



กรมพัฒนาพลังงานทดแทน
และอนุรักษ์พลังงาน
กระทรวงพลังงาน

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Sustainable Aviation Fuel (SAF)





Important of SAF Policy in Thailand



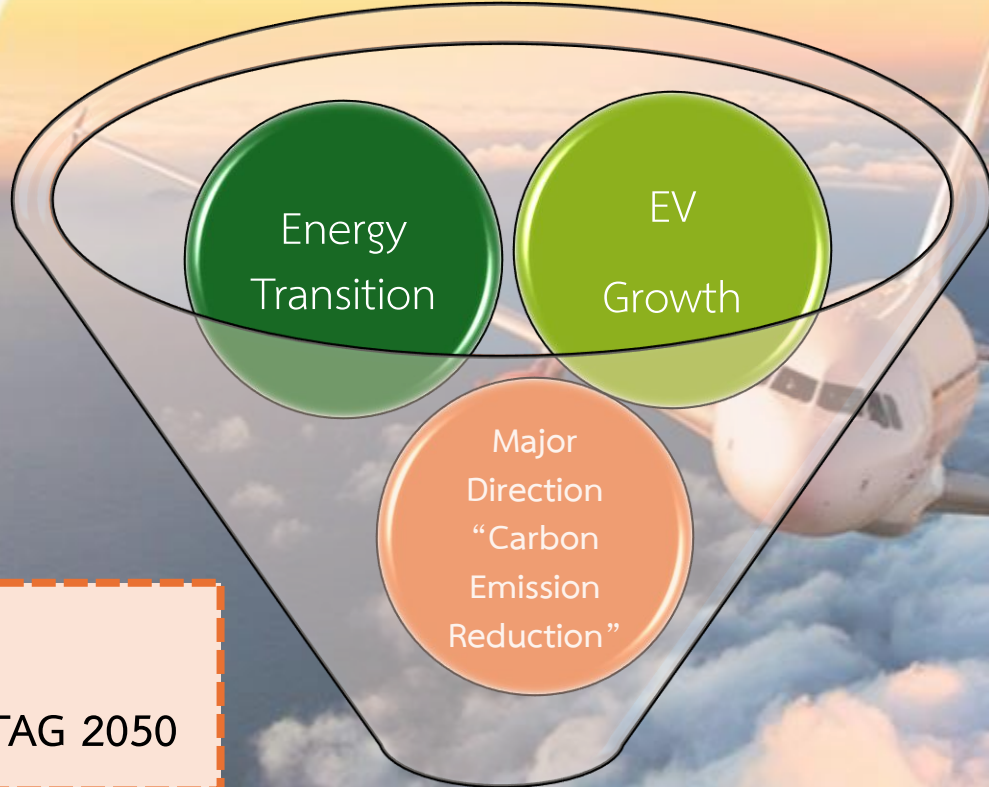
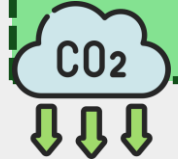
Feedstocks and Pathways in Thailand



Thailand's SAF Policy and Directions

Reasons for SAF production in Thailand

The transition to use of
Low Carbon Aviation Fuel
(LCAF)



EV ramp up policy made biofuels demand (Road sector) decrease and impact to usage of

