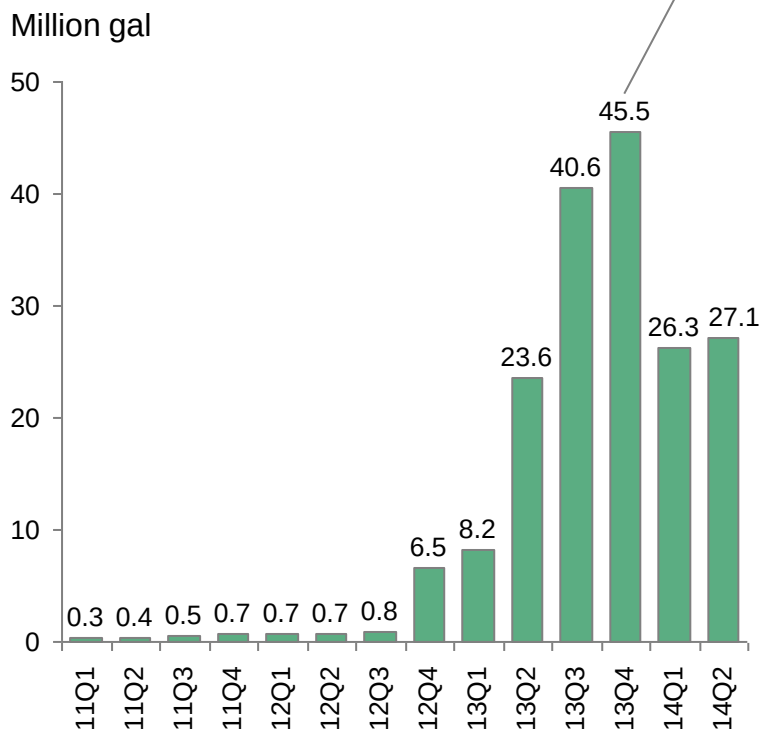


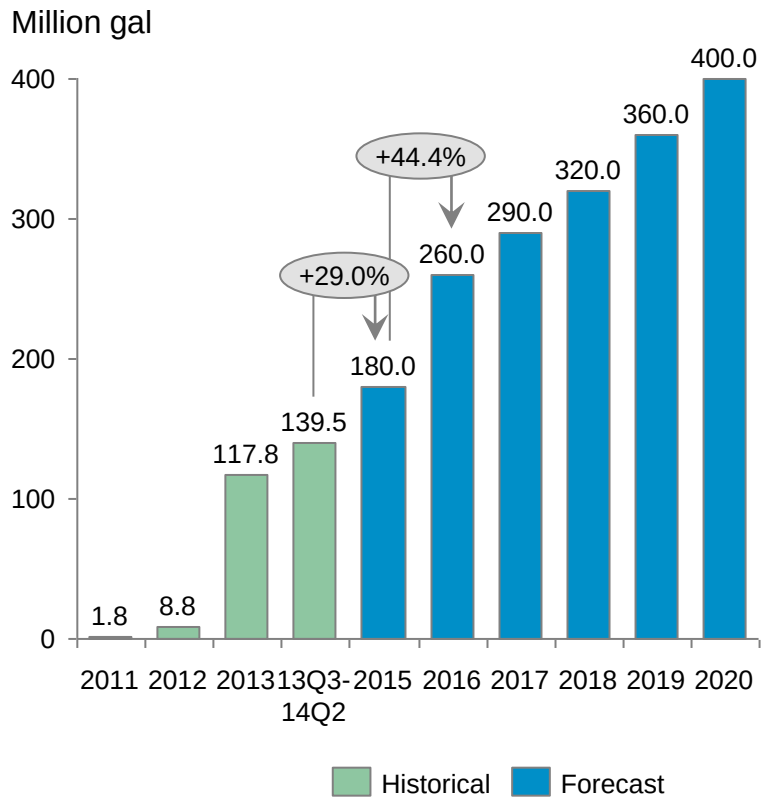
Source: CARB

Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

Renewable diesel projection relies on significant growth – what is the source of expected volumes?

Do these volumes reflect maximum available from Singapore to California?



