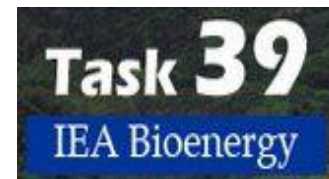




IEA Bioenergy
Technology Collaboration Programme



Implementation Agendas Report: 2020-2021 Update (compare-and-contrast biofuels policies)

Mahmood Ebadian

**Virtual Business Meeting
19-21 April 2020**

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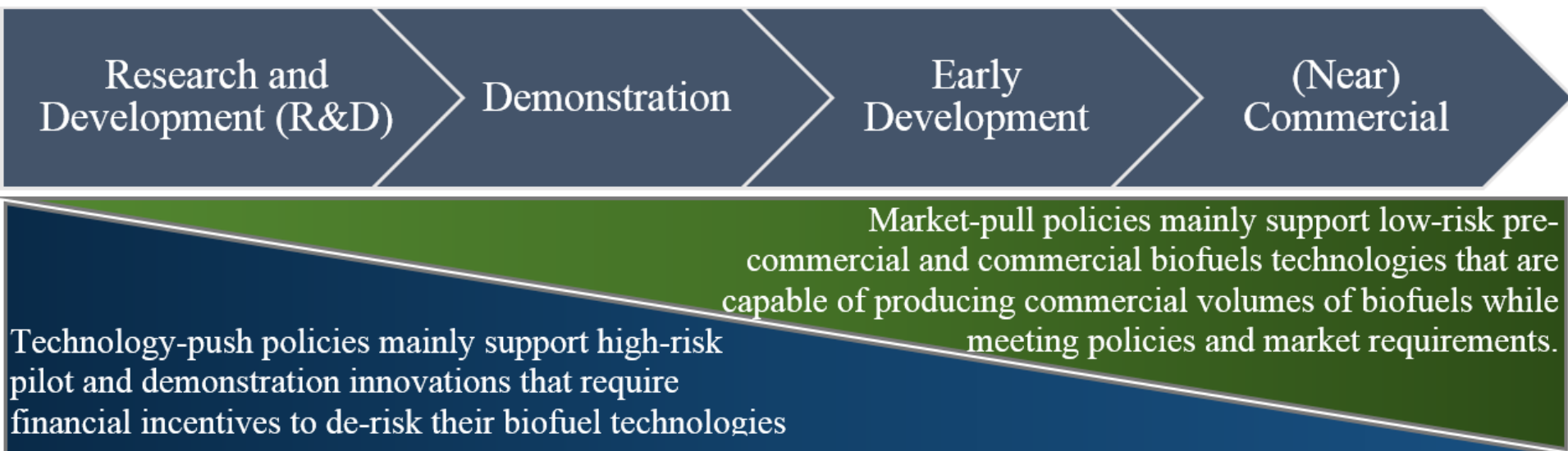
Technology Collaboration Programme

by **iea**

Implementation Agendas Report

- Compare and contrast developments/policies regarding **transport biofuels production and use** in member countries
- Particular focus on **biofuel policies** while determining the extent to which these policies have been effective (or not!)
- Assess the measures taken by member countries **to develop or stimulate their respective biofuels sectors**, including incentives. For example, investment in research, development, demonstration and commercialization
- Update **the current status of assessing the “sustainability” of biofuels** and related discussions that factor into policy development

Existing policies and incentives for biofuel production and use



- **Market-pull policies:** bridge the price gap and access to the fuel market.
- **Technology-push policies:** De-risk the development and deployment of new biofuel technologies and their supply chains.

Progress to-date on update:

