Oregon Low Carbon Fuel Standard Compliance Scenarios

- All Scenarios achieve a 10% reduction in carbon intensity by 2022.
- Where indirect land use change (ILUC) is included, the ILUC number is from California Air Resources Board's low carbon fuel standard.

Business-as-Usual

- Assumes Oregon receives its proportional share of the federal Renewable Fuel Standard (RFS2) Primary Control Case biofuel volumes (cellulosic ethanol, cellulosic diesel, sugarcane ethanol, soybean ethanol, corn ethanol). Delayed use of cellulosic diesel until 2013.
- An E10 blendwall (a requirement to blend no more than 10% ethanol with gasoline) was assumed for the analysis period.
- E10 blendwall met in 2013, limiting gasoline from absorbing any additional ethanol required by RFS2. After this point E85 consumption begins to increase.
- Biodiesel blend level increases to ~ 13.5% by 2022 due to the federal RFS2.

Gasoline Pool VISION Runs:

In all cases, 26 million gallons per year of Northwest corn ethanol made from Midwest corn plus 1.75 million gallons per year of ethanol from waste berries.

Scenarios

Scenario A – Cellulosic Biofuels with ILUC (Runs 1 + 6)

Run 1 – Cellulosic Ethanol with ILUC (Produced In-State)

- In addition to Northwest corn ethanol and waste berry ethanol, compliance with standard achieved through use of in-state cellulosic ethanol.
- If more ethanol is needed to reach total RFS2 proportional share volumes, it comes from Midwest corn ethanol.

Run 6 – Cellulosic diesel with ILUC (Produced In-State)

- Compliance achieved through the use of new in-state cellulosic diesel and new waste oil biodiesel capacity

Scenario B – Mixed Biofuels with ILUC (Runs 2 + 7)

Run 2 – Mixed Ethanol with ILUC

- In addition to Northwest corn ethanol and waste berry ethanol, compliance achieved through use of sugarcane ethanol, lower carbon intensity Midwest corn ethanol, and cellulosic ethanol
- So much ethanol was required here that the blend wall had to be increased to E12 (12% ethanol blended with gasoline) in 2017 and E15 (15% ethanol blended with gasoline) in 2020

Run 7 – Conventional biodiesel with ILUC

- Compliance achieved through:
    - Moderate amounts of in-state cellulosic diesel production
    - Out of state grown and produced camelina renewable diesel
    - New In-state waste oil biodiesel capacity
    - Existing in-state canola biodiesel
    - New out-of-state canola biodiesel production from Oregon grown canola

Scenario C – Mixed Biofuels without ILUC (Runs 3 + 8)

Run 3 – Mixed Ethanol without ILUC

- In addition to Northwest corn ethanol and waste berry ethanol, compliance achieved through use of sugarcane ethanol, lower carbon intensity Midwest corn ethanol, and cellulosic ethanol
- For comparison with Run 2 in **Scenario B**, we increased the blend wall to E12 in 2017 and E15 in 2020

Run 8 – Conventional Biodiesel without ILUC

- Compliance achieved through
    - Existing canola biodiesel
    - Existing waste oil biodiesel
    - Midwest soybean biodiesel

Scenario D – Electricity, CNG and Cellulosic Biofuels with ILUC (Runs 4 + 9)

Run 4 – High Electric Vehicles with Cellulosic Ethanol with ILUC (Produced In-State)

- In addition to Northwest corn ethanol and waste berry ethanol, compliance achieved through use of Electric Vehicles and Plug-In Hybrid Electric Vehicles plus in-state cellulosic ethanol
- Similar to Run 1 except more plug in vehicles are included, so less ethanol is required

Run 9 – max CNG vehicles and cellulosic diesel with ILUC

- Similar to 6, but more CNG vehicles are included so less biofuels are required

Scenario E – One Pool

- Gasoline pool reductions achieved mainly through the use of in-state produced cellulosic ethanol (on top of existing Northwest corn ethanol and waste berry ethanol production).
- Plug-in vehicle populations double the BAU
- Diesel pool reductions achieved mainly through the use of in-state produced cellulosic diesel, new waste oil biodiesel capacity and imported camelina renewable diesel.
- Light-duty diesel populations increase, CNG populations increase

Scenario F – Mixed Biofuels without ILUC, high oil prices (Runs 3H+8H)

- Similar mix of fuels as Scenario C, but with higher oil prices (A new BAU was run as well)

Scenario G – Mixed Biofuels without ILUC, low oil prices (Runs 3L+8L)

- Similar mix of fuels as Scenario C, but with lower oil prices (A new BAU was run as well)

Scenario H – Cellulosic Biofuels with ILUC, Out-of-State (Runs1H+6H)

Run 1H – Cellulosic Ethanol with ILUC (Produced Out-of-State)

- In addition to Northwest corn ethanol and waste berry ethanol, compliance with standard achieved through use of out-of-state cellulosic ethanol.
- If more ethanol is needed to reach total RFS2 proportional share volumes, it comes from Midwest corn.

Run 6H – Cellulosic biodiesel with ILUC (Produced Out-of-State)

- Compliance achieved through the use of out-of-state cellulosic diesel and new in-state waste oil biodiesel capacity, existing in-state canola biodiesel.