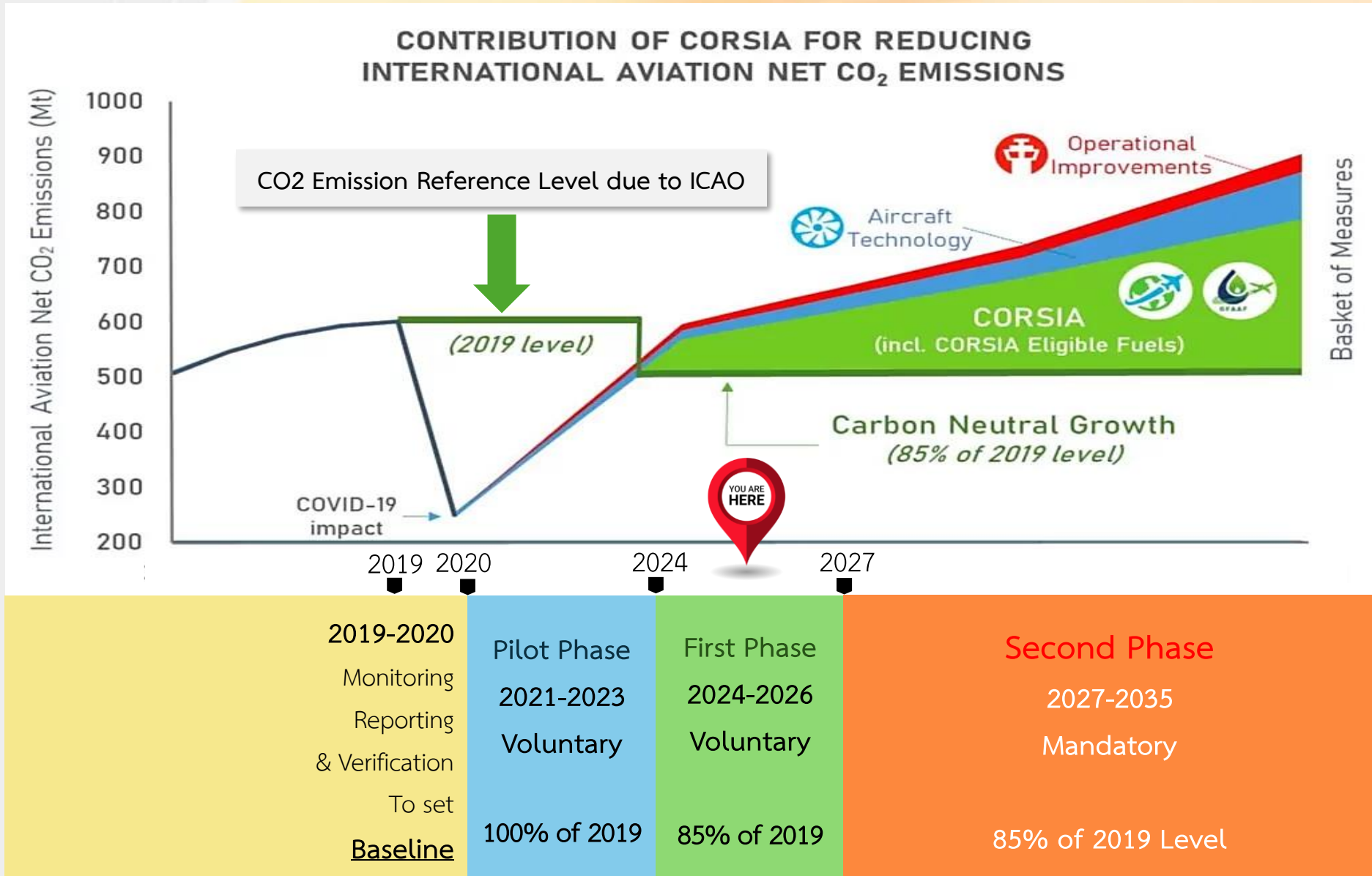
- Crude palm oil (CPO)
- Sugarcane and tapioca

