



Department of Environmental Quality

Low Carbon Fuel Advisory Committee
Feb 24, 2009

**Low Carbon Fuel Standard
Example Compliance Scenario**

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Department of Environmental Quality

**Low Carbon Fuel Standard: Example of a
Compliance Scenario**

Purpose:

- Give an example of how to use the fuels assessment
- Policy decisions in upcoming months
- Example of fuel and alternative fuel volumes which might be required

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Outline

1. Review compliance scenario process
2. Describe fuels assessment
3. Walk through compliance scenario example
 - Gasoline
 - Diesel
4. Highlight assumptions

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Outcomes

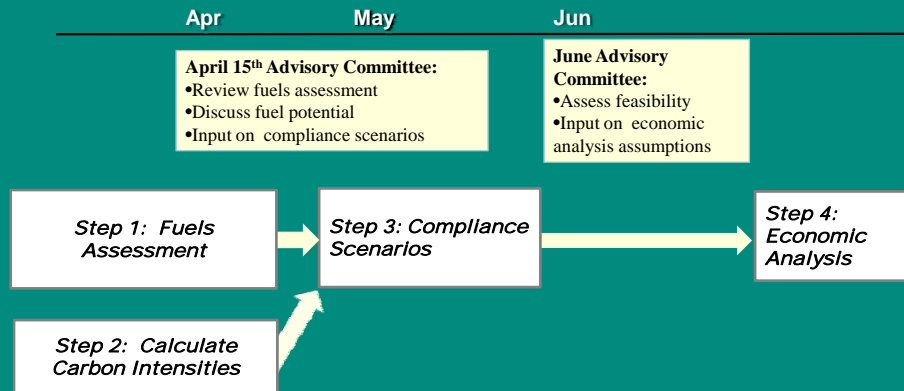
- Advisory committee will understand:
- Compliance scenario development process
- How to use fuels assessment
- Type of assumptions
- Policy decisions

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Compliance scenario/fuel assessment

2010



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Fuels Assessment

- **Current and potential OR fuel production**
 - Include an assessment of OR feedstock
- **Out of state production**
- **Technology description and commercialization status**
- **Regulatory context:**
 - Federal Renewable Fuel Standard
 - Oregon Renewable Fuel Standard
 - Portland Renewable Fuel Standard

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Proposed process for developing compliance scenarios

- Review fuels assessment
- Expert speakers on future of:
 - Electric vehicle use
 - CNG use
 - Cellulosic/advanced ethanol production

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Developing Compliance Scenarios

Identify volumes of fuels and vehicles needed to reduce carbon intensity 10% by 2020

- What alternative fuels will be available?
- Consider carbon intensities
- Develop approximately five plausible scenarios

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Proposed process for developing compliance scenarios

- **Input on assumptions:**
 - Volumes of various low carbon fuels available
 - Penetration of electric vehicles into market
 - Penetration of CNG into market
 - Penetration of hydrogen into market
 - Flex fuel vehicles operating on E85
 - RFS2 “fair share” fuel volumes

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Example of a Compliance Scenario

- Limitations of this example**
- **“Back of the Envelope”**
 - Excel spreadsheet
 - Real compliance scenarios might use VISION
 - **Preliminary RFS2 “fair share” volumes**
 - **Carbon intensities for Oregon not complete**
 - **Uses some East Coast/Mid-Atlantic assumptions**
 - Number of electric vehicles
 - RFS2 calculations

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Gasoline Example Compliance Scenario Assumptions

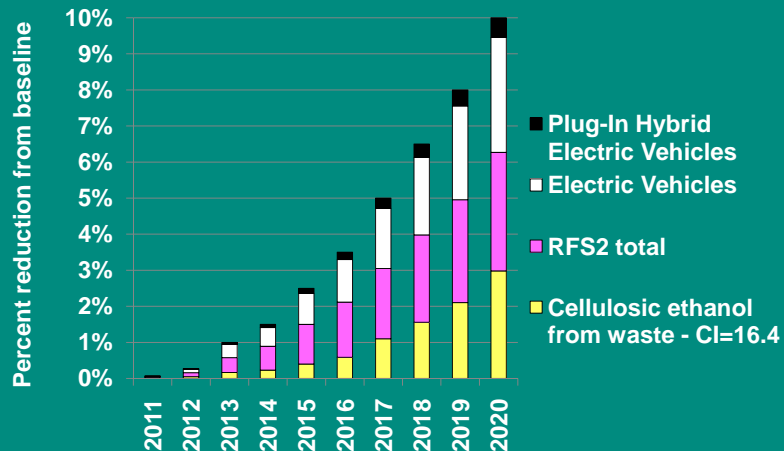
Assumptions:

- CA's phase-in schedule
- 4.4% of fleet in 2020 will be electric vehicles
- 4.4% of fleet in 2020 will be plug in hybrid electric vehicles
- Increase in E85 use
- RFS2 calculations
 - “Advanced ethanol” CI is 50% of gasoline CI
 - “Cellulosic ethanol” CI is 60% of gasoline CI
 - Other ethanol CI is 16.4 g CO₂E/MJ

