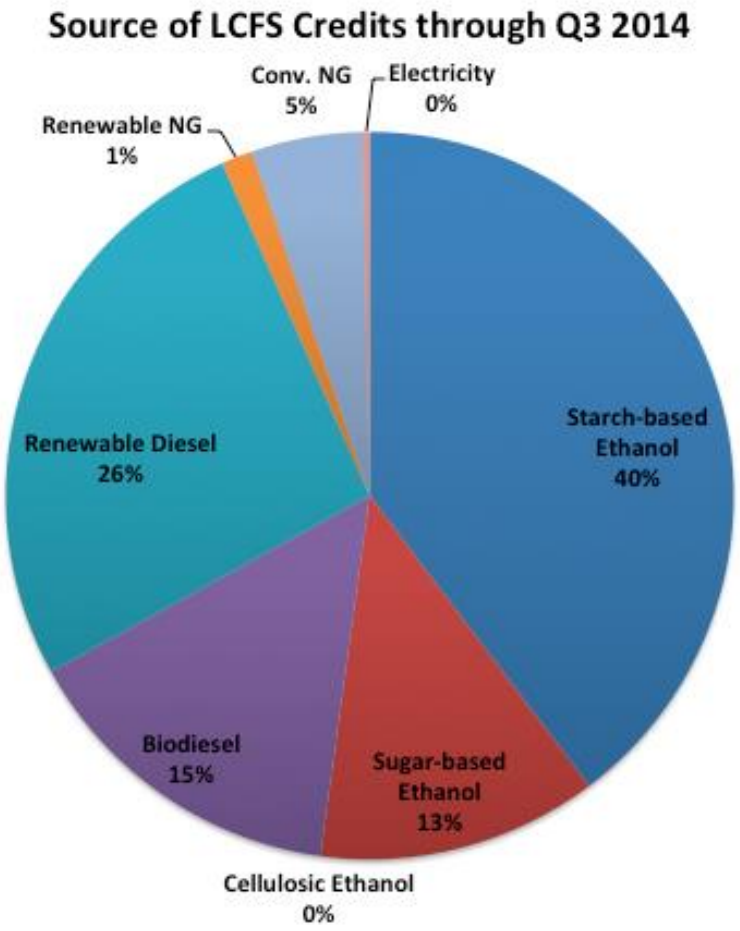
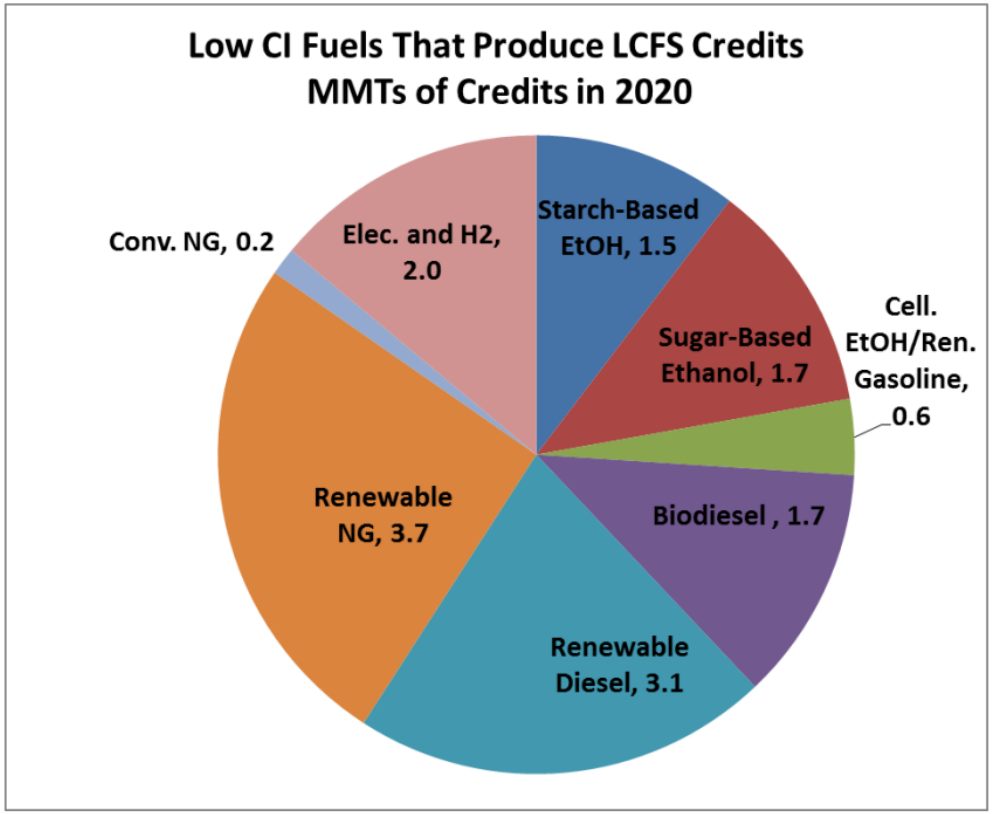
Who is E2?