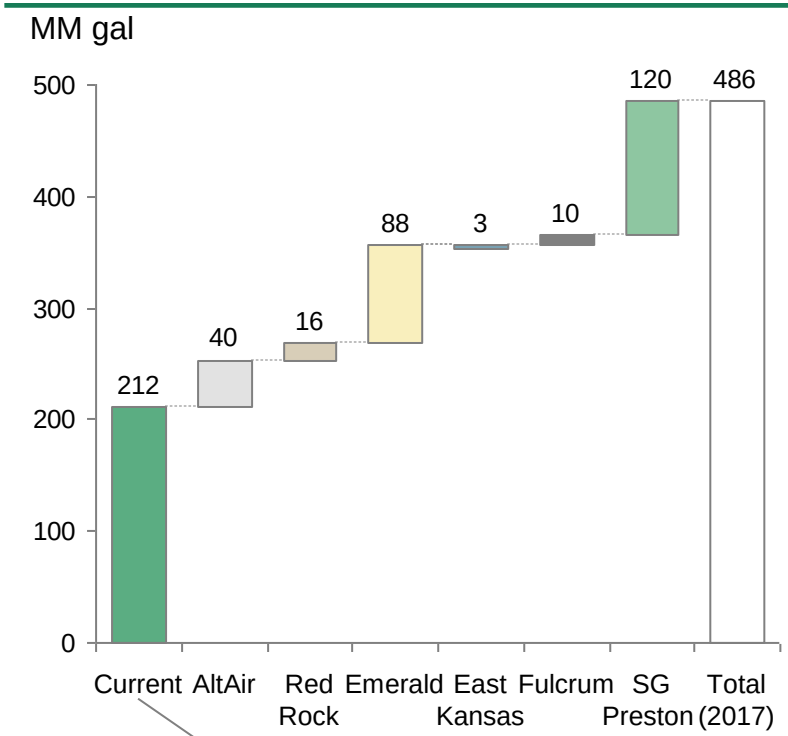


Source: CARB

Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

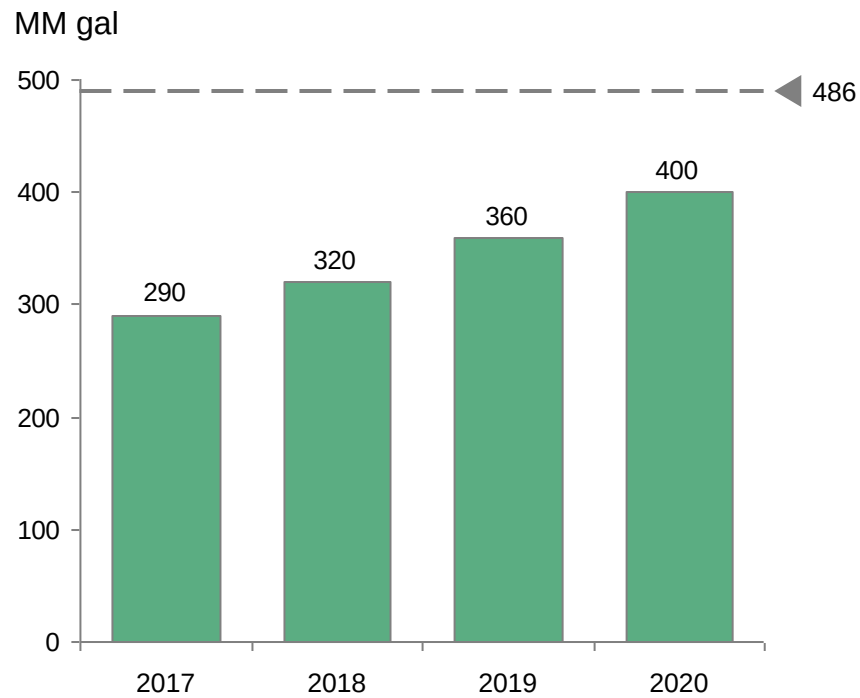
Even optimistic outlook for projects unlikely to provide enough volume of RD to achieve projected availability

Even if all announced projects were built by 2017 in the US...



Includes at least one facility that doesn't have infrastructure to ship fuel to California

...would it be realistic for California to receive more than 50% of production?



Source: CARB Sept workshop, E2 2013 Advance Biofuel Market Report, CARB compliance curves spreadsheet

Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

Renewable diesel projections still highly optimistic

Previous US estimate was 900-1,500 MGY of capacity assuming all existing projects built along with strong additional growth from projects not yet announced (but still expected to be in place within 5 years).

- What share of US production is expected to go to California?
- What logistics would need to be built to make the fuel available to California? At what cost?

As renewable diesel pathways vary significantly depending on feedstocks, does CARB have information about the expected feedstocks of the planned facilities to determine the CI impact?

Have RD facilities that product jet fuel been discounted?