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Gasoline and substitutes: Contribution of Low Carbon Fuels to 10% reduction in average carbon intensity



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**Gasoline and Substitutes Example
Compliance Scenario: 2020**

Fuel Type	Percent contribution to 10% reduction in 2020	Volume/Number
Cellulosic Ethanol CI = 16.4	3.0%	79 mil gallons
RFS2	3.3%	105 mil gal cellulosic 33 mil gal advanced
Electric Vehicles	3.2%	145,000 vehicles
Plug-in Hybrid Electric Vehicles	0.5%	145,000 vehicles

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Year	2011	2012	2013	2014	2015
% reduction from 2010	0.25%	0.5%	1.0%	1.5%	2.5%
RFS2 Cellulosic (Million gallons)	2.5	5	10	17.5	30
RFS2 Advanced (Million gallons)	1.4	3	5.5	8	13
Cellulosic CI=16.4 (Million gallons)	1	2	4	6	10
Battery Electric	3,600	7,200	14,500	21,700	36,000
Plug-in Hybrid Electric Vehicle	3,600	7,200	14,500	21,700	36,000
Ethanol Blend %	9.9%	9.9%	9.9%	9.9%	9.9%

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Year	2016	2017	2018	2019	2020
% reduction from 2010	3.5%	5%	6.5%	8%	10%
RFS2 Cellulosic (Million gallons)	42.5	55	70	85	105
RFS2 Advanced Cellulosic (Million gallons)	18	23	28	33	33
CI=16.4 (Million gallons)	15.12	28.425	40.24	54.97	78.662
Battery Electric	50,700	72,500	94,000	116,000	145,000
Plug-in Hybrid Electric Vehicle	50,700	72,500	94,000	116,000	145,000
Ethanol Blend %	9.9%	9.9%	9.9%	9.9%	9.9%

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Diesel Example Compliance Scenario Assumptions

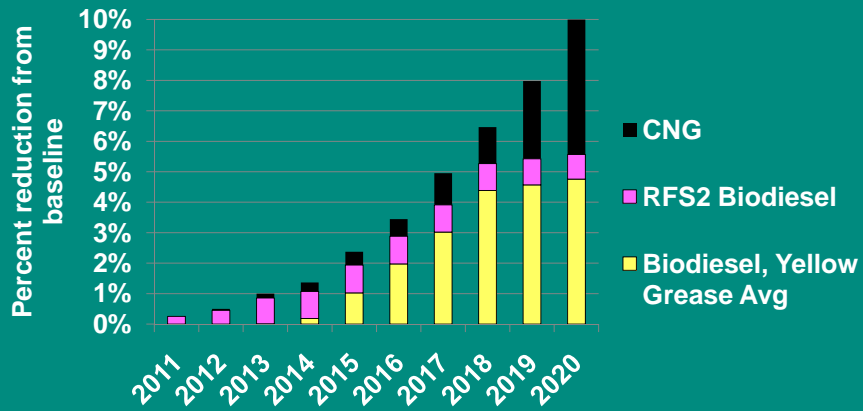
Assumptions:

- CA's phase-in schedule
- Carbon intensity numbers from WA or CA
- RFS2 calculations
 - "Biodiesel" carbon intensity is 50% of diesel carbon intensity
 - Other biodiesel carbon intensity is 13.8 average
- CNG use increases

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Diesel and substitutes: Contribution of Low Carbon Fuels to 10% reduction in average carbon intensity



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Diesel and Substitutes Example Compliance Scenario in 2020

Fuel Type	Percent contribution to 10% reduction in 2020	Volume/Number
Biodiesel, Yellow Grease Avg (CI = 13.8)	4.8%	35 mil gallons
RFS2 Biodiesel	0.8%	12 mil gal biodiesel
CNG	4.4%	250 standard cubic feet

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Year	2011	2012	2013	2014	2015
% reduction from 2010	0.25%	0.5%	1.0%	1.5%	2.5%
Biodiesel, Yellow Grease Avg (Million gallons)			0.1	1.4	7.4
RFS2 Biodiesel (Million gallons)	9.6	12	12	12	12
CNG (standard cubic feet)		3	5	10	15
Biodiesel Blend %	1.7%	2.1%	2.1%	3.8%	4.8%

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Year	2016	2017	2018	2019	2020
% reduction from 2010	3.5%	5%	6.5%	8%	10%
Biodiesel, Yellow Grease Avg (Million gallons)	14.1	21.4	30.9	32.8	35.0
RFS2 Biodiesel (Million gallons)	12	12	12	12	12
CNG (standard cubic feet)	20	40	50	120	250
Biodiesel Blend %	5.2%	6.4%	8.1%	8.3%	8.4%

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April 2010 LCFS Meeting

Discuss future availability of fuel

- Are there questions you would like the experts to address?
- There will also be time for Q and A at the April meeting.