

FAA CENTER OF EXCELLENCE FOR ALTERNATIVE JET FUELS & ENVIRONMENT

ASCENT 01

National and Regional Law and Policy Drivers for Alternative Jet Fuel

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Task 1.4.1 – National & Regional Surveys of Biofuel Law & Policy



- **Objective:**

- Conduct a survey and summarize current and proposed state and federal biofuel law and policy
- Talked through a number of these in October 2018 at ASCENT project meeting

- **Current Tasks:**

- Publication of three regional white papers (Hawaii, Southeast, West) describing biofuel law and policy in each region, with attention to federal standards as well
- White papers to be submitted for review shortly

The big picture for law & policy:



- Nationally, changes in law and policy create an uncertain environment
- Federal Renewable Fuel Standard (RFS) set yearly; requirements hard to predict, leads to uncertainty
- States are employing various methods to meet federal, regional, and state mandates and agreements

Federal RFS standards one key



- Federal Renewable Fuel Standard (RFS)
 - Requires US transportation fuel to contain a minimum volume of renewable fuel
 - Established by the Energy Policy Act of 2005; expanded by the Energy Independence and Security Act (EISA) of 2007
 - Began with 4 billion gallons of renewable fuel in 2006 and aims to reach 36 billion gallons in 2022
 - After 2022, EPA has statutory authority to determine volume
 - The total renewable fuel target consists of both conventional biofuel and advanced biofuel

Federal statutory targets have not been met

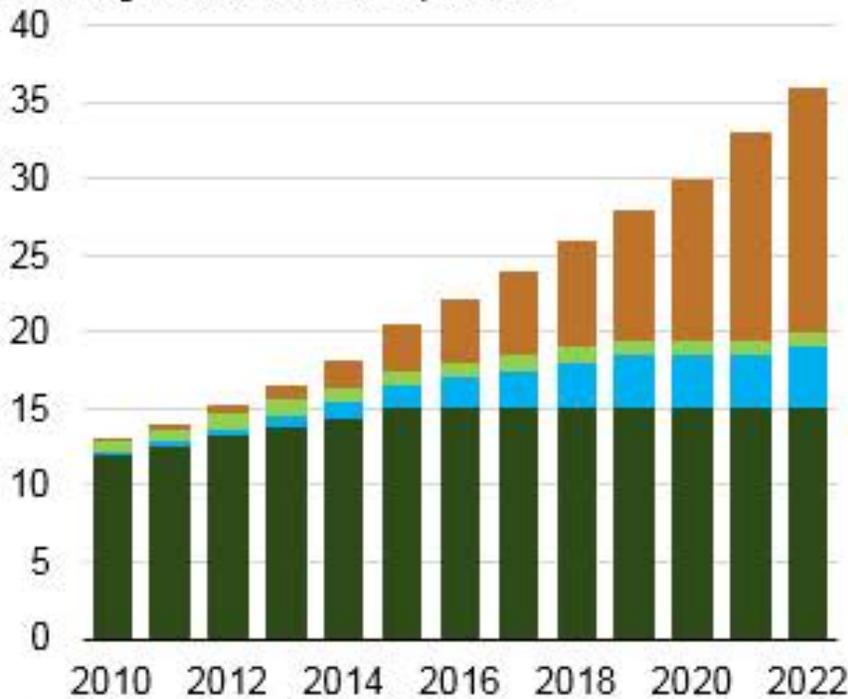


- Federal RFS, continued.
 - Since 2014, the total renewable fuel statutory target has not been met, with the advanced biofuel portion falling below the statutory target by a large margin since 2015
 - EPA reports that in early 2019, it will issue a rulemaking that proposes to modify (or “reset”) the cellulosic biofuel, advanced biofuel, and total renewable fuel volume targets for the years 2020-2022
 - Challenges to implementation:
 - Infrastructure
 - Technology
 - Limited federal assistance
 - Delays in EPA approval of fuel pathways
 - Lack of cellulosic biofuel production