- Environmental Entrepreneurs (E2) is a national community of individual business leaders who advocate for good environmental policy while building economic prosperity
  - 850 members across the country
- Non-partisan, working on state and federal issues
- Non-profit, very small full-time staff
- Our members see the economic and environmental potential of clean fuels

Diversifying our fuel mix



Source: California Air Resources Board



Feasibility and Price

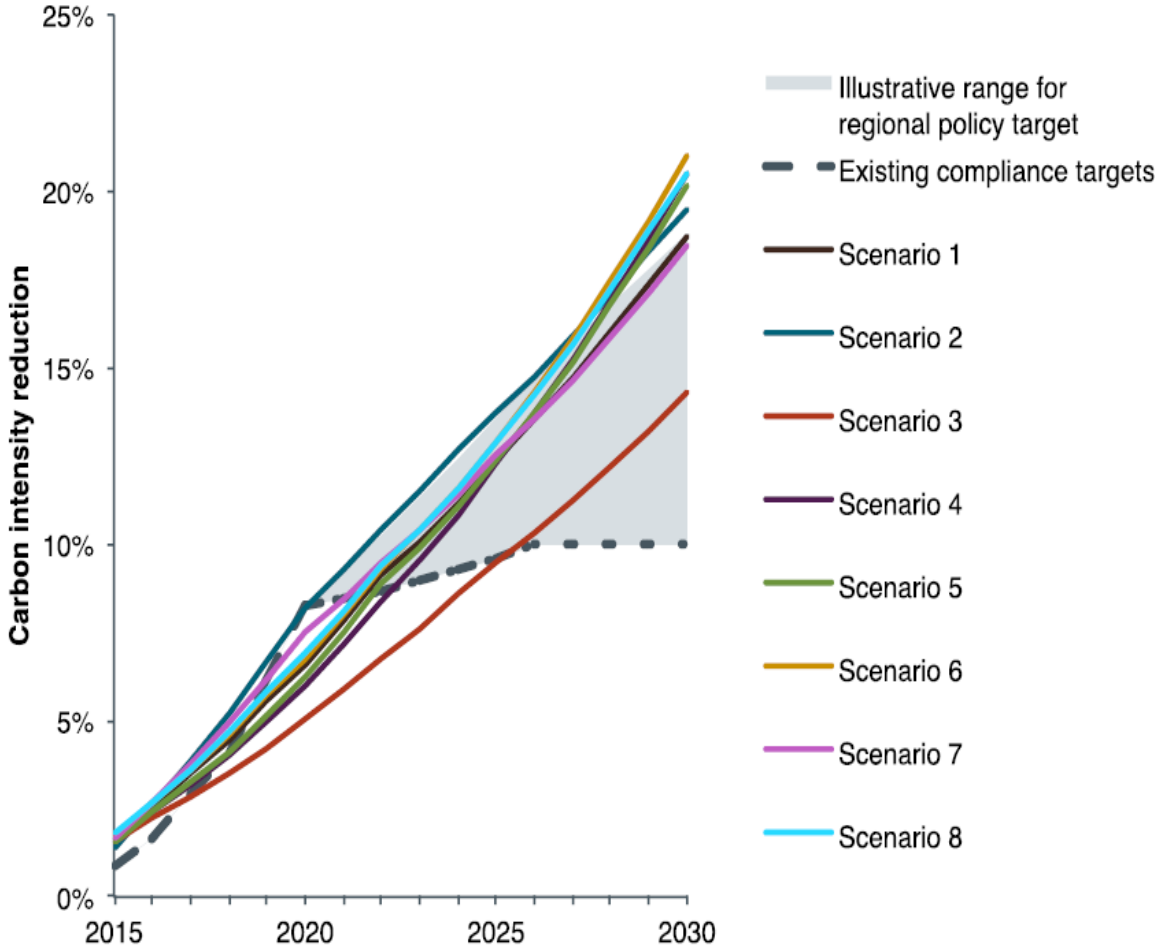
- California 2014 total credits banked = 4 MMT
  - Less than 1¢ per gallon (UC Davis)
- Oregon 2025 credits needed = 2 MMT

Pacific Regional Low Carbon Fuel Study

- Performed by the International Council on Clean Transportation and E4Tech, with assistance from UC Davis Policy Institute for Energy, Environment and the Economy.
- Drew from over 30 local or technology-specific fuel supply assessments.
- Combined pathways in Argonne National Labs' VISION model to develop regional supply assessment.
- 20+ independent experts in the Stakeholder Advisory Group.