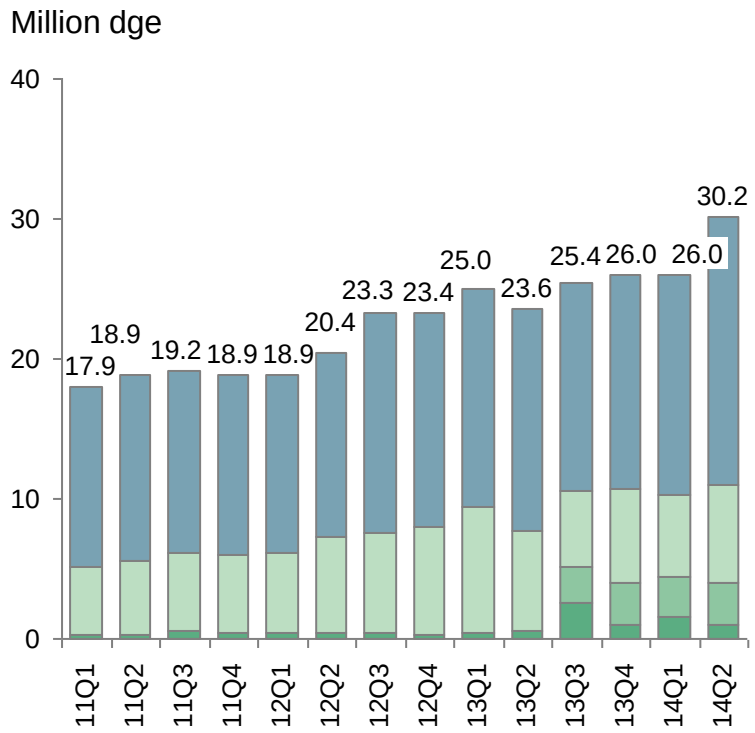
Was competition with other states/Canada considered in the assumption that California would be able to receive 400 MGY by 2020?

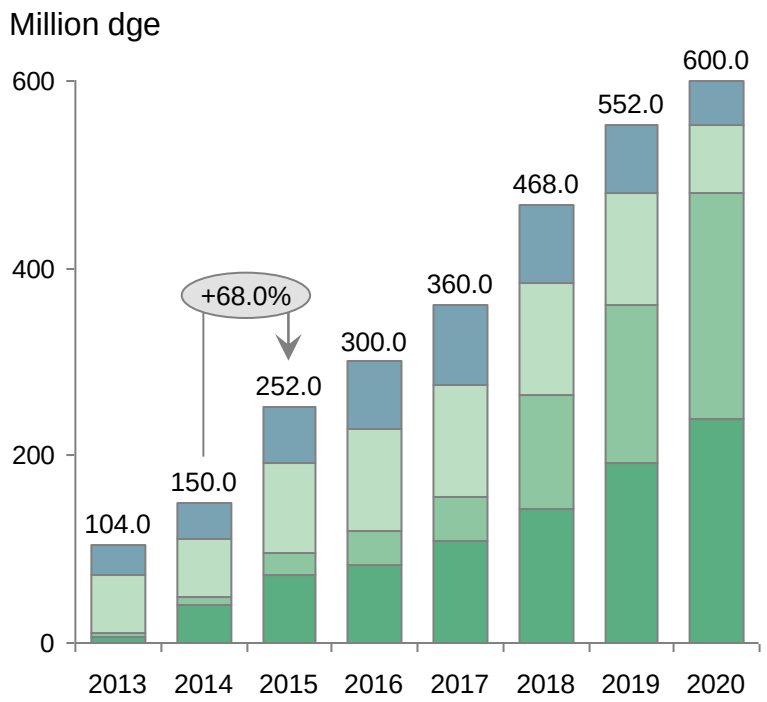
Why have volumes in 2014 Q1 and Q2 decreased from 2013 Q3 and Q4?

- 2014 Q2 relatively flat vs. 2013 Q2 (+15%) while growth expected to be 50% according to model

Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

Natural gas growth has been steadily increasing, but what is causing the forecasted spike in usage starting in 2015?