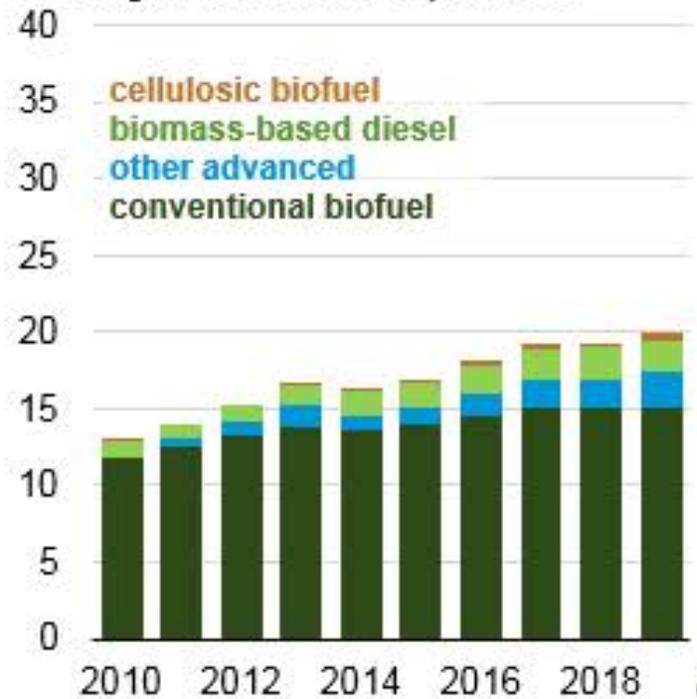
Statutory mandates (left graphic) EPA rulemaking waiver for required volumes much lower (right graphic)



EISA 2007 volume standards (2010-2022)
billion gallons, ethanol equivalent



RFS volume requirements (2010-2019)
billion gallons, ethanol equivalent



Source: U.S. Energy Information Administration, based on U.S. Environmental Protection Agency's Renewable Fuel Standard program

Note: Data for biomass-based diesel are actual gallons, not ethanol equivalent.

EPA issued final rule for 2019 RFS on 11/30/2018: <https://www.eia.gov/todayinenergy/detail.php?id=37712>

- 3% higher than 2018 mandate
- 30% lower than statutory volume (esp. cellulosic biofuel)

Federal policy for forests another key

- Federal forest policy has shifted over time:
 - Custodial management (1905-1945)
 - Production of wood products (1945-1985)
 - A still evolving form of ecosystem management (1985-?)
- Court battles in 1980s, 1990s
 - Endangered Species Act, timber management
 - Between 1989 and 2004, timber sales on all public lands fell more than 80%, from about 50 billion m³ to between 9-13.5 billion m³
- Need for a different approach?



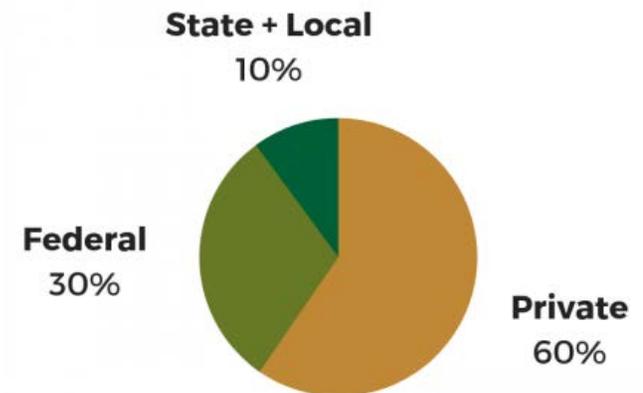
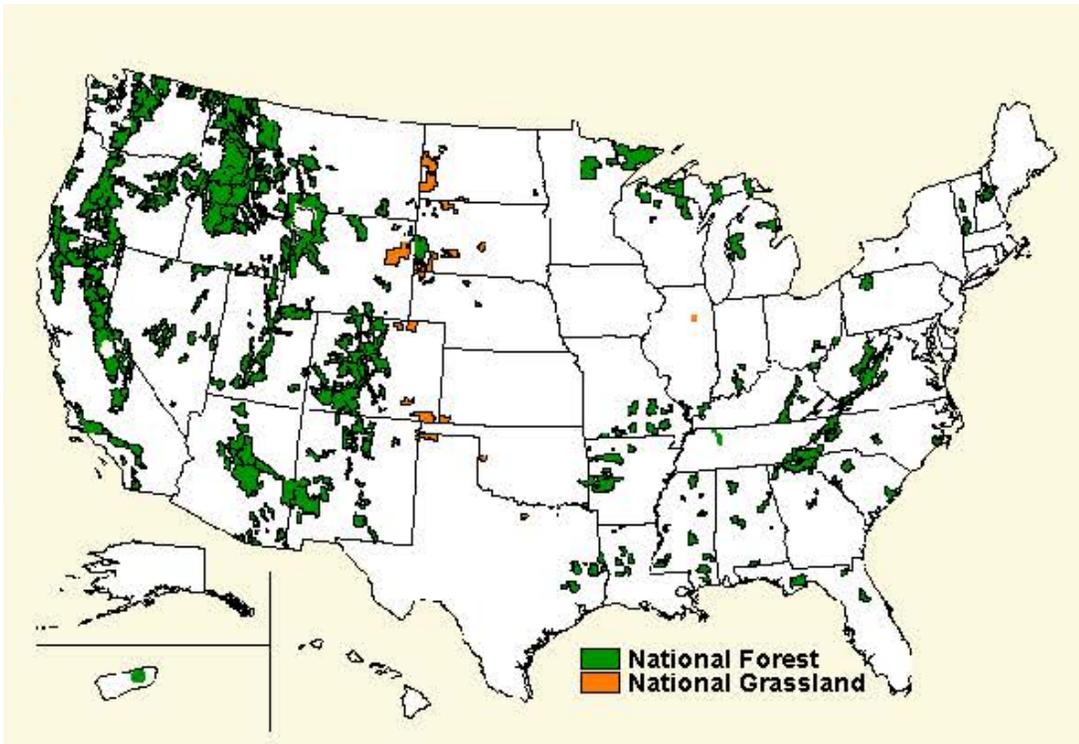
<https://www.sfgate.com/news/article/bark-beetles-California-dead-trees-fire-risk-7390544.php>