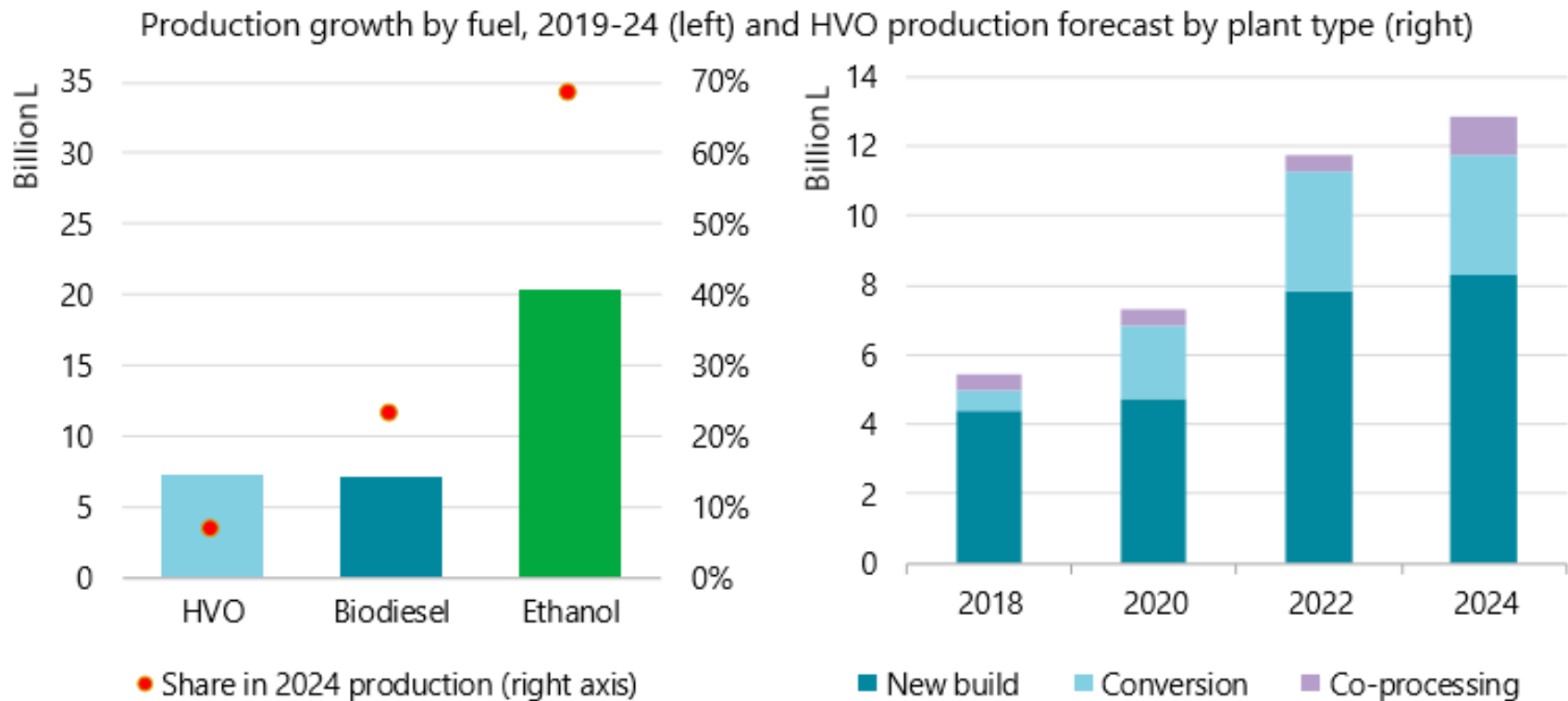
- Prepared and finalized the revised questionnaire with new additions (e.g. historical GHG emissions inventory data and the contribution of transport sector, existing and emerging sustainability certification schemes for transport biofuels and feedstocks, compliance cost of biofuel policies and co-processing at oil refineries)-**April 2020**
- Sent out the revised questionnaire with new additions to all Task 39 member countries- **May 2020**
- The completed questionnaire and draft country chapters were returned from all member countries- **Completed**
- All of the returned country chapters were reviewed and returned to the respective members for polishing- **Working with a few country representatives to update their country chapters**
- Published the country chapters as the feature article of Task 39 newsletter (**Sweden, issue#55; India, issue#56 and Ireland in the upcoming issue in May 2021**)
- The revised country chapters are now being incorporated into the draft 2021 implementation agenda report- **Ongoing**
- The draft 2021 implementation agenda report will be shared with the country representatives for their final review and feedback- **June 2021**

Implementation Agendas Report- 2020-2021 Update

- **Chapter 1:** Role of biofuel policies in the development of transport biofuels markets- **international perspective**- set the scene for the rest of the report
 - A summary of **the existing and emerging biofuels policies and their impact on the growth of transport biofuels**
 - In addition to conventional biofuels (bioethanol and biodiesel), **the recent and projected developments in renewable diesel/HVO and biojet/SAF** used to decarbonize long-distance transport are emphasized in the update report.
 - Recent developments in **advanced biofuels and the supporting policies** are briefly discussed.