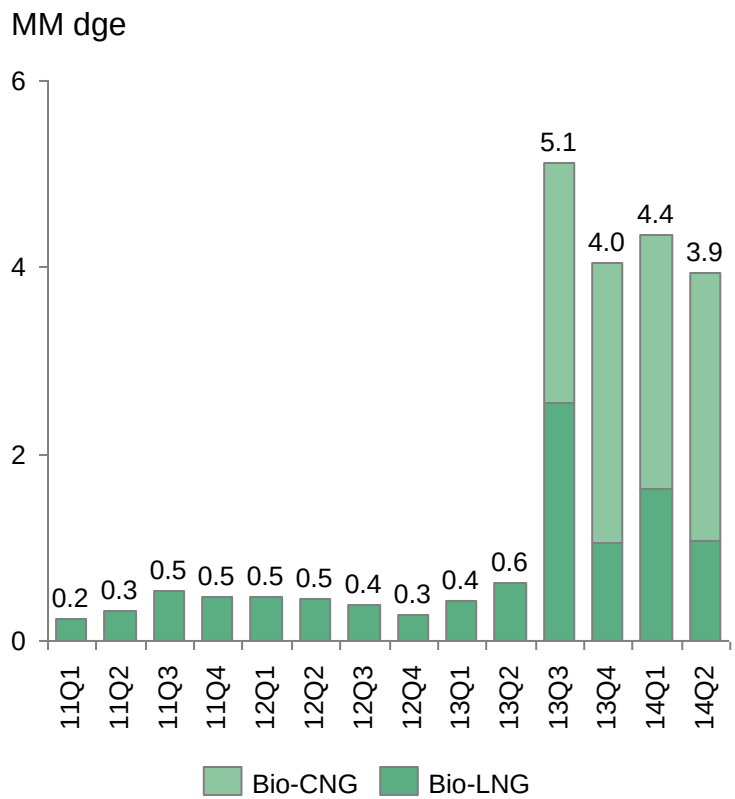


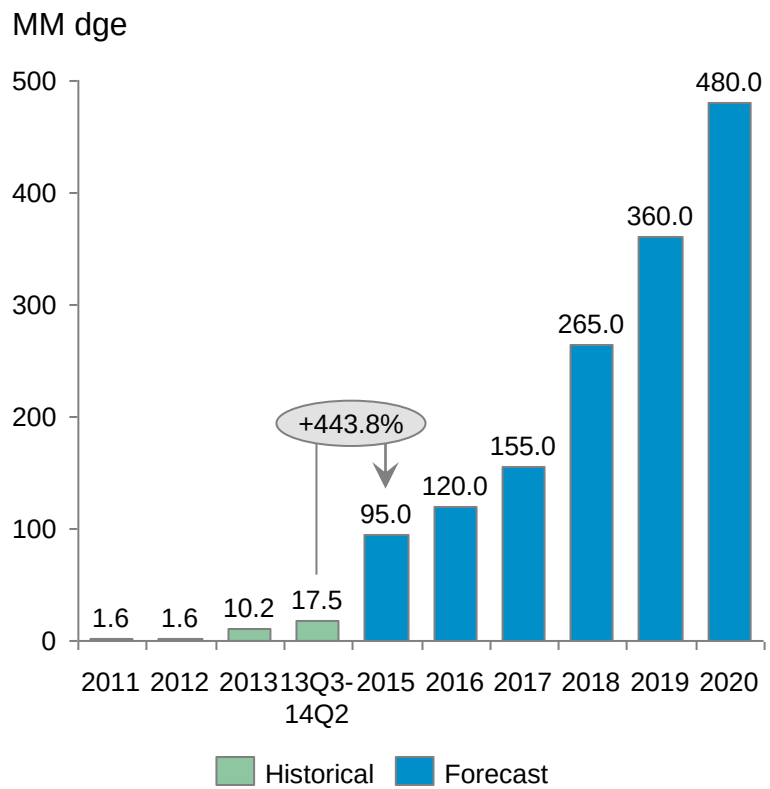
CNG LNG Bio-CNG Bio-LNG

Source: CARB

Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

While renewable gas volumes have grown, what is the driver for further 4-5x growth in the next 12 months?