Ferguson Fire near Yosemite, 2018
(<https://www.usatoday.com/story/news/2018/08/08/fire-near-yosemite-devastating-merchants-tourism-economy/941677002/>)

Federal policy for forests another key

- Any wood-based renewable fuels from federal forests explicitly prohibited to meet renewable fuel standards (doesn't apply to private or state/local forest lands)
- Express limitations in statutes:
 - Renewable Fuel Standard (RFS)
 - Biomass Crop Assistance Program (BCAP)



**FORESTLAND OWNERSHIP
IN THE UNITED STATES**

Data Source: FIA 2012

Presented state policy focus areas at October 2018 ASCENT meeting



- Regions of focus offer three different trends:
 - Hawaii: focused on 100% renewable goals by 2045
 - Pacific Northwest: regional agreements across west coast, Canadian provinces
 - Southeast: strong policy support from 2006-2013, less support now

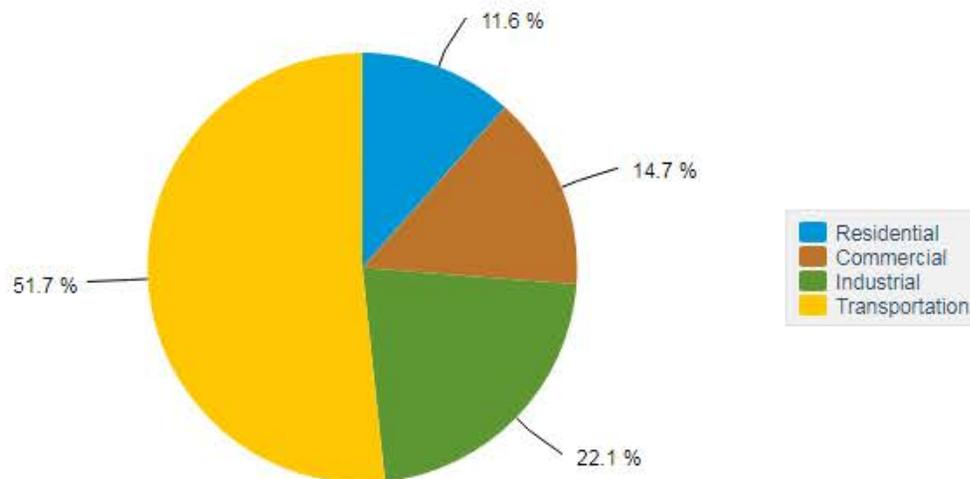


Hawaii Update

- Energy consumption dominated by transportation, but focus of Renewable Portfolio Standard (RPS) on providing renewables for electricity generation

