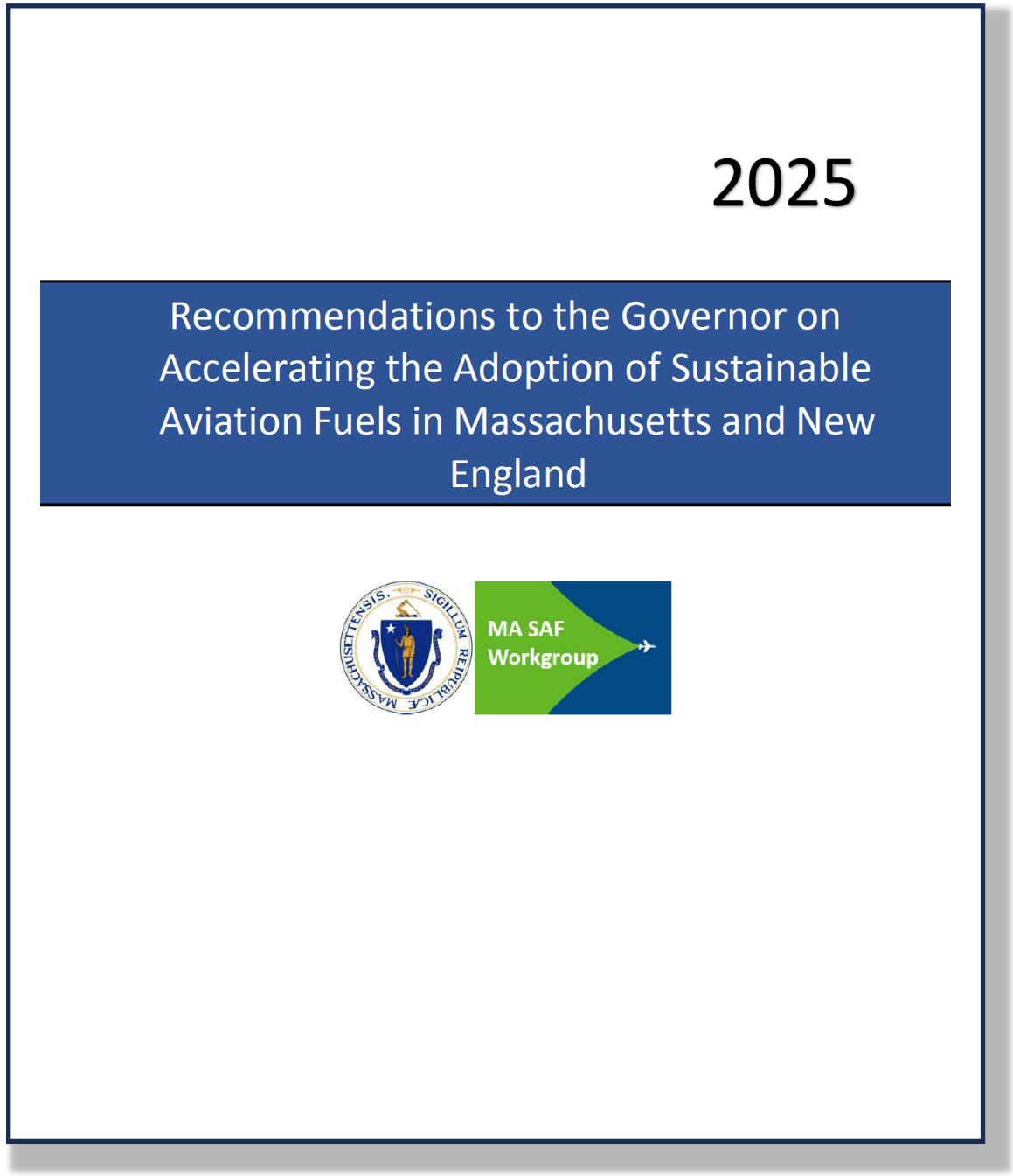
Review of Massport-led Report on Sustainable Aviation Fuels

- *What is it about?*
- *What does it recommend?*
- *Will it improve GHG impacts?*
- *What will happen?*



Reason for SAF Workgroup Report

- *Aviation GHG impacts are large and growing*
- *GHG growth is incompatible with state law and plans*
- *Growth plans for private luxury jets are particularly egregious (high impact – no public benefit)*
- *Intended to allow growth plans and dismiss concerns of*
  a) *The public*
  b) *Legislators and the Governor*

SAF is about "maintaining our license to grow; perhaps maintaining our license to exist!"

What does the Report recommend?

1. *SAF as the way to reduce aviation impacts*
2. *That Massachusetts and Massport lead adoption and innovation*
3. *The use of State subsidies to encourage adoption*

The Report hopefully suggests that SAFs "have the potential to reduce lifecycle aviation emissions to near zero by 2050."

The report does not explain whether this is possible. Independent research does not agree.