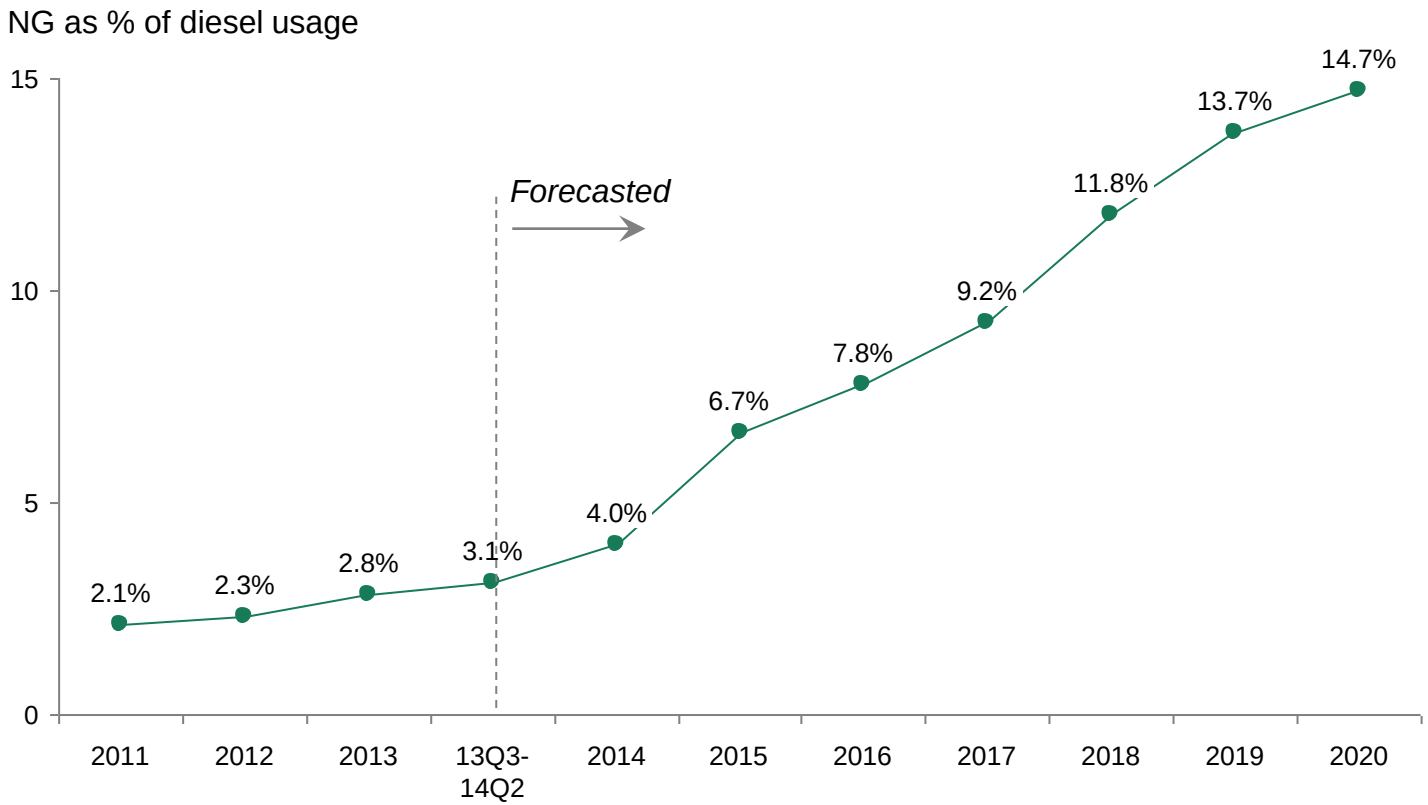




Source: CARB, BCG analysis

Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

Will NGV penetration be enough to consume all of the expected natural gas volumes?



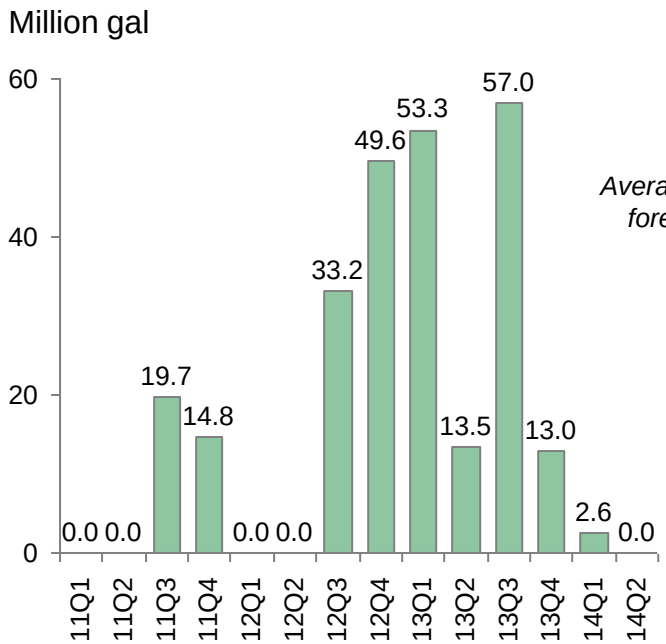
- What is the current fleet size of NGVs in California and how would that need to increase to use these volumes of natural gas as a transportation fuel?
- What infrastructure changes would be required to transition to this level of NGV adoption and at what cost?