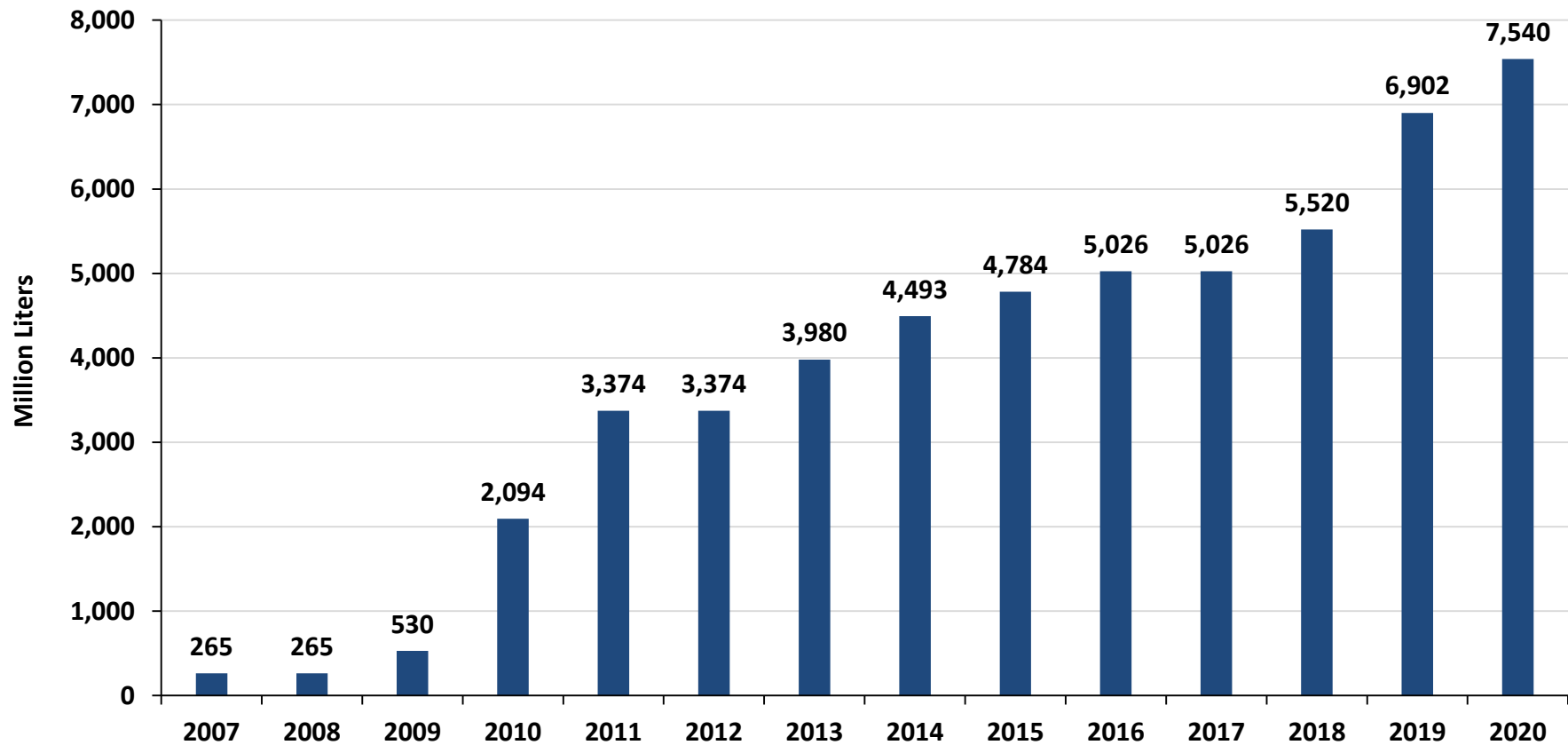
Biofuels: towards 2030- Production growth

Source: IEA, 2019



- Total production growth of 35 billion liters is projected over the period 2019-2024.
- The majority of additional capacity is projected to come from **conventional** biofuels by 2024 (57% ethanol, 23% biodiesel and 20% **conventional drop-in** biofuels).
- Around \$5 billion of investment in new plants is anticipated.