Hawaii Energy Consumption by End-Use Sector, 2016

 DOWNLOAD



 Source: Energy Information Administration, State Energy Data System

Hawaii's RPS (2015)

- Requires each utility company to establish renewable portfolio of:
 - 20% of its sales by 2020
 - 40% of its sales by 2030
 - 70% of its sales by 2040
 - 100% of its sales by 2045
- Includes biomass crops and municipal solid waste as eligible renewable energy sources
- Excludes aviation

Hawaiian Energy CO's Energy Portfolio (main focus= electricity generation)

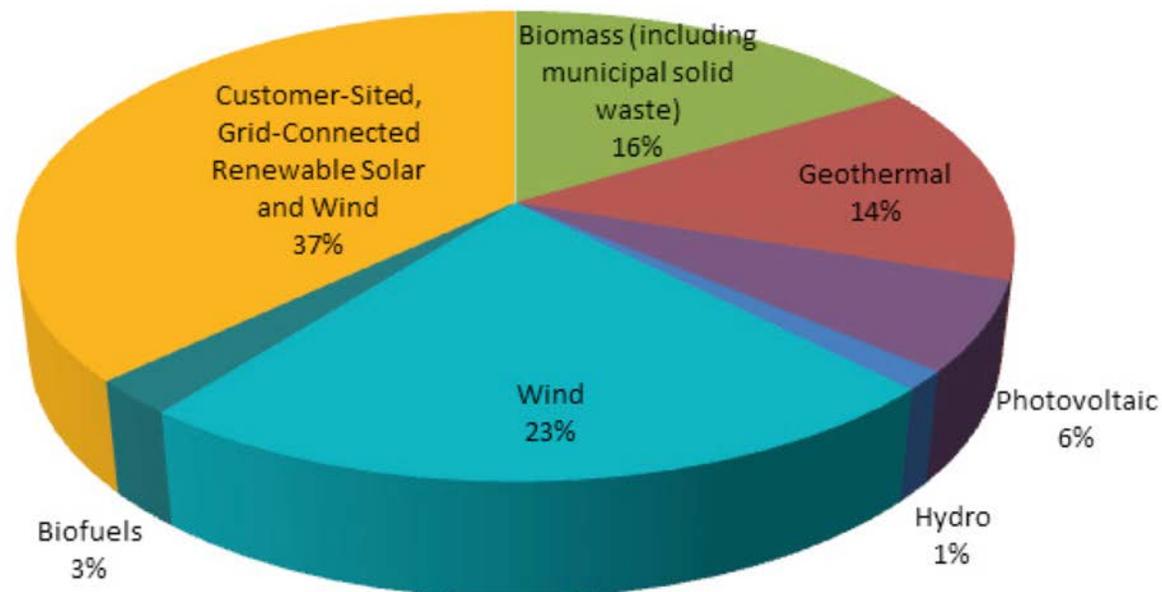


Hawaiian Electric Companies achieve 27 percent renewable energy in 2018 despite loss of geothermal

HONOLULU, Feb. 26, 2019 – The Hawaiian Electric Companies achieved a consolidated 27 percent renewable portfolio standard in 2018, even with the loss of Hawai'i Island's geothermal resource for most of the year following the Kīlauea volcanic eruption.

https://www.hawaiianelectric.com/documents/about_us/news/2019/20190226_hawaiian_electric_companies_2018_rps.pdf

Renewable Energy Portfolio



<https://www.hawaiianelectric.com/clean-energy-hawaii/clean-energy-facts>

Since October, researched Hawaii's Waste to Energy Program



- Hawaii's Waste-to-Energy Program
 - Not direct ecosystem service, could be considered indirect ecosystem benefit
 - Preserves landfill space
 - Prevents creation of another landfill
 - Aids in finding recyclable materials (metals) in landfill
 - One of Oahu's waste-to-energy facilities, H-POWER, processed more than 700,000 tons of municipal solid waste in 2017:
 - Converted 507,000 tons to electricity
 - Sent 22,000 tons of metal to recycling
 - Sent 170,000 tons of non-combustible material to landfill