Source: CARB, BCG analysis

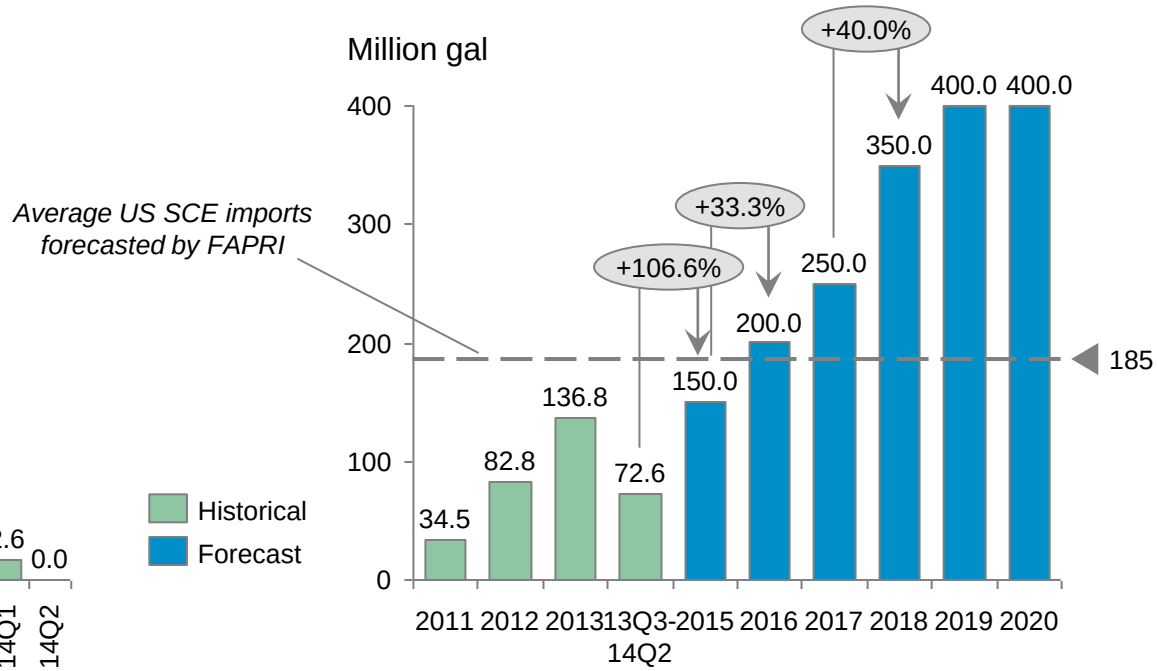
Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

Sugarcane ethanol forecast requires record volumes and growth in imports to California

Cane ethanol volumes to California have been inconsistent...



...but CARB predicts that CA volumes will increase quickly and consistently



- Is CARB still using FAPRI 2012 forecasts to estimate ethanol imports from Brazil?
- What changes in infrastructure would be needed to integrate these volumes of imported ethanol into the California fuel system?