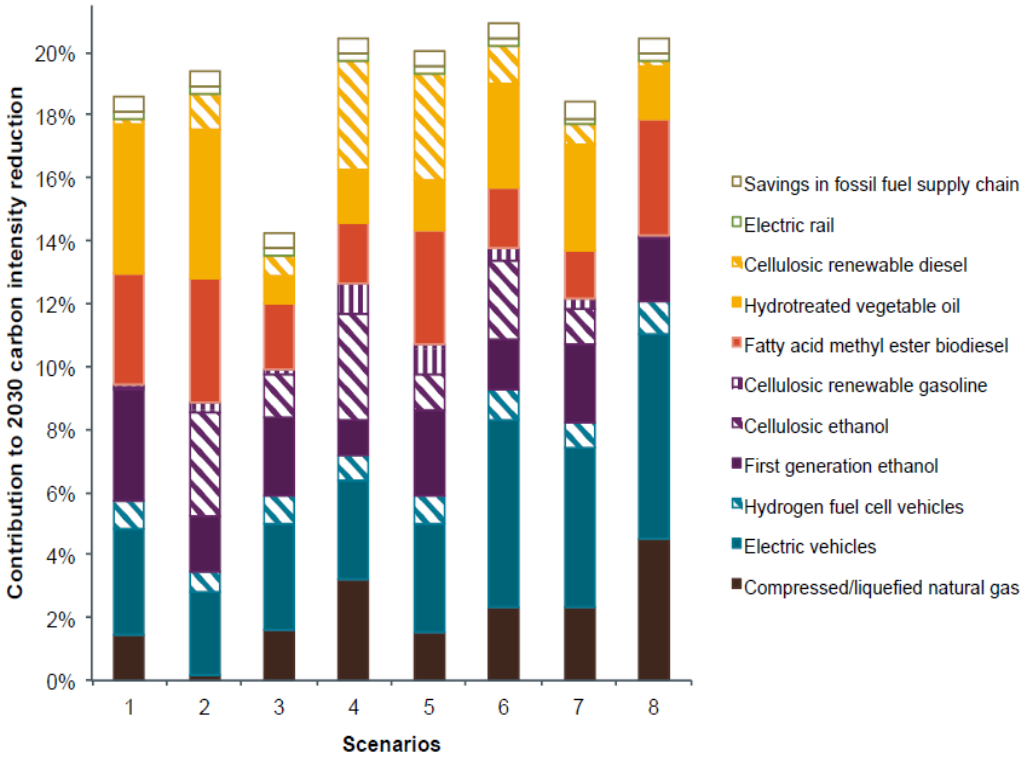
Pacific Study: Results

- All scenarios meet goals of at least 10% carbon reduction.
- Scenarios also show that 14% - 21% carbon reduction can be achieved in the long-term (2025-2030), exceeding existing goals.
- But investment and steady policy is required to expand alt-fuel market.



Pacific Regional Study: Results

- Wide variety of ways to achieve the goal.
- No single technology is required to develop at high rates to meet targets.
  - Flexibility allows market to pick the best solution.
- Cellulosic fuels not required to attain goals, but are very helpful.
- Electric Vehicles likely to be major component of compliance.



ES.II. Fuel carbon intensity reductions by 2030 from eight alternative fuel deployment scenarios for the Pacific Coast region (British Columbia, California, Oregon, Washington)

Pacific Regional Study Conclusions

- Assuming continued policy support, there will likely be a sufficient supply of low carbon fuels to meet PCC jurisdictions low carbon fuel goals.
- Regional adoption of CFP could reduce petroleum consumption (gasoline & diesel) by 25%.
- Depending on combination of fuel pathways utilized, this could result in reduced GHG emissions by 14-21%
- This matches the experience seen in California, so far.