Contractual obligations = policy and fiscal challenge



- Honolulu and H-POWER under contract:
 - Honolulu required to deliver a certain tonnage of waste to H-POWER facility each year
 - If required tonnage not sent, city must pay penalties to H-POWER
- Impact of change to contractual provisions:
 - Prior to 2013, Honolulu guaranteed delivery of 561,600 tons of waste to H-Power
 - Increased to 840,000 tons of waste per year after installation of a third boiler in 2013
 - Due to failing to meet delivery requirements between 2013-2016, Honolulu had to pay penalties of over \$6 million

To address transportation, support for liquid biofuel production as well



Example programs in Hawaii:

- **Alternative Fuel Standard Development**
 - Requires 20% of highway fuel demand be from alt. fuels by 2020 [30% by 2030]
- **Biofuels Production Land Use Allowance and Exemption**
 - Allows land zoned as ag land use district for renewable energy production, storage and distribution, including biofuels
- **Energy Feedstock Program**
 - Helps promote/support production of energy feedstock used to produce biofuels
- **Biofuels procurement preference**
 - Preference for state/county agencies to purchase biofuel or blend of biofuel/petroleum
- **Barrel tax**
 - Enacted in 1993, provides \$1.05/barrel on import/use of petroleum based fuels; meant to incentive use of alternative or biofuels. Significant funding: \$25 million annually.

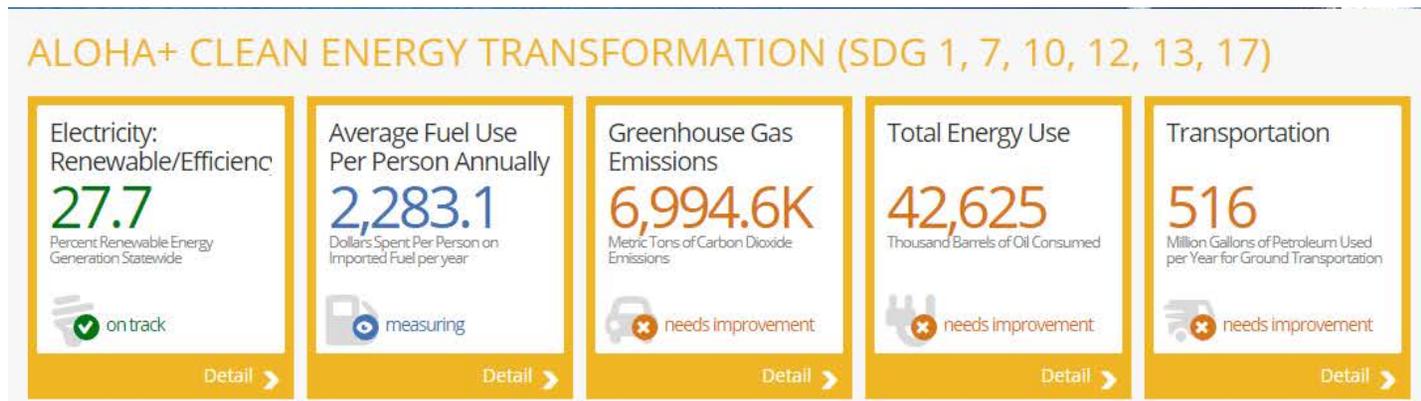
Support through NGOs for alt. fuels



Sustainable Transportation Coalition of Hawaii= ground transportation

Hawaii Green Growth = meeting sustainable development goals, tracking progress through dashboard, focusing on clean energy transformation, reducing greenhouse gas

The screenshot shows the website for the Sustainable Transportation Coalition of Hawaii (STCH). The logo features a globe with icons for a car, a train, and a bicycle. The text reads: "Sustainable Transportation Coalition of Hawai'i" and "A U.S. DEPARTMENT OF ENERGY CLEAN CITIES COALITION". Below the logo is the tagline "Accelerating Hawaii toward Sustainable Transportation" and a navigation menu with links for Home, Alternative Modes, Electric Vehicles, Alternative Fuels, Stakeholders, and About STCH. The word "BIOFUELS" is prominently displayed in the center.



<https://dashboard.hawaii.gov/aloha-challenge>

Aviation = big part of transportation demand in Hawaii



Need for alternative jet fuel

- Commercial airlines = 650 million gallons of jet fuel/year
- At groundbreaking ceremony in Oct. 2018 for new refinery meant to produce cleaner fuels, “The governor added that the airline industry is committed to be part of the solution and would certainly consider alternative fuel options. ‘Quite frankly they just don't have an alternative that is economically viable for the industry,’ he said.”