Source: FAPRI, CARB, BCG analysis

Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

Agenda

Near-term growth of banked credits

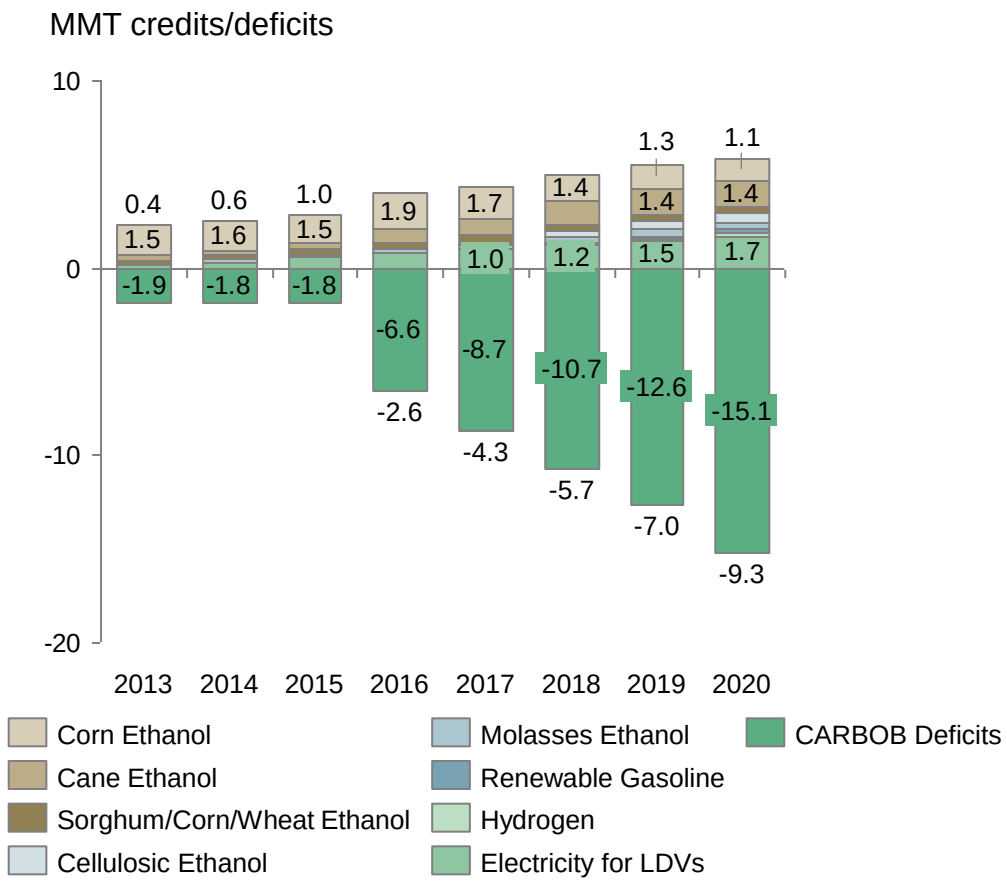
Fuel availability through 2020

Sustainability

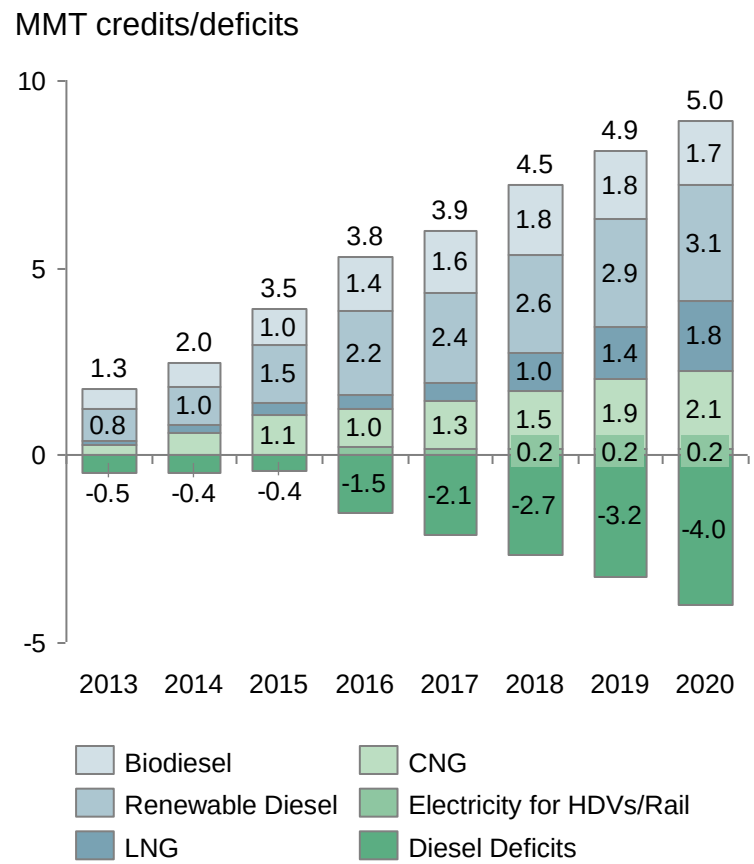
Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

CARB's forecast[1] depends heavily on diesel substitutes for overall compliance

By 2020, gasoline accrues more than 9 MT deficits per year...