Growth in RD global production capacity: 2007-2020



- RD production has experienced significant growth from 265 million liters (ML) in 2007 to over 7,500 ML in 2020; **an average annual growth of 41%.**

Growth in renewable diesel being driven by policies e.g. LCFS & Market Conditions

- Policies such as the Low Carbon Fuel Standard (LCFS) have made the production of RD economically attractive, with the development of a carbon credit/debt market.
- Fuel-agnostic, with credits or deficits generated based on the carbon intensity (CI) of the particular fuel
- Proven to be a successful tool to decarbonize the transportation sector by encouraging the reduction in the carbon intensity of all fuels
- Proven to be successful in encouraging the production and use of low-carbon intensive drop-in biofuels and advanced biofuels;
Consequently increasing their market value!
- California and British Columbia are at the forefront of these policies.

Global consumption of renewable diesel (RD)

Location	Consumption volume (ML)
The United States (US)	3,483
California	2,347
Other states/exported	1,136
Canada	302
British Columbia	113
Ontario	189
Europe	3,500

- The LCFS policy has been driving the use of RD in California, Oregon and BC.
- In the US, the Renewable Fuel Standard (RFS) and blenders tax credit have encouraged the use of RD in other states by increasing the market price of RD.
- In Europe, the Renewable Energy Directive (RED) and Fuel Quality Directive (FQD) have driven RD sales.
- Ontario has a program that could be called an “LCFS lite” program. This requires a 2.8% reduction in GHG emissions.

Implementation Agendas Report- 2020-2021 Update

Chapters 2-17: Biofuel policies in 16 member countries (country chapters)

- Historical contribution of transportation to the total primary energy supply and the national GHG emissions
- Main drivers for biofuels policy
- Biofuels policy
 - Biofuels obligations
 - Excise duty reductions
 - Fiscal incentives
 - Investment subsidies
 - Other measures stimulating the implementation of biofuels
- Promotion of advanced biofuels
- Market development and policy effectiveness

Updates on biofuels policies in the revised county chapters

- **India's** National Policy on Biofuels
- **EU'REDII**
- **Brazil's** RenovaBio
- **New Zealand's** the Climate Change Response (Zero Carbon) Amendment Act
- **Canada's** Clean Fuel Standard and **British Columbia's** Low Carbon Fuel Standard
- **South Korea's** the National GHG Reduction Target and the Renewable Fuel Standard (RFS)
- **Japan's** Basic Energy Plan
- **US's** Biodiesel Tax Credit and **California's** Low Carbon Fuel Standard
- etc.

Implementation Agendas Report- 2020-2021 Update

Chapter 18: Compare and contrast biofuel policies in member countries

On what basis has biofuels use been assessed?

- Volumetric?
- Energy Content?
- Reduction in Carbon Intensity (CI)?