GHG emissions of SAF

- *SAF and fossil jet fuel emit the same amount of CO_2 when burned*
- *Proposed benefit of SAF is that its production ABSORBS some of the CO_2 that is later emitted*
- *CO_2 can be absorbed by biological absorption during feedstock growth (like crops), or by direct air capture of CO_2*
- *Processing steps of SAF add to GHG emissions*
- *The net GHG reduction of SAF varies depending on many factors, and can be negative (**making CO_2 worse**!!)*

Will SAF reduce GHG impacts?

- *SAF only makes any sense if it reduces impacts*
- *Current impacts:*
  - *Boston CO_2: 6 megatons **decreasing to 2** by 2040*
  - *Mass. Jet aviation CO_2: 6 megatons **increasing to 7** by 2040*
  - *Hanscom is projected to emit more CO_2 than the four HATS Towns added together*
- *Report sets jet impact reductions as an aspiration, and warns that future innovation is necessary*
- *The report speaks about three types of SAF, which have different issues*
- *Unfortunately, published research shows none of the three approaches will reduce overall GHG impacts*

To understand this, each type of SAF must be examined separately

SAF from waste cooking oil and animal fats

- *How SAF is produced in small amounts today*
- *Requires the least processing to make jet (or diesel) fuel*
- *CO_2 reduction of 50% compared with fossil fuel*
- *Supply is tiny (<1%) compared with requirement*
  - *Global liquid fuel requirement:* ***4,500 million tons***
  - *Global waste cooking oil available:* ***15 million tons***

This is a dead-end approach that is not a solution and should not be subsidized

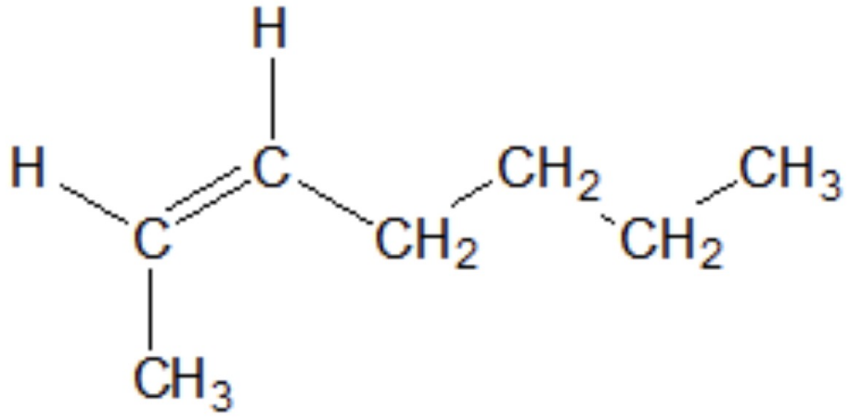
SAF From Crops

- *Dedicate cropland for fuel production, and harvest soybean, corn, switchgrass or other crops as feedstock*
- *Crop SAF uses a tremendous amount of cropland!* ***38,000 acres for a single passenger jet for a year!***
- *Incremental cropland requires forest cutting, resulting in loss of forest CO_2 sequestration*
- *CO_2 reduction of only 50% best case, but CO_2 increases if forest is cut*
- *While scalable, Workgroup report admits this type of fuel is not acceptable*

EU says: "fuels produced from food and feed crops are not eligible under the proposed ReFuel-EU Aviation."

Synthetic SAF From Energy (e-fuel)

- *The only type of SAF that can scale to demand*
- *Uses energy first to pull CO_2 from the air, and then to assemble hydrocarbons from Carbon and Hydrogen.*
- *<u>Extremely</u> inefficient*
- *Energy requirements are astronomical*



GHG reduction "cannot be done with bio-based fuel, it can only be done using e-fuels." Lufthansa CEO Carseten Sphor

What would be required to meet Mass Jet Fuel Requirements with e-fuel?

- *To replace 500 million gallons jet fuel per year (Mass current use) requires 52,000 gigawatt-hours of electricity per year*
  - *Equivalent to 10 of the retired Pilgrim Nuclear Plants*
  - *More than all the energy produced in Massachusetts today*
  - *If power comes from current grid supply mix, e-fuel would actually* ***increase*** *CO_2 emissions by 15 megatons/year*
- *We also need subsidies to bring the cost to fossil equivalence*
  - *Projected subsidy range of $2 to $10 per gallon = $1-5 billion per year*
  - *More than the entire Mass transport budget*

Huge subsidies for no GHG gains

- *It would be false and misleading to set the expectation that SAF will reduce jet GHG emissions*
- *Inefficient aviation, such as private jets, should be reduced and not be allowed to grow*
- *Aviation alternatives are the best path*
  - *Electric High-Speed Rail (can serve up to 1/3 of MA jet traffic)*
  - *Don't build capacity for or incentivize private luxury jets*

Sustainable aviation fuel is just greenwashing…it really is. It's nonsense, and I think somebody needs to say it for what it is." Breeze Airways CEO David Neeleman

For more information, upcoming report from the Institute for Policy Studies: "Barriers to Implementing Sustainable Aviation Fuel (SAF) in Massachusetts"