Target
ICAO CORSIA & LTAG 2050

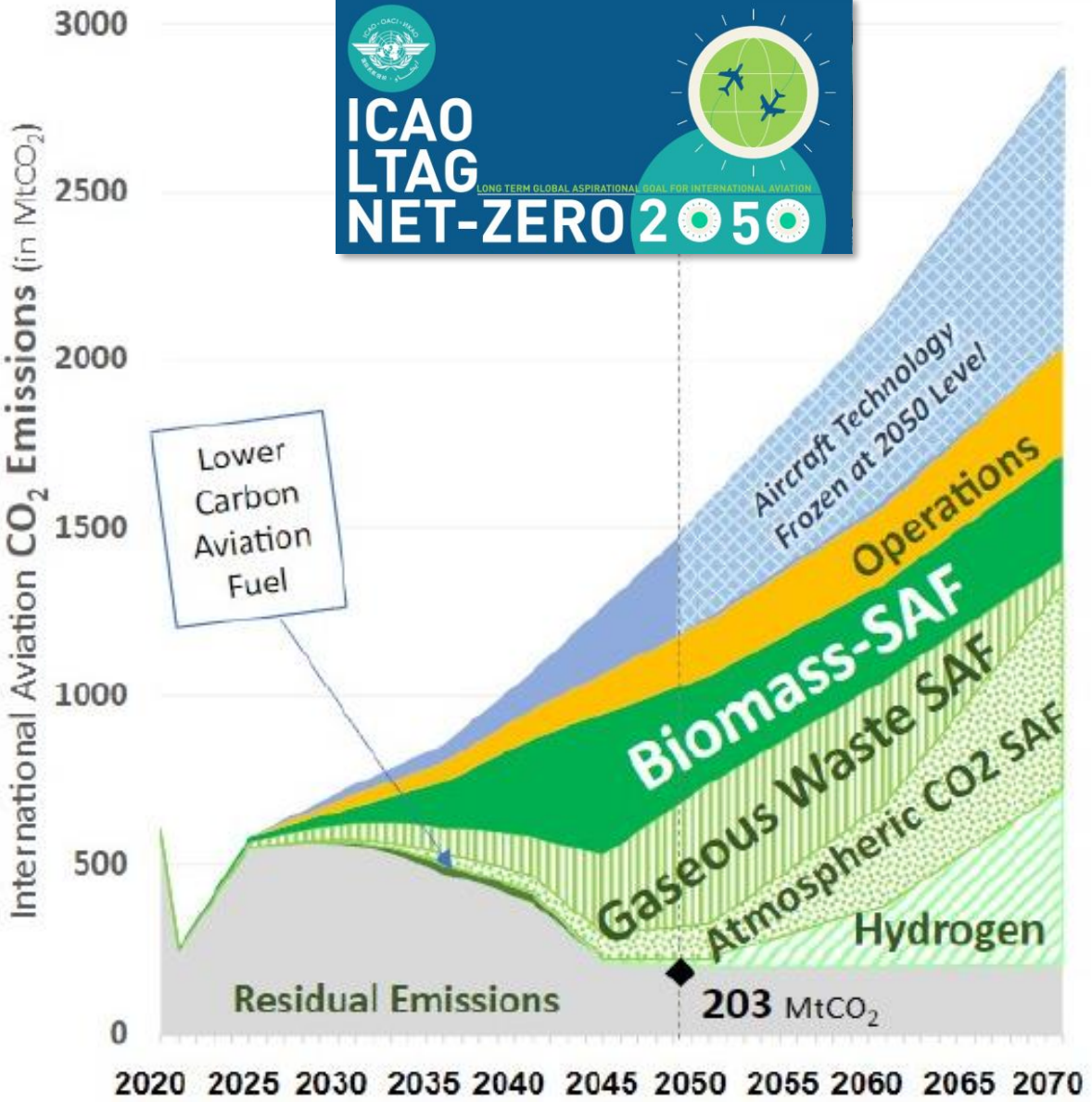


Sustainable Aviation Fuel (SAF)





ICAO CORSIA Basket of Measure



New Aircraft Technology



Operational Improvement



SAF + Low Carbon Aviation Fuel (LCAF)



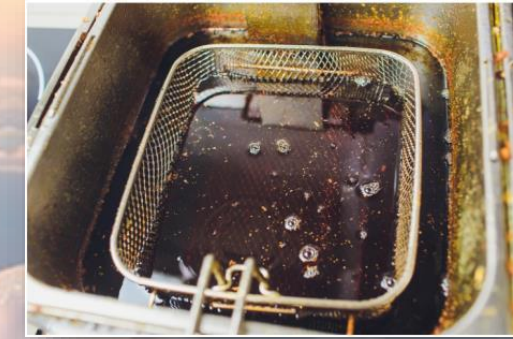
ICAO-CORSIA
eligible emission units
(Book & Claim Carbon Credits)