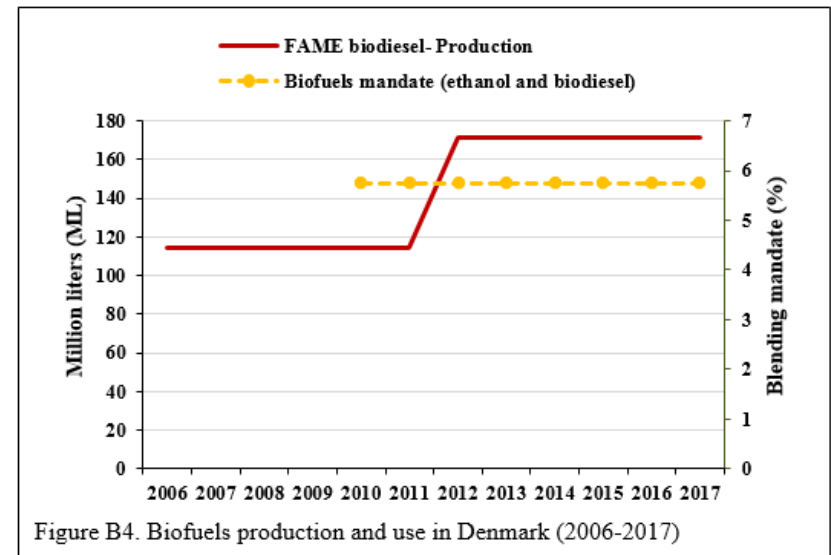
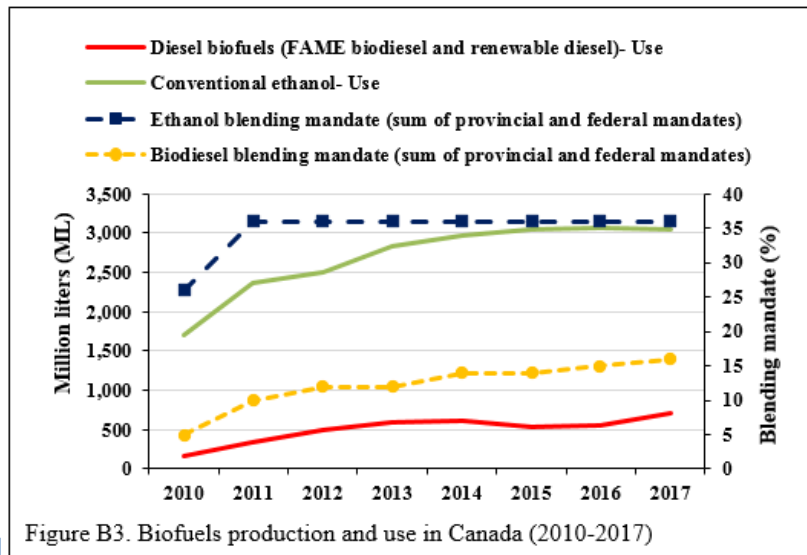
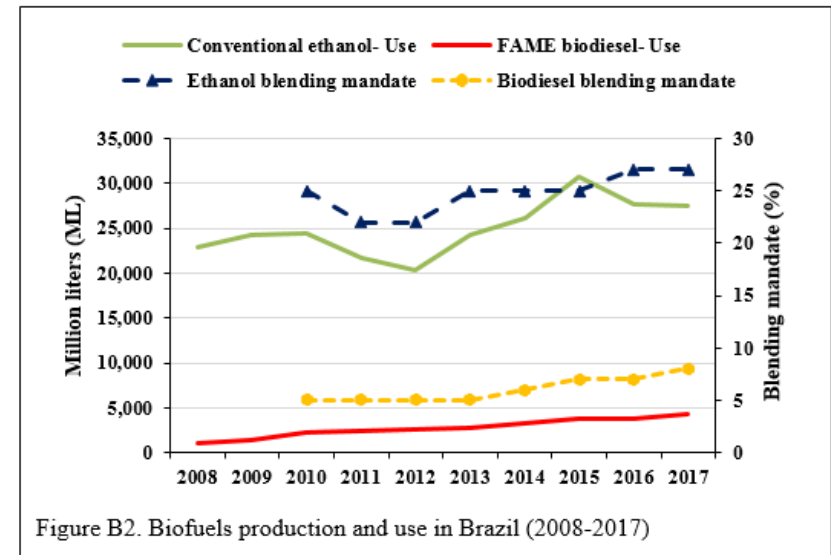
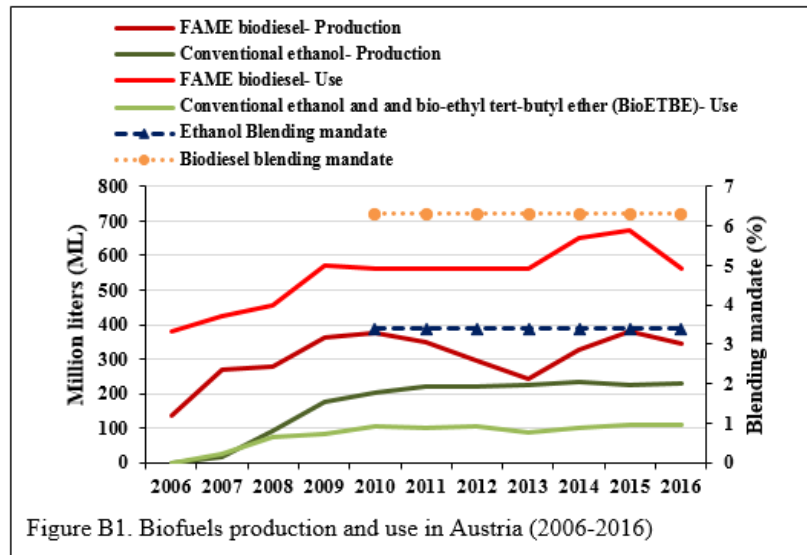
What policies have been used so far to develop biofuels?