...while diesel substitutes provide ~5 MT credits per year

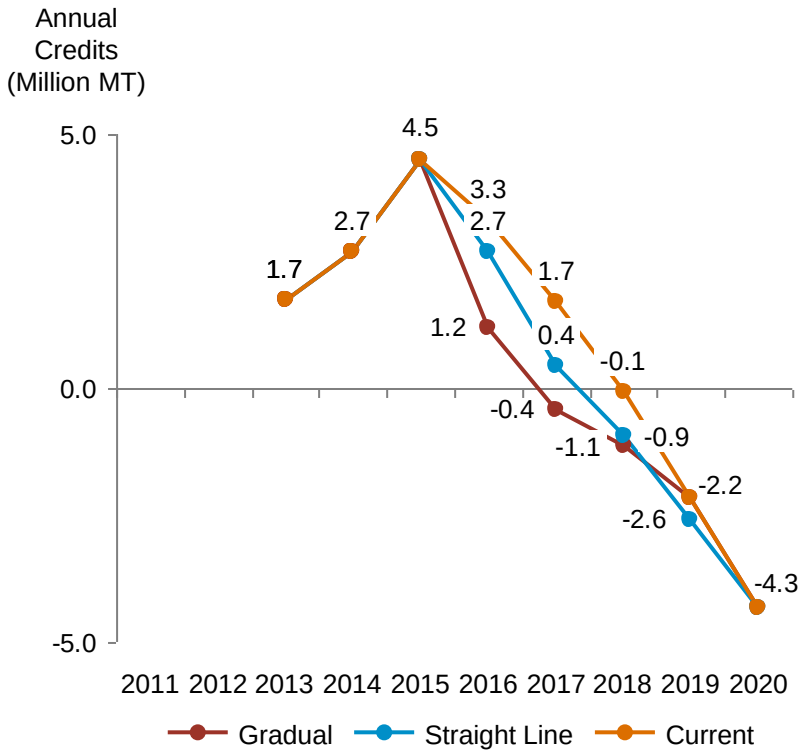


1. Based on CARB's straight line scenario
Source: CARB

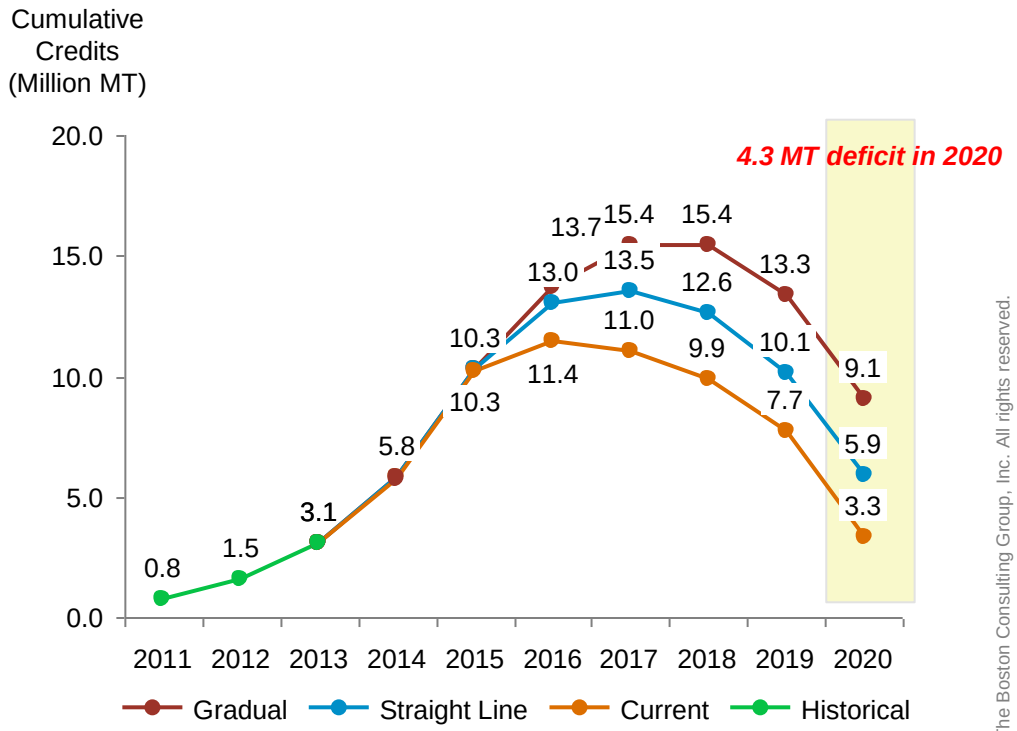
Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

Annual deficits start as early as 2017 with a 4.3 MT deficit in all scenarios in 2020

CARB scenarios show annual deficits starting as early as 2017...



...fully depleting credits by 2021 even if optimistic projections hold



Plan to draw down banked credits on pace with optimistic fuel availability projections risky

Source: CARB, BCG analysis

Copyright © 2014 by The Boston Consulting Group, Inc. All rights reserved.

BCG

THE BOSTON CONSULTING GROUP

Thank you

bcg.com | bcgperspectives.com