National Energy Plan and SAF Policy



ASTM reference	Conversion process	Abbreviation	Possible Feedstocks	Maximum Blend Ratio
ASTM D7566 Annex 1	Fischer-Tropsch hydroprocessed synthesized paraffinic kerosene	FT	Coal, natural gas, biomass	50%
ASTM D7566 Annex 2	Synthesized paraffinic kerosene from hydroprocessed esters and fatty acids	HEFA	Bio-oils, animal fat, recycled oils	50%
ASTM D7566 Annex 3	Synthesized iso-paraffins from hydroprocessed fermented sugars	SIP	Biomass used for sugar production	10%
ASTM D7566 Annex 4	Synthesized kerosene with aromatics derived by alkylation of light aromatics from non-petroleum sources	FT-SKA	Coal, natural gas, biomass	50%
ASTM D7566 Annex 5	Alcohol to Jet synthetic paraffinic kerosene	ATJ-SPK	Biomass from ethanol, isobutanol or isobutene	50%
ASTM D7566 Annex 6	Catalytic hydrothermolysis jet fuel	CHJ	Triglycerides such as soybean oil, jatropha oil, camelina oil, carinata oil, and tung oil	50%
ASTM D7566 Annex 7	Synthesized paraffinic kerosene from hydrocarbon - hydroprocessed esters and fatty acids	HC-HEFA-SPK	Algae	10%
ASTM D7566 Annex 8	ATJ derivative starting with the mixed alcohols	ATJ-SKA		
ASTM D1655 Annex A1	co-hydroprocessing of esters and fatty acids in a conventional petroleum refinery	co-processed HEFA	Fats, oils, and greases (FOG) co-processed with petroleum	5%
ASTM D1655 Annex A1	co-hydroprocessing of Fischer-Tropsch hydrocarbons in a conventional petroleum refinery	co-processed FT	Fischer-Tropsch hydrocarbons co-processed with petroleum	5%
ASTM D1655 Annex A1	co-hydroprocessing of biomass	co-processed biomass		5%

HEFA



Hydrogenated Ester and Fatty Acids
max. Blending 50%

ATJ



Alcohol to Jet Synthetic Paraffinic Kerosene
max. Blending 50%

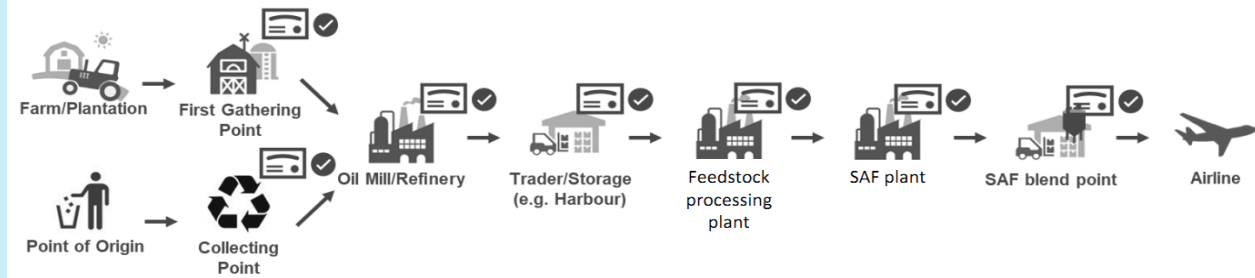
ICAO's Sustainability Criteria

Sustainability Themes

1. Greenhouse Gases (GHG)
2. Carbon stock
3. GHG reduction permanence
4. Water
5. Soil
6. Air
7. Conservation
8. Waste and Chemicals
9. Seismic and Vibrational Impacts (only for LCAF)
10. Human and labour rights
11. Land use rights and land use
12. Water use rights
13. Local and social development
14. Food security

Enforced
(2021-2023)

2024
onwards



Well-to-Flight of SAF Certification



Certification Body was Approved by ICAO

Thailand's feedstock for SAF

domestically available

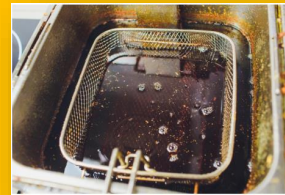
conventional use
in road transport

ICAO-CORSIA eligible

Technology Readiness Level
(TRL)