- Market pull?
- Technology/R&D push?

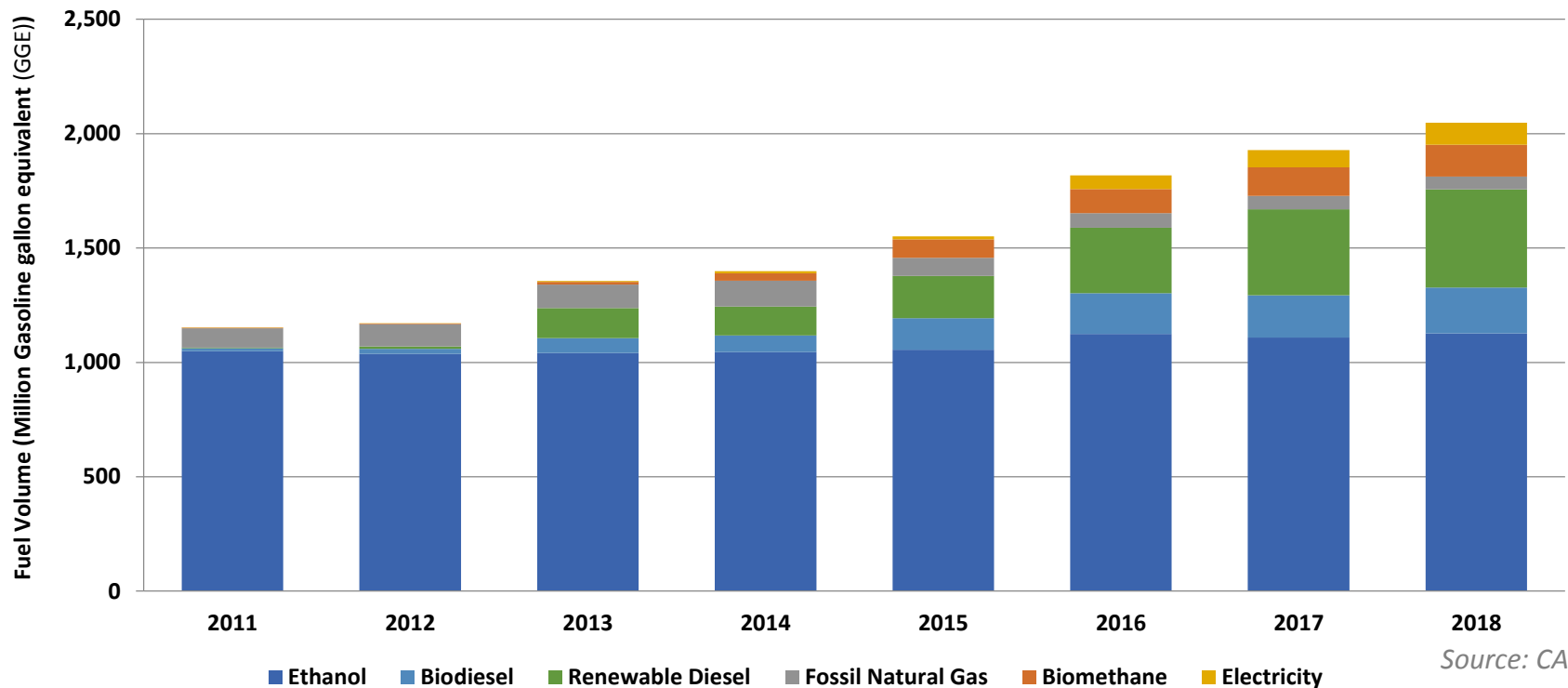
What policies will “incentivize” the oil sector and make more use of the fuel distribution network?