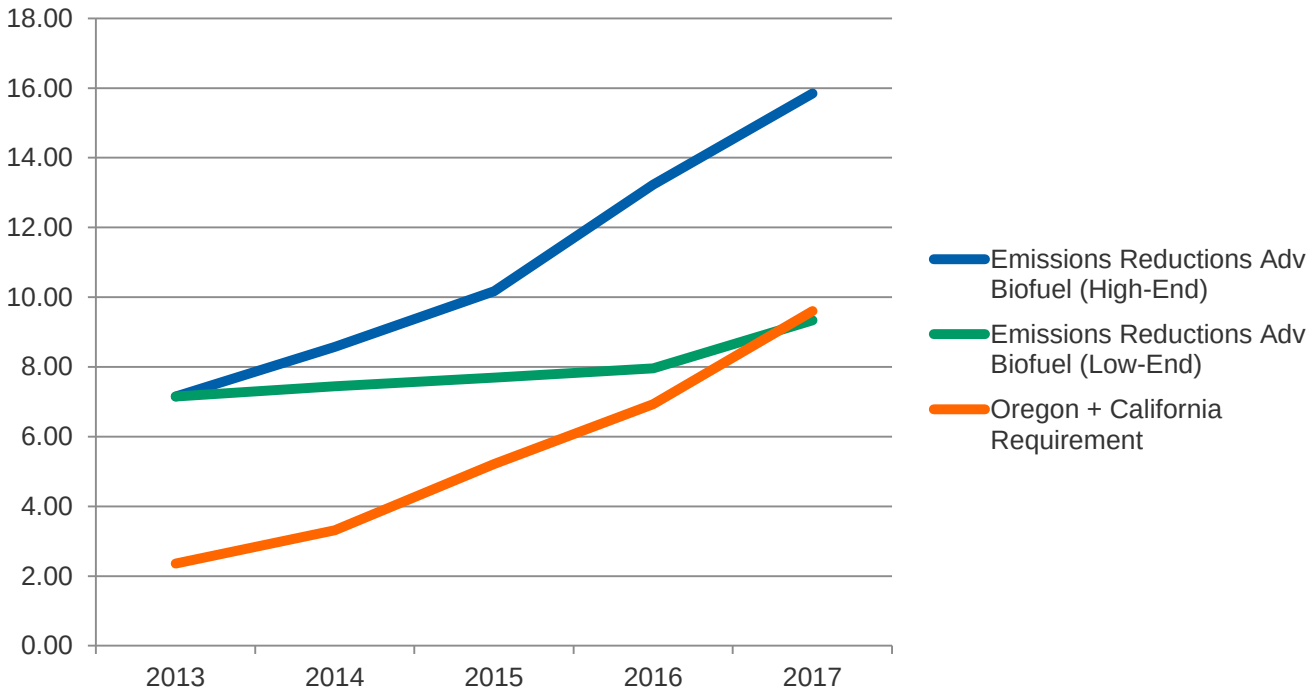
Bottom-up assessment of advanced biofuels

Domestic Advanced Biofuel Capacity
In millions of gallons/year

	2014		2015		2016		2017		Number of Companies	
Fuel type	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	Low	High
Biodiesel	512	619	512	748	512	904	512	1,094	123	123
Drop-in	214	216	214	216	309	326	319	347	15	27
Ethanol	58	57	97	97	115	170	182	215	26	27
Other	2	2	2	2	20	20	60	60	1	3
TOTAL (volume)	**784**	**893**	**824**	**1,063**	**955**	**1,421**	**1,072**	**1,716**	**165**	**180**
TOTAL (gge)	**819**	**933**	**846**	**1,095**	**878**	**1,444**	**1,056**	**1,719**		

Applying E2 numbers to Metric Tons

Million Metric Tons of Reduction from E2-tracked Advanced Biofuels



A growing body of work

- Seven separate studies show an abundance of ways to comply:

Pacific Coast

1. ICCT & E4Tech Study (2015), Pacific Coast Collaborative

Oregon

2. ICF International (2014), Oregon DEQ
3. TIAX LLC (2010), Oregon DEQ

California

4. Promotum (2015), NRDC/EDF,UCS
5. ICF International (2013), CalETC, E2, CNGVC, CERES, CBA, ABFA
6. Tetratech (2013), NRDC

Washington

7. Lifecycle Associates (2014), WA OFM

CFP Adoption

- Oregon's Clean Fuel Program is a reasonable, conservative approach to reduce petroleum use in the state.
- 10% reduction in 2025 for fuel
  - 25% reduction in 2025 for electricity