HEFA Feedstock



UCO



PFAD



CSPO

ATJ Feedstock



Molasses

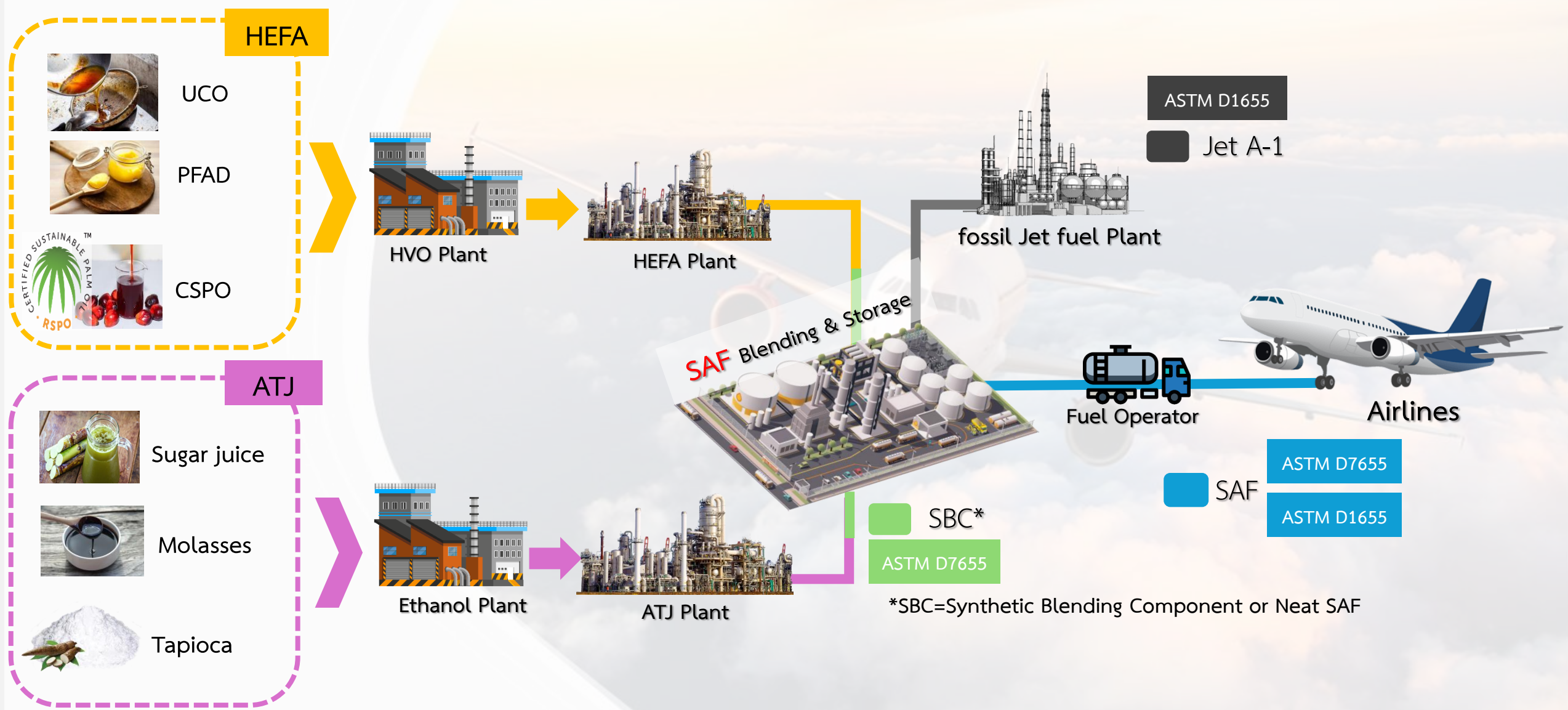


Sugarcane juice



Tapioca

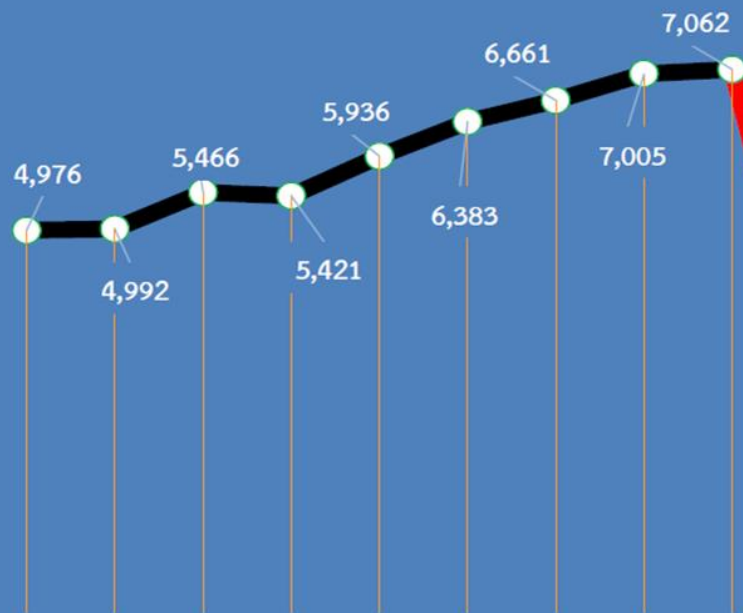
SAF Pathway and Production Standards



Forecasted Jet fuel demand in Thailand

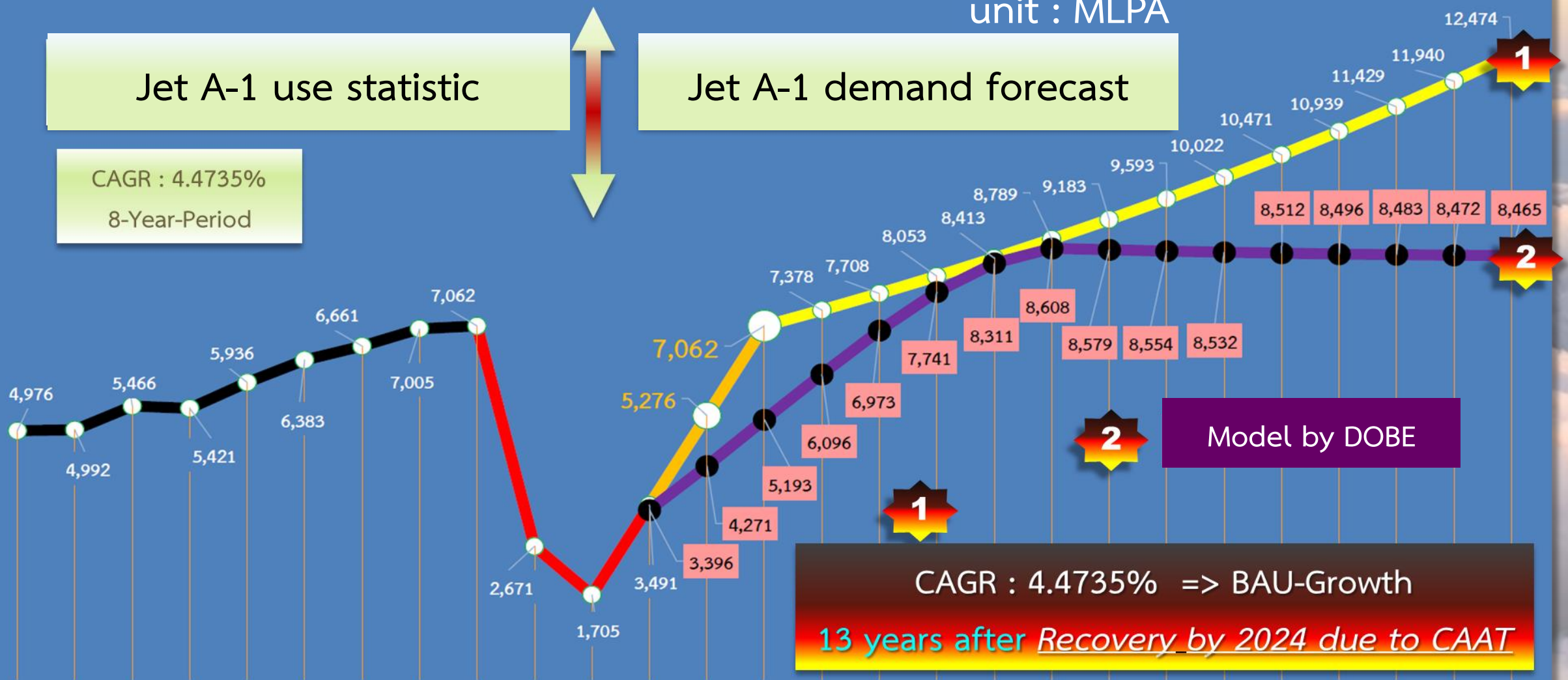
Jet A-1 use statistic

CAGR : 4.4735%
8-Year-Period



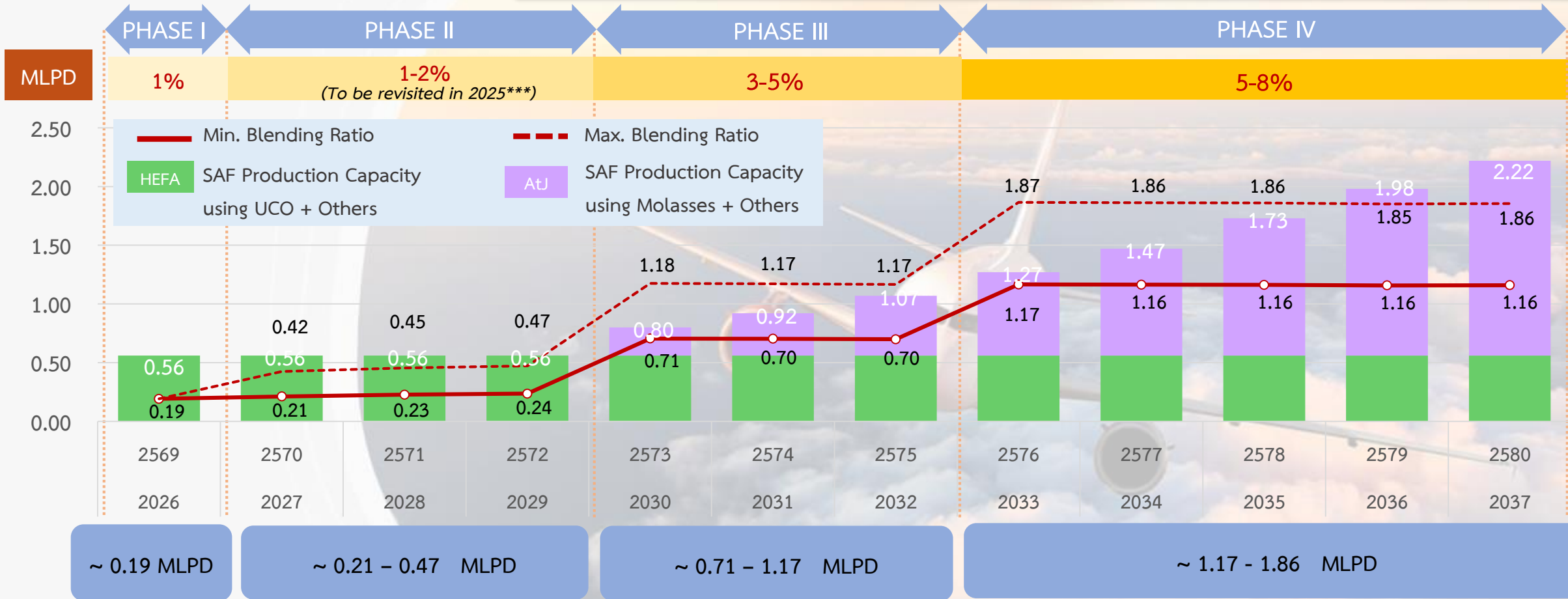
Jet A-1 demand forecast

unit : MLPA



CAGR : 4.4735% => BAU-Growth
13 years after Recovery by 2024 due to CAAT

SAF Production Capacity and Blending Target in Thailand



~ 0.19 MLPD ~ 0.21 – 0.47 MLPD ~ 0.71 – 1.17 MLPD ~ 1.17 - 1.86 MLPD

Production pathways: **HEFA**
Using **UCO** as main feedstock
In case **UCO** amount lower than the target,
using Palm Fatty Acid Distillate (PFAD)

Production pathways: **HEFA & ATJ**
For ATJ, **molasses** is expected
to be used as main feedstock

Production pathways: **HEFA & ATJ**
Blending Targets are adjustable due to feedstock availability
Other types of feedstock may be accepted by CORSIA

*** The target will be revisited subject to airline readiness and economic impacts on aviation and tourism industry.



Thank You



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Department of Alternative Energy
Development and Efficiency