- Carbon Intensity (i.e. LCFS)

Impact of blending mandates on biofuels market development

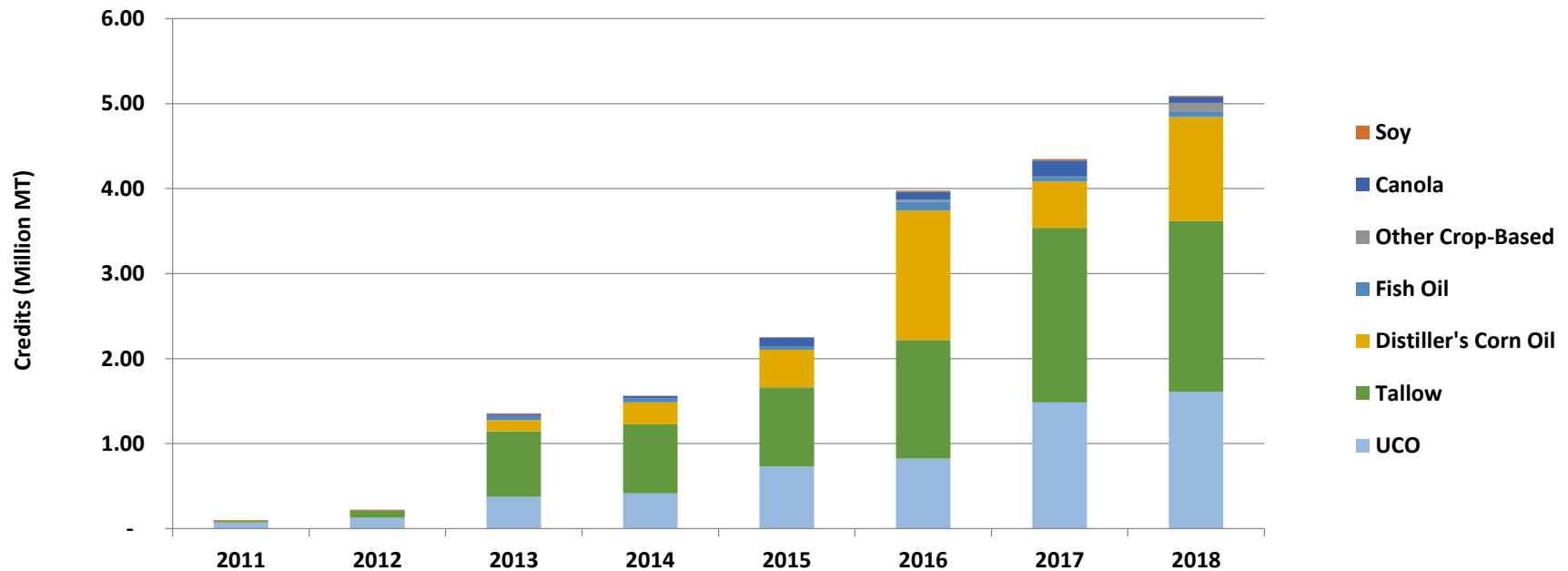


How the LCFS has influenced the California biofuels market



- Increase use of renewable diesel from **2 million GGE in 2011 to 429 million GGE in 2018**
- Increase use of biomethane from **2 million GGE in 2011 to 139 million GGE in 2018**
- While **ethanol contributed the largest amount of biofuel on a volume and energy basis in 2018**, 70% of the LCFS credits were generated by non-ethanol biofuels with lower carbon intensities.

California LCFS- How it has Encouraged the use of wastes and residues



Source: CARB, 2019.

- The LCFS incentivizes the growth in biofuels derived from **“waste” feedstocks**.
- In 2018, 98% of the total credits generated by biodiesel and renewable diesel were derived from **wastes and residues rather than crop-based oleochemicals**.

Policies will continue to be essential

- **Market pull: Biofuel blending mandates**
 - Are expected to be the primary policy tools in the short-to-mid term, to encourage the production and use of conventional biofuels.
- **Increasing use of policies such as LCFS**
 - The Relative success of LCFS policies in California and British Columbia, has encouraged related policies in other jurisdictions (e.g. Canada Clean Fuel Standard and Brazil RenovaBio).
- **Technology push: R, D & D investments**
 - Needed to diminish the risk of building “pioneering” and demonstration plants, establishing markets for co-products, etc.
- **Expect an increase in the number of policies related to long-distance transport such as aviation and marine**
 - Norway, Sweden, Finland US have policies aimed at promoting alternative jet fuel production.
 - In 2018, the IMO reached an agreement on an “initial strategy” to reduce CO2 emissions from shipping. However, no new policies to date