<https://www.bizjournals.com/pacific/news/2018/10/11/hawaii-refinery-breaks-ground-on-new-27m.html>

Switching regions→ western US/ Canada



Western Climate Initiative (WCI)

- Original agreement between Arizona, British Columbia, California, Manitoba, New Mexico, Oregon, Utah, and Washington
 - Now includes 7 western states, British Columbia, Quebec, Manitoba
 - Goal: “reduction of regional greenhouse gas emissions by 15% below 2005 levels by 2020”
- Relies on a cap-and-trade program to target emissions reductions
 - Excludes emissions from combustion of biomass, biofuel, pure biofuels, or proportion of carbon dioxide emissions from the combustion of biofuel in a blended biofuel
 - Indirectly promotes consumption of biofuels and supports federal Renewable Fuel Standard’s goals by helping to promote biofuel production and consumption in member jurisdictions
- Active market & trading: Feb. 2018 action raised \$1.6 billion for linked cap and trade auction between California, Quebec & Ontario
 - Robust market: withstood Ontario’s withdrawal in 2018

Western Regional Efforts, cont.



Pacific Coast Collaborative

- 2013 regional partnership between California, Oregon, Washington and British Columbia, and several western cities
 - Agreement to strategically align policies to reduce greenhouse gas emissions, promote clean energy.
 - Overall goal of reducing greenhouse gas emissions by 80% by 2050
- Working to create a low-carbon economy by use of low-carbon transportation fuels such as conventional biofuels, natural gas, and advanced cellulosic biofuels.
- Recent study: policy targets established or proposed by region's state/ provincial governments for fuel carbon intensity reductions can be met by using biofuels, electric vehicles and natural gas-powered vehicles

Tennessee: example of early policy support and more recent challenges



- Tennessee Biofuel Policy
 - In the early 2000s, Tennessee came out with full and strong support for the biofuels industry
 - **2006**: Governor Phil Breden signed Executive Order 33, creating the interagency Tennessee Alternative Fuels Working Group
 - **2007**: the Governor announced \$72.6 million to support the Tennessee “Biofuel Initiative” at the University of Tennessee with an additional \$135 million in federal funding to Oak Ridge National Laboratory
 - **2008**: Executive Order 54 established the “Governor’s Task Force on Energy Policy” which created further support for alternative fuels

Tennessee, cont.



- Tennessee Biofuel Policy
 - **2009:** Tennessee received funding for DOE’s Clean Cities program for “biofuel fueling infrastructure grants” – resulting in the “Biofuel Green Island Corridor Network”
 - **June 2014:** Tennessee is part of the longest biofuels “green” corridor from Florida to Michigan with E85 biofuel or B20 biodiesel fueling stations at least every hundred miles along I-75
- Despite early projects and advancements, industry support within the state has decreased due to funding issues, lack of infrastructure, and political changes

Task 1.4.1 – National & Regional Surveys of Biofuel Law & Policy

- **Future Plans:**

- Compile the information and research gathered from tasks 1.4.1 and 8.1 (focused on biomass and water quality in the Chesapeake Bay watershed) and produce a journal article for publication
- Expand upon the three regional overviews to explore law and policy drivers in additional areas of interest for the ASCENT program and look at additional environmental service and credit-trading markets

Task 1.4.3 – Help Support Stakeholder Engagement Efforts



- **Objective:**
 - Facilitate dialogue between producers, industry, government and other affected stakeholders

- **Current Tasks:**
 - Help support various teams as needed

 - We presented on stakeholder engagement to the ASCENT 01 group on 4/30/2018

Task 1.4.3 – Help Support Stakeholder Engagement Efforts



- **Future Plans:**

- Moving forward, we'd like to work on identifying potential stakeholders and developing guidelines for facilitating discussions among various stakeholders
- We plan to provide additional presentations to the project partners on facilitation skills and tactics
- Additional support for the regional projects will be offered for facilitation and stakeholder engagement sessions as the regional projects move to the deployment stage

Schedule and Status



- **Spring 2019:**
 - Publication of three regional white papers to the ASCENT 01 partners (broader publication after internal ASCENT approval is received)
- **March/early April 2019:**
 - Call with Tennessee team re: Tennessee stakeholder meeting
- **Summer 2019:**
 - Compilation and submission of biofuel law & policy journal article for publication

Questions?

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