E2 Study

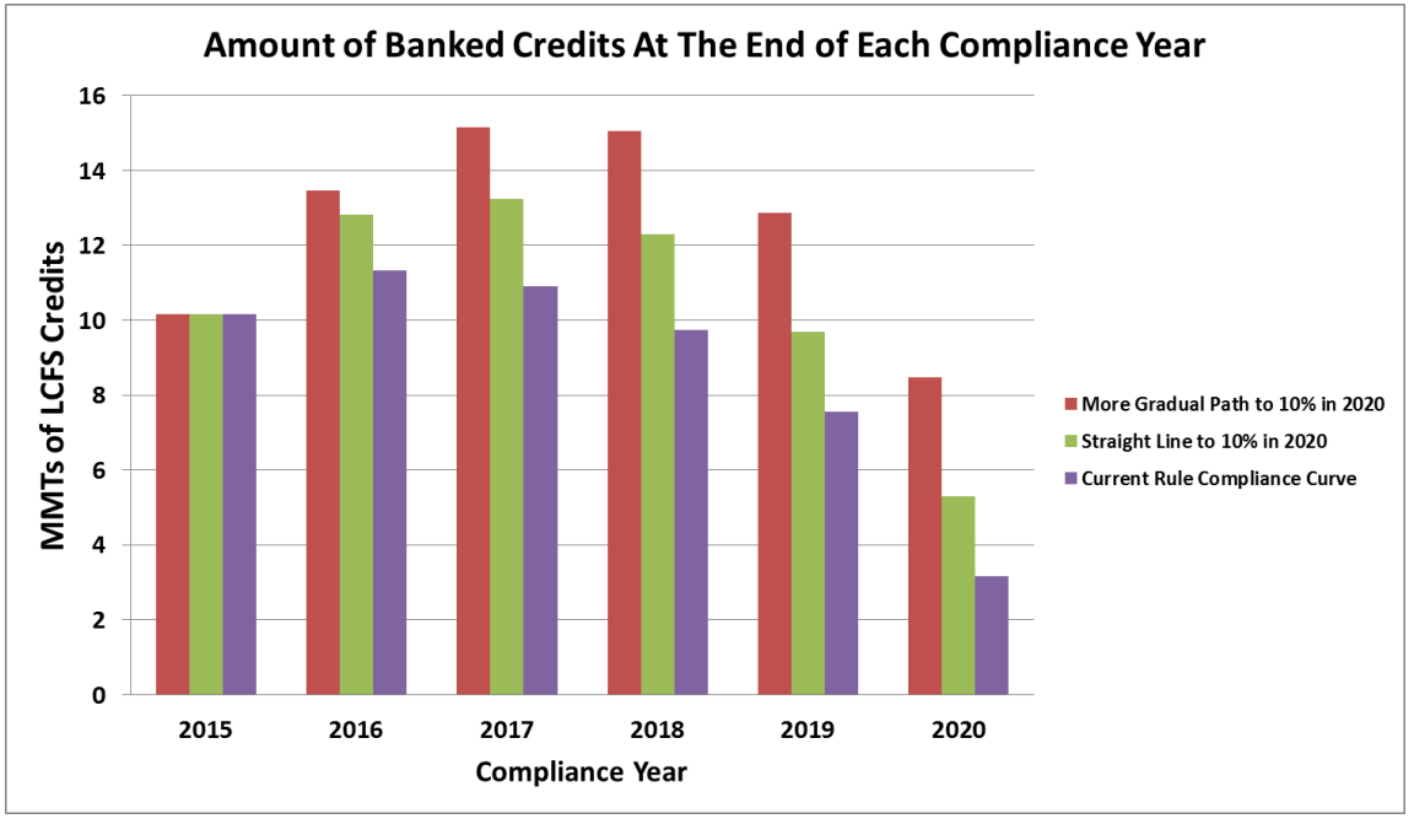
Million Metric Tons of Reduction from E2-tracked Advanced Biofuels

	2013	2014	2015	2016	2017
California + Oregon Requirement (MMT CO2e reduction)	2.36	3.31	5.21	7.03	9.62
Emissions Reductions Adv Biofuel (Low-End)	7.15	7.44	7.69	7.96	9.34
Emissions Reductions Adv Biofuel (High-End)	7.15	8.57	10.17	13.23	15.84
Difference (Low-End)	4.79	4.13	2.48	0.93	-0.29
Difference (High-End)	4.80	5.26	4.96	6.20	6.22

All units in Millions of Metric Tons (MMT)

Sufficient Buffer

Proposed ARB compliance paths and banked credits estimated to comply with LCFS



Source: California Air Resources Board

Understanding Carbon Intensities

	Carbon Intensity Score (grams CO2e/MJ)	Carbon Reductions (kg CO2e/gallon ethanol)	Volume	Carbon Reductions (MT CO2e/MG)	Gallons for one LCFS credit (metric ton CO2)
OR Gasoline blendstock	89.3				
Corn Ethanol (California Low CI)	80.7	0.7	1,000,000	693	1,442
Cellulosic Ethanol	23.4	5.3	1,000,000	5,310	188

Oregon CFP = ~ 2 million metric tons in 2025
California LCFS = ~ 17 million metric tons in 2020